ĀNANDAKANDA KNOWLEDGE BASE WITH SPECIAL REFERENCE TO PLANTS, ANIMAL PRODUCTS AND MINERALS

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DECLARATION

I hereby declare that the work embodied in this thesis entitled "**ĀNANDAKANDA KNOWLEDGE BASE WITH SPECIAL REFERENCE TO PLANTS, ANIMAL PRODUCTS AND MINERALS**" is carried out by me under the supervision of Dr. J.S.R.A. Prasad, Asst. Professor, Department of Sanskrit Studies, School of Humanities, University of Hyderabad, Hyderabad, and has not been submitted for any degree in part or in full to this university or any other university.

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CERTIFICATE

This is certify that **Mr. *Siva Panuganti* (09HSPH05)** has carried out the research-work incorporated in the present thesis entitled "**ĀNANDAKANDA KNOWLEDGE BASE WITH SPECIAL REFERENCE TO PLANTS, ANIMAL PRODUCTS AND MINERALS**" at the University of Hyderabad. The dissertation represents his independent work and has not been submitted for any research degree of this university or any other university.

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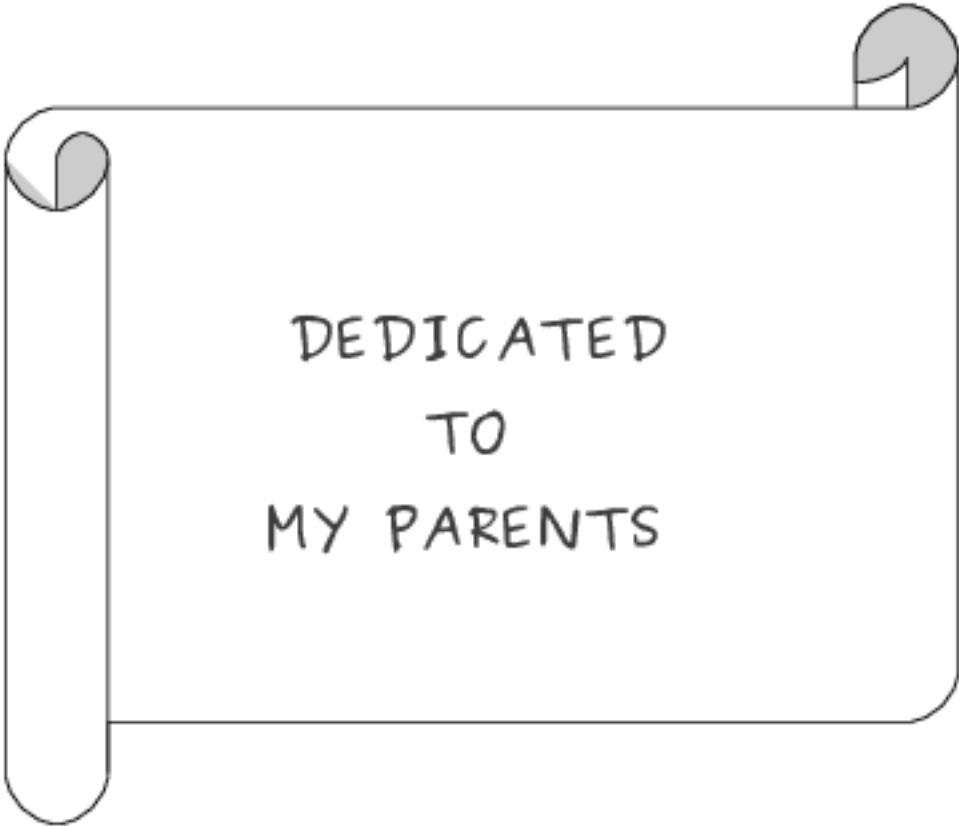
I also convey my sincere gratitude to my *teachers* whose invaluable blessings drive me to the right path.

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Siva Panuganti

DEDICATED
TO
MY PARENTS

ABBREVIATIONS USED

1. A.S. — *Aṣṭāṅga Saṃgraha*
2. A.C. — *Abhidhāna Cintāmaṇi*
3. Ā.K. — *Ānandakanda*
4. A.S.I. — *Ayurveda Subodha Itihās*
5. R.V.S. — *Rasavaiśeṣika*
6. Amara. — *Amarakośa*
7. Bhava. — *Bhāvaprakāśa*
8. C.S. — *Caraka Saṃhitā*
9. H.H.C. — *History of Hindu chemistry*
10. D.G. — *Inroducton to Dravya Guṇa*
11. O.A.P. — *Ocean of Ayurvedic Pharmaceutics*
12. R.A. — *Rasārṇavam*
13. R.M. — *Rasendra Maṅgalam*
14. R.C. — *Rasacikista*
15. R.H.T. — *Rasahṛdaya Tantram*
16. R.N. — *Rāja Nighaṇṭu*
17. R.R. — *Rasa Ratnākara*
18. R.R.S. — *Rasa Ratna Samuccayam*
19. R.S. — *A text book of Rasa Śāstra*
20. R.S.S. — *Rasendra Sāra Sangraha*
21. S.S. — *Suśṛta Saṃhitā*
22. T.S. — *Tarka Saṃgrah*

List of published papers related to thesis

1. *"आयुर्वेदे शिक्षोपयोगि-स्वस्थ्यविचाराः"* author *Siva Panuganti,* co-author Dr. J.S.R.A. Prasad, *Shiksha Sudha, a Quarterly Educational Sanskrit Research Journal',* ISSN: 2249-491X, October – December 2011, Puri.

2. *"Significance of Rasa Shastra in Ayurveda"*, author *Siva Panuganti,* co-authors Dr. Vinaya P.N., Dr. J.S.R.A. Prasad, Sanskrit Academy Journal, ISSN-0976-089X, Volume XXI 2011, Hyderabad.

3. *"अर्थावबोधने प्रवृत्तिनिमित्तस्य प्रासङ्गिकता"*, author *Siva Panuganti*, co-author Dr. J.S.R.A. Prasad, Lalita (kavi Bharati) Journal, ISSN-0975-6256, December 2012, Varanasi.

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Overview

Introduction

Ayurveda, an *upaveda* of *Atharvaveda* is considered as the ancient Indian medical science. It has a tremendous global influence. Many countries prefer to use Ayurvedic medicine that has been declared by WHO as a Complimentary and Alternative Medicine (CAM). Other medical systems such as *Unani, Siddha* etc., have emerged based on Ayurvedic principles. In the *Buddhist* period, Ayurveda was taught as a subject along with theistic schools of Indian philosophy. It is believed that Acupuncture of Traditional Chinese Medicine (TCM) has taken insights from Ayurveda owing to its strong theory on *marmas* (vital points). M.S. Baghel of Gujarat Ayurveda University opines that "*Foreign travelers were coming to India since centuries in search of knowledge. They were studying Ayurveda along with religion and philosophy at premier Universities like Nalanda, Taxila and Kashi*". This statement is an evidence in demonstrating the depth, width and spread of the Indian medical knowledge.

Sanskrit was a prerequisite to learn and practice Ayurveda. Without a good background in Sanskrit, one cannot be able to understand the intricate concepts described in the seminal texts *Bṛhatrayī*, i.e. *Caraka Saṃhitā, Suśṛta Saṃhitā and Aṣṭāṅgahṛdaya*. Ayurveda prescribes extensive use of herbal medicines. Along with herbs and animal products, minerals too were mentioned right from the *Bṛhatrayī* times. Texts in Ayurveda improvised the scheme of identification of medicinal drugs and named them contextually based on the availability of place, plant physiology, morphology, and other special characteristics. Over the course of time, lexicons like *Amarakośa* (*Vanauṣdhi varga* only), *Dhanvantari Nighaṇṭu, Rāja Nighaṇṭu, Kaiyadeva Nighaṇṭu,*

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Bhāvaprakāśa etc., have compiled invaluable information about medicinal drugs. In transition of time, referring to lexicons become impending for Ayurvedic doctors,[1] in order to identify the drugs and their constituent properties.

In spite of a good availability of Ayruvedic lexicons, searching information pertaining to domain specific terminology is not an easy task with printed texts. Hence, they are not exhaustive. Also, the availability of such technical terminology differs from text to text, resulting a lacunae in the Ayurvedic lexical tradition. In this context, the need for textual and digital dictionaries become imminent.

Of late, a new interdisciplinary research area called 'Sanskrit Computational Linguistics' (SCL) has gained momentum and Sanskrit scholars, linguists and computer scientists work in teams to create on line Sanskrit learning tools based on a comprehensive Sanskrit digital Corpora. But unfortunately, with regard to Ayurveda digital corpus, very few efforts have been noticed. Though *Rasaśāstra* is a part of Ayurveda, it has been considered a separate medical discipline as its approach was mainly based on several purifying methods of metals like mercury and other minerals. Nowadays, very few scholars are available who have explored and acquired expertise in the *Rasaśāstra* literature. The text considered for the present thesis, '*Ānandakanda*', belongs to the *Rasaśāstra* literature. Though, this is a tough text to follow, but is an encyclopedic work that explains important *Rasaśāstra* concepts.

The authorship of *Ānandakanda*, has been attributed to *Manthāna Bhairava*, a close disciple of great *Acāraya Nagārjuna*. In *Ānandakanda*, various plants, animal products and minerals were mentioned. The description of *pārthivas* (minerals) is noteworthy in the text. There are numerous medicinal preparations with extensive use of

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[1]निघण्टुना विना वैद्यो विद्वान् व्याकरणं विना ।
अनभ्यासेन धानुष्कस्त्रयो हास्यस्य भाजनम् ॥ R.N. Verse 6, p.3

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metals and minerals explained in *Ānandakanda*. It would be very useful for *Rasaśāstra* scholars, and researchers working in this area, if this text is digitized with an interface backed up by accepted tagging guidelines. This sort of *Rasaśāstra* database would be unique and can become a useful resource for the scholars, *vaidyas* working in the area of *Rasaśāstra*. As no effort has been made to interpret and analyze the contents of *Ānandakanda*, this work is an humble attempt to create a digital database of the text with an ontological interface, called '*Ānandakanda* Knowledge Base (AKB)'.

Aims of the Research :-

1. Developing an ontological knowledge base for *Ānandakanda*.
2. Providing access to lexical database for the categories of plants, minerals and animal products annotating *Rasapañcaka* for total 663 words.

Objectives

- ◆ To develop an on line searchable lexical resource, for the terminology of *Ānandakanda*.
- ◆ To provide grammatical information such as derivation, etymology etc. for the terminology.
- ◆ To link the ontological information as per Ayurvedic *dravya* classification.
- ◆ To provide *Rasapañcaka* information for the technical terminology
- ◆ To compare the *pārthiva* category of *Ānandakanda* with other *Rasaśāstra* texts.

Previous efforts

With reference to the Ayurvedic/*Rasaśāstra* on line interfaces, a few efforts have been observed in India and abroad.

1. Dr.Oliver Hellwig, a German linguist, has developed an impressive interface by creating a Digital Corpus of Sanskrit (DCS). DCS is a part of the Parts Of Speech

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(POS) and Sanskrit Tagger, which he has developed in 1999. Sanskrit tagger uses a *Sandhi* analyser, a morphological and a lexical database to generate proposals for the analysis of strings of Sanskrit text. A dictionary with meanings for lexical units, a text collection and a list of reference pointers are the components of DCS. There are more than a dozen of *Rasaśāstra* texts in the text collection, including *Ānandakanda*.

In the interface, when a lexeme (a minimal lexical unit of a language) occurring in text is queried, it produces the output with references sorted alphabetically, chronologically and subject wise. Along with this, the frequency of nominal forms from the text collection, and respective meanings are displayed by the system. Also, the user interface facilitates one to annotate and add data to the lexemes based on the given linguistic information. So that the system can also be trained in improving the reference pointers.

The DCS system, that is available at http://kjc-fs-cluster.kjc.uni-heidelberg.de/dcs/, has an excellent user interface with numerous cross links to the tagged data. But, with regard to the *Rasaśāstra* terminology, it has a limitation. As per the current date, the system has not been upgraded to produce the derivation, etymology and synonyms of certain technical terms. Also, information on the *Rasapañcaka* (pharmaco-dynamics) of herbs is not available. This system has been developed about ten years ago.

2. There was a related effort by Ms. Sivaja Nair, from the department of Sanskrit studies, University of Hyderabad in 2011. She has worked on *Amarakośa* for her Ph.D. thesis titled 'The Knowledge Structure in *Amarakośa*' to prepare a Sanskrit Wordnet based on the English Wordnet of Princeton University, U.S. For the total 11,580 content words in *Amarakośa*, she has developed synsets and introduced ontological relations. *Vaiśeṣika* ontology has been adopted in showing relations

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for the head words. In *Amarakośa, Vanauṣadhi Varga* refers to the names of numerous herbal drugs.

As per the statistics, this certain *varga* has total 259 terms (unique) referring to plants and related material. For Instance, for the word हरीतकी, the system produces the following result. => वृक्षः> अचलसजीवः> पृथ्वी> द्रव्यम्> पदार्थः". Further, it also displays number of synonyms of हरीतकी, in this case, which is nine. This interface has a limitation with regard to number of plants referred as *Vanauṣadhi Varga* does not offer a comprehensive database of the minerals, plants and animal products.

3. Finally, there is a notable work called '*Ayurvedokta Oṣadha Niruktamāla*' authored by Dr. J.L.N. Sastry, which provides etymology to Ayurvedic single drugs with related synonyms. This book was published by Chaukhamba Orientalia, Varanasi, in year 2000. It is an important work on Ayurvedic drugs which has given an insight in taking up this research work. Of course, terminology related to *Rasaśāstra* has not been dealt within the text.

Nonetheless, these scholars and scientists tried to analyze the Ayurvedic lexical resources, but, their efforts were not comprehensive of providing access to the details like etymology of the term, *Rasaśāstra* ontology and *Rasapañcaka* related domain specific terminology. Because, their view and aim is different. The present work tries to address these problems.

Methodology

Ānandakanda digital copy has been acquired from Dr. Oliver Hellwig's website. Initially, contents of *Ānandakanda* were manually tagged to programmatically access the

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data. An incomplete chapter (Chapter 19) in the text has been keyed in. Context analysis, with regard to the three categories and pharmaco-dynamics of drugs, has been done for the entire tagged data. Hence, based on the above three categories (1. Plants 2. Minerals and 3. Animal products), *Rasaśāstra*/Ayurveda ontology is developed for a better understanding of the substances referred. With regard to the database work, XML has been used for tagging plain text in to a structural text. Scripting language PERL and CGI have been used for text processing for the on line interface.

The Organisation of Thesis

The overview section starts before the first chapter, it details the survey of the work in the field of computational searching tools for Sanskrit texts. It describes aim of the work, objectives, methodology and structure of the thesis.

The first chapter 'Introduciton to *Rasaśāstra*' gives a brief introduction to the chronological development of *Rasaśāstra* as a separate branch in traditional Indian medicine. It includes references to *Rasaśāstra* from *Saṃhitā* (*Bṛhatrayī*) texts, *Rasaśāstra* texts (*Rasaratnasamuccaya, Rasendramaṅgalam*, Rasendra Cudamani) and classical Sanskrit texts *(Artha Śāstra, Harṣa Carita)* and discusses the use of metals, minerals and herbs for medicinal purposes.

The second chapter 'Importance of Dravya and its classification in Ayurveda and *Rasaśāstra*' describes the importance of *dravya* and its classifications. With Regard to the *pārthiva* category, a comparative study is done with *Ānandakanda* and five other popular *Rasaśāstra* texts. Also, this chapter provides a brief knowledge of *Rasapañcaka* (pharmaco-dynamics) in Ayurveda.

The third chapter 'Structure of Anandakanda' describes the structure of

Ānandakanda along with contents of total 36 *Ullāsa*s spread in two *Viśrānti*s in detail.

The fourth chapter 'A study of Pārthiva category in Ānandakanda and other Rasaśāstra texts' provides a complete information of comparative study on *pārthiva* category with *Ānandakanda* and other five *Rasaśāstra* texts.

The fifth chapter 'Anandakanda Knowledge Base' describes the interface of 'Ānandakanda Knowledge Base' along with modules.

Discussion

The discussion part explains the problems encountered in developing electronic database of *Ānandakanda*. Also, it discusses some of the issues noticed during the comparative study of *Ānandakanda* and five other important *Rasaśāstra* texts.

Conclusion

It describes, the utility of the present thesis, future scope of developing ontological and lexical resources to *Rasaśāstra* texts, to work further in this innovative direction.

CHAPTER 1

Introducton to *Rasaśāstra*

1.1. Preamble

Ayurveda, U*paveda* of *Atharveda*, is the 'science of life'. Ayurveda uses all naturally available drugs which could be of animal, herbal, mineral and metallic preparations for treating diseases. The knowledge of Ayurveda is attributed to *Bramha*, believed to be the creator of the universe according to *purāñas*. This knowledge was passed on to *Dakṣaprajāpati*, who taught this science to *Aswini kumarau* (divine twin doctors). Who in turn, imparted this knowledge to *Indra*, king of the divine beings. Further, a group of sages including famous *Bharadwāja* and *Dhanvantari* learned Ayurveda from *Indra*. Later, the tradition of learning and imparting knowledge continued in two streams through '*guru śiṣya parampara*'.

Punarvasu Ātreya belongs to the former stream. His *śiṣya, Agniveṣa* had compiled his guru *Punarvasu Ātreya's,* teachings. After several stages, finally, it was redacted by sage *Caraka* and today it is popularly known after his name '*Caraka Saṃhitā*'. A few chapters have been added by *Dṛḍhabala* for the completion of the text. Hence, both *Caraka* and *Dṛḍhabala* can be considered the redactors of '*Caraka Saṃhitā*'. *Dhanvantari* belongs to the latter stream of said Ayurvedic lore. *Dhanvantari's* disciple, *Suśṛta* compiled the *Suśṛta Saṃhitā*. These two classics along with *Vāgbhaṭa's Aṣṭāṅgahṛdaya* forms the *Bṛhattrayī* (great triad) of Ayurveda. Today, Ayurveda is a living tradition in some foreign countries also. This development is due to the transmission of knowledge by invaders, who grabbed away not only the physical wealth of India but also the intellectual wealth. In this context, the written documents of foreign tourists like *Megasthenes* and *Huan Tsang* are the historical evidences that attest the fact of influence of Ayurveda over indigenous

medical systems of other countries.

Predominantly, Ayurvedic fundamentals are based on *Sāṃkhyā* and *Vaiśeṣika* systems of Indian philosophy. Being a medico-philosophical system, Ayurveda follows a doctrinal epistemology and its own system of metaphysics. Closely following the *Sāṃkhyā* system, the *Prakṛti-Puruṣa* concept has been referred to and adopted in *'Suśṛta Saṃhitā*[2]. Sage *Suśṛta* asserts that, there are eight 'prakṛtis' viz. 'avyaktaṃ (the unmanifest), *mahat* (primordial mind stuff), *ahaṅkāra* (principles of self assertion- *sattva, rajas* and *tamas*) and *pañcatanmātra* (five primordial elements- *śabda, sparśa, rūpa, rasa, gandha*)[3] and sixteen 'vikāras' viz. 'pañca jñānendriya (five cognitive organs- *śrotra, tvak, cakṣus, jihvā, ghrāṇa*), *pañca karmendriya* (five motor organs - *vāk, pāṇi, pāda, pāyu, upastha*), *manas* (mind) and *pañca mahābhūta* (gross elements – *pṛthivī, ap, tejas, vāyu, ākāśa*)[4], respectively. Ayurveda accepts that all matter considered to be composed of the *Pañca Mahābhūta* (five gross elements). There are three bio-energies called 'tridoṣa's which govern the biological processes of humans. *tridoṣa*s regulate both the psychological and physiological processes. A harmonious state between the doṣas is called health and a disturbance in *doṣa*s, due to external or internal factors is called sign, symptom or disease. Each *doṣa* is a synergy of at least, one *Mahābhūta*. It is depicted in the following picture -
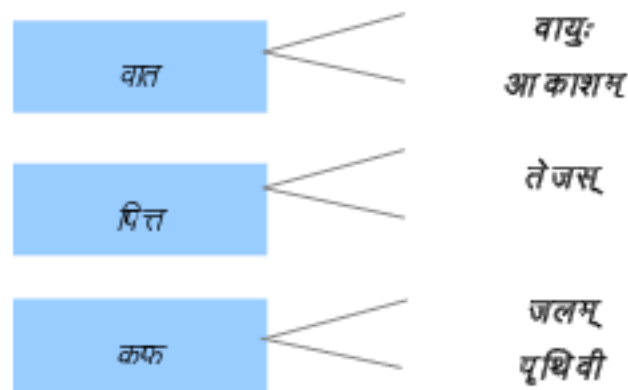
[2]S.S. 3.9
[3] अथ यक्तं महनहङ्कारः पञ्चान्मत्राणि चेत्यषौ प्रकृतयः, शेषाः विकाराः ।। S.S. 3.1.6 p. 6
[4] S.S. 3.1.4 p.4

Ayurveda derives its *Tridoṣa* theory from the the *Vaiśeṣika* ontology. Because, वात derived from the element of वायु, पित्त derived from the element of अग्नि and कफ derived from the element of अप् is the agreed concept. The five gross elements are part of the nine substances that *Kaṇāda* had enumerated, bears an ontological link with *Tridoṣa*.

Suśṛta has asserted, that the primary goal of Ayurveda is to protect the health of the healthy and treat the sick by proper treatment (*प्रयोजनं चास्य स्वस्थस्य स्वास्थ्य रक्षणं आतुरस्य विकार प्रशमनं च / +*), in order to attain the highest pursuit 'mokṣa'. The entire Ayurveda is divided into eight branches, namely -

1. कायचिकित्सा   –   General Medicine

2. कौमारचिकित्सा   –   Pediatrics

3. शल्य चिकित्सा   –   Surgery

4. शालाक्यचिकित्सा   –   E.N.T

5. भूतविद्या   –   Psychotherapy

6. अगद्तन्त्रम्   –   Toxicology

7. रसायनम्   –   Rejuvenation therapy

8. वाजीकरणम्   –   Aphrodisiacs

Dr. Raghavan Tirumalpad observes the link between *Rasaśāstra* and Ayurveda as follows:

> *Rasaśāstra, the science of mercury, though it was developed as a separate science in the beginning. In later period completely merged with Ayurveda. It is not considered as one of the above main branches (Aṣṭāṅga) of Ayurveda, however it has gained so much importance that it has become indispensable part of Ayurvedic treatment*[5].

By majority, *"it is believed that Rasaśāstra is an expansion of the Rasāyana therapy*[6]*"* which is one of the eight branches of Ayurveda. It is unique in health approach and grants quick relief to diseases. Interestingly, it is similar to disease centric concepts rather than patient centric concepts in modern medicine, otherwise known as 'Allopathy'. *Caraka* states *Rasāyana* as "स्वस्थस्योजस्करं यत्तु तद् वृष्यं तद्रसायनम्[7] ।" *Rasāyana* is that which increases immunity and virility in a healthy person. Remaining types of Ayurvedic treatment have become more or less, 'specializations' for which individual departments have been established in Ayurvedic colleges. *Rasaśāstra* is also effective in physical and mental illnesses by administering metallic and herbal drugs.

1.2. *Rasaśāstra*

Rasa means mercury. *Rasaśāstra* means – The science of the study of mercury and using metallic drugs for strengthening the body. It makes use of processed minerals assimilable for the body so that they can be used as medicines. The word *rasa* connotes several meanings such as - "Taste" (रस्यते आस्वाद्यते इति रसः ।) , "Juice" (रसति शरीरे प्रसरति इति रसः ।) , "First material formed after digestion (रसति

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[5] R.S. 1 p. 1
[6] R.S, Preface, p.v
[7] C.S. 1.1.5

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आहारादगच्छति इति रस: ।), "Material which is capable of engulfing and consuming all metals" (रसनात् सर्वधातूनां रस: ।) , The emotion is also called *rasa* among the considered nine *rasas* in the Sanskrit literature (स्थायीभावो रसो स्मृत: ।).

Also, a text in Indian alchemy, *Rasendra sāra sangraham* defines *rasa* thus -

रसो जले रसो हर्षं रस श्रृङ्गारपूर्वकः ।
स्वाद्वादिषु निर्यासो पारदेऽपि रसो विषे ।।[8]

The polysemous sense of 'rasa' has been attributed to 'water', 'pleasure', 'emotions', 'mercury' and 'poison' etc. There are two main branches of *Rasaśāstra* namely Alchemy and *Rasāyana*. The main purpose of the science of Alchemy is to convert lower metals to higher metals and the goal of *Rasāyana* is to rejuvenate the body and psyche, there by increasing vitality. *Rasaśāstra* texts precisely classify poisons, metals, minerals, diamonds and gemstones in various categories, and describe their purification and processing *(samskāras)* methods to generate and enhance therapeutic properties while making them less toxic to the body. It is contextual to quote B. Mukherji's popular proverb - *"There is no better medicine than mercury, no greater god than Mahādeva, no better friend than a Physician and no better deed than a gift"*[9].

1.3. *Rasa vidya* and *Rasaśāstra*

Historically it is considered that *Rasaśāstra* has acquired two embedded streams with it, viz. *Rasa vidya* (rejuvenation therapy) and *Rasaśāstra* (Transmutation of metals). The former deals with herbs and metallic medicines which are prepared in the form of *Rasāyanas*. The latter deals with transmutation of lower metals into

[8] R.S.S. preface, p.vii
[9] http://shrifreedom.org/ayurveda/rasa-shastra/

higher metals, mercury being the prime component. *Rasa vidya* classification is mentioned in the "preface of *Rasa Cikistā* text, it is classified into three types *Dhātuvidyā* (deals with metals and minerals), *Rasacikitsā* (deals with herbs including metals), and *Kṣemavidyā* (deals with *tantras*) respectively. Again *Rasacikitsā* is classified into two types *Rogacikitsā* (cure the body effected diseases), *Rasāyanacikitsā* (rejuvenation therapy)"[10] respectively. The above classification of *Rasa vidya* is depicted in the following picture.

रसविद्या

धातुविद्या   रसचिकित्सा   क्षेमविद्या

रोगचिकित्सा   रसायन चिकित्सा

1.4. Importance of *Rasaśāstra*

The importance of *Rasaśāstra* is stated in *Rasendrasāra Saṃgraha* as follows -

यथा न रोचते किंचिद्व्यञ्जनं लवणैर्विना ।

रसशास्त्रं विना तद्वत्सर्वशास्त्रं न रोचते ॥[11]

'*As a curry is tasteless without pinch of salt, no Śāstra is appealing without the consideration of Rasaśāstra.*'

In *Rasaśāstra*, two concepts are noteworthy. 1. '*Lohavedha*' which describes the "development of *Rasaśāstra* so as to convert non-precious metals into precious

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[10] रसविद्या त्रिधा प्रोक्ता धातुवादचिकित्सितम् । दुर्लभा क्षेमविद्या च सर्वविद्यासुरा वराः ॥
चिकित्सा द्विधा ज्ञेया व्याधीनां जरसस्तथा । जराव्याधिविनाशिनी चिकित्सा हि रसायनम् ॥ R.C., भूमिका, p 21
[11] R.R.S, p.1

ones"[12]. and 2. *Dehavedha* which describes the "development of invent medicines to gain longevity of life, vigor and vitality"[13]. "By the science of mercury, it is to be understood not only a branch of Chemistry alone, but it is also to be applied to salvation by means of *Dehavedha*"[14].

Mercury is called 'King' among all metals, possessing an inherent capacity to rejuvenate and treat serious health disorders. With regard to the *'Lohavedha'*, the metal mercury has a great significance in *Rasaśāstra*. It is said - 'एकोऽसौ रसराजः शरीरमजरामरं कुरुते ।' (*Rasa alone, has the inherent capacity to make the body always youthful and eternal*).

Philosophically, the human body is a *pārthiva* substance, so naturally, it is homologous to the metal and mineral constituents found in the earth. In human body, metals are present in traces and important for the proper functioning of sense organs. Deficiency of metal ions or electrolyte imbalance due to unhealthy food and aging causes malnourishment of the particular tissue or organ. So, testing for the deficient metal and electrolytes could help in replenishment of the same through injections or oral administration. With balance restored the body will be strengthened. With a healthy body, the pursuit of salvation will no longer be an impossible task.

There is a widespread notion that *Rasaśāstra* is useful only for transmutation purposes. While rejecting this, it is clearly stated in *'Rasendrasāra samgrah'* as follows -

" न च रसशास्त्रं केवलं धातुवादार्थमेव मन्तव्यं देहवेधद्वारा मुक्तिरेव परम प्रयोजनात् ।
यथा लोहं तथा देहे कर्त्तव्यः सूतकस्सदा । समानं कुरुते देवी प्रत्ययं देहलोहयोः ।

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[12] R.S.1, p.7
[13] R.S.1, p.7
[14] H.H.C, Pp. ix to xvi

पूर्वं लोहे परीक्षेत ततो देहे प्रयोजयेत् ।। [15] *

Therefore, the scope of '*Rasaśāstra*' is not only limited to certain principles, as stated before.

1.5. Facets of *Rasaśāstra*

'Rasa' or *pārada* is called '*sūta*' because, it bestows vigor and strength (कायसिद्धिं सूत इति सूतः ।). Ayurveda classifies drugs into three types - 1. *khanija* (minerals), 2. *prāṇija* (animal products) and 3. *kāṣṭhauṣadhī* (herbs). All metals and minerals were referred to in the first category. All animal products like flesh, blood, poison etc., are considered in the second category. All herbal plants are included in the third category.

'*pārada*' (mercury), comes under *khanija* category. The viscosity of mercury is very high and comparably it is unstable like that of human mind. As the reflections of mind are controlled by '*Samskāras*' (mental conformation of mind), the unstable '*pārada*' needs eighteen '*Samskāras*'. Roots of *Rasāyana* therapy can be traced back to Ṛgveda. For instance, the hymns 'हिरण्येन मणिना शुम्भमानाः' (*wearing of Gold and Diamonds, brings splendor; 1-3-2-8*), 'तद्रजतं हिरण्यमभवत्' (*Silver has become Gold*) (Yajurveda *1-5-1*), 'लवणेन सुवर्णं सन्दध्यात्' (*one would join gold with the help of borax, Chāndogyopaniṣad 4-17-7*) and so on. While referring such quotations it is clear that the knowledge of using metals was known in ancient India, though not exclusively meant for medicinal purposes. In the expression, 'आयुष्याणि भेषजानि' (Medicines increase life span), *āyuṣmāni* is referred to as '*Rasāyana*', thus making *Rasāyana* a life enhancer.

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* R.S.S, preface, P.vii

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1.6. Significance of *Rasa* Medicines

In *Rasaratna Sanuccaya*, three types of *Rasāyana* treatments were described -

आसुरी मानुषी दैवी चिकित्सा त्रिविधा मता ।
शस्त्रैः कषायैर्लौहाद्यैः क्रमेणान्त्याः सुपूजिताः ।। [16]

1. '*āsurī*', 2. '*mānuṣī*', and 3. '*daivī*' are the three kinds of treatments amongst which '*āsurī*' deals with surgical instruments, '*mānuṣī*' deals with making decoctions and '*daivī*' deals with *Rasayogas*. The '*daivī*' type of treatment is very significant among the three kinds of treatment. Three important factors makes it epochal as follows.

I. **Dosage**: Unlike herbal medicines, which are prescribed in greater quantities, the dosage of *rasauṣadhī*s ranges from 1 *ratti* to 5 *rattis* only. This quality has been stated as 'अल्पमात्रोपयोगिता' ।

II. **Palatability**: Normally, herbal medicines are bitter or pungent in taste. But, the *rasauṣadhī*s which are made in *bhasma* form, do not have any taste, as so many times the ingredients undergo several purification processes. Hence, they are easily acceptable. This quality has been stated as 'अरुचेः अप्रसङ्गः' ।

III. **Efficacy**: Herbal medicines will take a couple of months to show their efficacy. Wherein, the *rasa* medicines have an immediate effect as the end product consists nano-particles of the respective metals. This quality has been stated as 'क्षिप्रमारोग्यदायिता' ।

Based on the above facts '*rasa*' treatment is considered the best and it scores over pure herbal treatments.

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[16] R.R.S, preface, p.vii

1.7. Purification Processes of Metals

Rasaśāstra narrates how to perform *rasa Saṃskāras*, *rasa siddhis* and constructing useful laboratories for experiment. Various types of *yantras* have been explained that are most useful in the purification process of mercury and other metals. No metal is prescribed to be used without *saṃskāras* as it may leads to dangerous toxic effects. This idea is reflected in the following Verse of *Cakrapāṇi*, author of *Abhidhāna cintāmaṇi* -

"अशोधिते धातुरसे जीवनान्तं न संशयः ।

मृताश्चामृततुल्यं हि भवन्ति सर्व्वधातवः ।।[17]"

Interestingly, while experimenting with each medical formula, invocatory *pooja* and worship are prescribed in *Rasaśāstra*. Under *Rasavidya*, *svarṇa bhasma*, *rajata bhasma*, *tāmra bhasma*, *pārada bhasma*, *abhraka bhasma*, are some of the *bhasmas* commonly referred.

The supremacy of *Rasaśāstra* in indigenous medical science is remarkable as noted by scholars. It is appropriate to quote *Caraka*'s references on the three 'eṣaṇās'[18] considered as the purpose of Ayurveda. Since *Rasaśāstra* medications are prescribed for treatment and rejuvenation purposes, the '*Prāṇaiṣaṇā*' is fulfilled. The art of converting lower metals to higher metals is called alchemy. Knowing this science will confer prosperity, hence it fulfills the '*Dhanaiṣaṇā*' to the person practicing it. The knowledge of *Rasaśāstra* has been given the highest status as it leads to salvation or '*mukti*', thus fulfilling the *Pāralokaiṣaṇā*.

1.8. Use of Metals

While peeping through the History, one can know that India was far better than other countries in using metals for various purposes. People belonging to the

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[17] A.C, Rasa suddhi nirupanam, Verse-2

[18] इह खलु पुरुषेणानुष्ठासव्यबुद्धिशरीरस्य राक्रमेण हितमिह चामुष्मिंश्च लोके समनुपश्यता तिस्र एषाः पर्येष्टव्या भवन्ति। तद्यथा- प्राणैषणा, धनैषणा, परलोकैषणेति ।। C.S.3,.113, p.69 ।।

Harappa and *Mohanjodaro* civilizations used several metals and minerals such as gold, lead and stannous (tin) etc. In that period, they used the compound metals also. They used bronze alloy by mixing copper and zinc.[19]

In *Rgveda*, many metals are described like gold, copper, silver, zinc, bronze (copper+zinc), iron etc,. In this period several herbs and their medicinal uses were mentioned. In the period of *Yajurveda*, gold, copper, iron, lead were described.

In *Atharvaveda*, reference to herbs and medicines is abundantly available. The *Atharvaveda* has got good amount of Information regarding *tantras*, *mantras* and medicines. *Manu, Āpasthamba, Yājñavalkya* etc. quoted *Atharvaveda*'s descriptions of *dhārmika Sūktas*. During this period, medicines were classified into two types, 'Bhaiṣajya' (that cures diseases) and 'Āyuṣya' (that bestows health and longevity). The primary sources of the *Rasāyana* branch can be traced back to the *āyuṣya* medicines. The *Sūktas* of *Atharvaveda* appeared first in the form of invocation to metals and gems, as they promote health and destroy the evil forces.

Mārkaṇḍeya Purāṇa and *Viṣṇudharmottara Purāṇa* described *abhrakadṛti* and *pārada*'s therapeutic utility. In *Udyogaparva* of *Mahābhārata*, gold and some other metals have been described from an astrological point of view. In *Raseśvara Darśana, dehasiddhi* (rejuvenation of the body) and *lohasiddhi* (transmutation of lower metals to higher metals) were described. there is a *purāṇic* belief that the *pārada* is the semen of Lord *Śiva* and *gandhaka* emerged from goddess *Pārvatī*, by processing which one can attain *dehasiddhi* and *lohasiddhi* respectively. Using *pārada* as a medicine one attains longevity. Use of both *pārada* and *gandhaka* removes poverty. This was partly based on the fact that their utility in the process of making gold makes one rich.

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[19] http://www.crystalinks.com/induscivilization.html

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1.9. References to Minerals and Metals in Caraka

In *Caraka Saṃhitā*, drugs are classified into three types as - 1. herbal products 2. animal products and 3. minerals. The third category is called *pārthivādi*, that includes gold, iron-rust, copper, iron, tin, silver, lead, *sikatā*, *sudhā*, orpiment, gems and jewels, salts and *añjana* (collyrium) etc. It has been quoted as 'सुवर्ण समलाः पञ्चलौहाः ससिकताः सुधाः मनःशिलाले ।[20] These metals or minerals are medically prescribed for both internal and external use. It is very interesting that 'śodhana' [C.S.5.18] of *pārthiva dravya*s is mentioned in *Caraka Saṃhitā*. It is evident that in depth knowledge of application of metals and minerals is there in *Caraka*'s period.

1.10. References to Minerals and Metals in Śuśṛta

Śuśṛta Saṃhitā was written by *Āchārya Śuśṛta*. This *Saṃhitā* represents surgical section of Ayurveda with full scientific glory. *Śuśṛta* was one of the earliest *Āchārya*s who advocated first ever surgeries in India. Hence, he has been bestowed the title 'Father of Surgery'. In this *Saṃhitā* also, *Rasaśāstra* related therapeutic applications of mineral and metallic substances are found.

In *Śuśṛta Saṃhitā* *dravya*s were classified into two types 'sthāvara' and 'jaṅgama', respectively. The 'pārthiva' category mentioned in the main category of *sthāvara*, which has also included a list of metals as 'सुवर्णरजतमणिमुक्तामनःशिलामृत्कपालादयः ।[21] 'pārada' was described along with some other metals - 'रक्तं श्वेतं चन्दनं पारदं च काकोल्यापि क्षीरिपिहिं च वर्गः ।[22] *Śuśṛta* has described metals and minerals like gold, silver, copper, bell metal, tin, lead, iron, and rust-iron for medical purposes. In 7th chapter of *sūtrasthāna*[23], *Śuśṛta* spoke about different

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[20] C.S.1.70, p.49

[21] S.S.1.1.31

[22] S.S.4.25

[23] S.S.1.7. p.46

instruments for surgical purposes which were made using various metals. These two classical texts represent the actual status that *Rasaśāstra* has enjoyed during those times.

1.11. References to Minerals and Metals in Vāgbhata

The third century C.E., witnessed another significant development in the field of Ayurveda. *Caraka Samhitā* and *Śuśrta Samhitā* were not available in their original form. But, *Aṣṭāṅgasaṃgraha* and *Aṣṭāṅgahṛdaya* were available in their original form. According to historians, there were two *Vāgbhaṭas*. '*The one who has written Aṣṭāṅgasaṃgraha was known as Vṛddha Vāgbhaṭa and the other, was Madhya Vāgbhaṭa, the author of Aṣṭāṅgahṛdaya. But, according to Ayurveda scholars both authors were same*[24]'.

In *Aṣṭāṅgasaṃgraha* and *Aṣṭāṅgahṛdaya*, several metals and minerals were described. For the first time *pārada* was mentioned for internal administration in *Rasāyana prakaraṇam* of *Aṣṭāṅgasaṃgraha* along with *svarṇa-mākṣika, loha, sikatā* etc. All these references indicate that the process of *dhātu bhasma* was conceived and took shape during the time of *Vāgbhaṭa*. The credit of using *Viṣa* (venom) in therapeutics once again goes to *Vāgbhaṭa*.

1.12. References to Minerals and Metals in Sanskrit Literature

There are references to *Rasaśāstra* in non medical literature like Sanskrit literature. *Harṣa Carita* of *Bāṇabhaṭṭa*, (believed to be lived between 600-1200 A.D.) quoted a long list of companions and assistants of king *Harṣa*. This includes physicians, alchemists, mineralogists, priests etc. The list includes *Mandāraka* (the son of physician), *Jāṅgulika* *Mayūraka* (toxicologist), *Mantra sādhaka karāla* (one who recite mantras), *Dhātuvādavid vihaṅgama* (alchemist) and *Asura vivaravyasani vihaṅgama* (a deep miner). In this text, mineralogy was considered one of the sixty-four traditional arts. Its aim was to produce worthy minerals out of the worthless ones

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[24] A.S. Preface, Pp. 4-5

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through the science of alchemy. The term *Jātarūpaka* for gold makes this clear.

1.12.1. *Arthaśāstra*

Arthaśāstra was compiled by *Kauṭilya* in 4th century B.C. *Kauṭilya* was a great Academic, Economic and political strategist of *Gupta* period. In this period several references of use of minerals and metals for making utensils, armory etc., and metals like gold, silver, copper, iron, lead were described. Also, *śodhana* and *mardavakara* processes of *dhātus* were mentioned. He had also described internal and external use of metallic preparations to maintain positive health for the prevention and cure of diseases. *Kauṭilya* referred to a post designated as *Akārādhyakṣa* (chief of mines). The selection criterion for the post was a good knowledge in mineralogy and Alchemy for the prospective candidate. A variety of gold called '*rasa viddha suvarna*' that would be prepared by transmutation lower metal into a precious metal with the help of processed mercury[25]. This shows that people knew the technique of converting base metals into noble metals with the help of 'processed mercury[26].

1.13. Nāgārjuna and *Rasaśāstra*

"In the wide span of history of *Rasaśāstra* the name '*Nāgārjuna*' stands out as an important author. Historically, references to *Nāgārjuna* have been mentioned in the 1st through 4th centuries and again in 8th century. The first appeared to be *Ārya Nāgārjuna* (1st A.D.), the second is *Nāgārjuna* (2nd A.D.), the third, *Nāgārjuna* of Gupta Dynasty (3rd or4[th] A.D.)"[27] and finally a *Nāgārjuna* who was the student of *Āchārya Śarabha*. The fourth *Nāgārjuna* was popularly known as *Siddha Nāgārjuna* belonged to 8th A.D. In fact, *Rasaśāstra* gain momentum during *Siddha Nāgārjuna's* time. He was born in *Amarāvati*, a small village in Guntur district of *Andhra Pradesh*. Though *Nāgārjuna* traveled the length and breadth of the country, he spent most of his life time in the hillocks near *Amarāvati*. He has conducted extensive experiments

[25] R.S. p 2
[26] Ibid
[27] R.S. p.8

on the medicinal uses of Mercury and other heavy metals for a significant part of his life. These studies, brought the visible re-emergence of this branch of Ayurveda, viz. *Rasaśāstra* and/or Alchemy. Ayurveda itself, in later periods, began to incorporate Mercury as well as other "toxic" metals as important components of pharmaceutical formulations. *Nāgārjuna* has written many books on *Rasaśāstra* like *Rasendra maṅgalam, Yoga śataka, Loha shastra, Rasendra cintāmaṇi, Kakṣapuṭatantra, Rati śāstra, Nāgārjuna tantra, Ārogya mañjarī* and *Yoga sāgara*.

After *Nāgārjuna*, a plethora of *Rasaśāstra* texts were composed. It is believed that *Rasendracūḍāmaṇi, Ānandakanda, Rasaratna Samuccaya, Rasārṇava, Rasendrasāra Samgraha* etc. were authored by the disciples of *Nāgārjuna*. There has been a unique representation of concepts such as metal as *mahārasa, ratnas, uparasas, sadhāraṇarasas, loha*s among all *Rasaśāstra* texts. The eighteen refining processes of mercury (*aṣṭādaśa saṃskārā*s) along with *koṣṭhī*s (fireplaces), *yantras* (appliances) and *mūṣas* (crucibles), *puṭas* (units of heat) etc. were also extensively described in texts like *Rasaratna Samuccaya*.

CHAPTER 2

Importance of Dravya and its classification in Ayurveda and Rasaśāstra

2.1 Introduction

In Indian philosophy, 'padārtha' is the supreme entity from an ontological perspective. The nature of 'padārtha' was discussed widely in *Vaiśeṣika* school of philosophy and was classified into six types – 1.*dravya* 2.*guṇa* 3.*karma* 4.*sāmānya* 5.*viśeṣa*, and 6.*samavāya*. Ayurveda (particularly in *Caraka*), followed the fundamental classification of *padārtha* according to *Vaiśeṣikas*. But the seventh *padārtha* 'abhāva'[28] was not taken into consideration, instead Ayurveda considers some *abhāva pratinidhi dvavyas* (drug substitutions) in replacing *abhāva dvavyas*. "For example, Plumbago zeylandica L. (*Chitraka*) of the Plumbaginaceae family, is substituted in place of Baliospermum montanum Willd (*Danthi*), belonging to an entirely different family (Euphorbiaceae). While the concept of substitute is mentioned as early as in *Caraka Saṃhitā*, *Bhāvaprakāśa Nighaṇṭu* and *Bhaiṣajya Ratnāvali* elaborated more on such plant pairs"[29].

There are two meanings for the term '*padārtha*', the former refers to 'पदस्य अर्थः' (a signifier-signified relation) and the latter is 'वस्तुस्वरूपम्' (an object). For instance, when a word like '*ghaṭa*' (pot) is uttered, then word, meaning and their relation only be cognised. So, the word is a signifier and the meaning is signified. The 'objects' an be anything like jar, etc. However, both the meanings of *padārtha* make a synthesis, as denote the same entity. According to *Nyāya-Vaiśeṣika*, a physical entity

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[28] Though Kanada has not explicitly referred *Abhāva* as a padārtha, his successor like Udayanacharya introduced it as a seventh one.

[29] J Ayurveda Integr Med. 2010 Jan-Mar; 1(1): 33–39

that do not has a significant meaning, cannot be considered as a *padārtha*. In the hierarchical structure of Ayurveda, *dravya* is taken into account, but *padārtha* was not referred to in the context of *dravya* classification.

As part of the *padārtha* classification, 'dravya' is the most important one. *Dravya* is a substratum of *guṇa* and *karma* which are related to *dravya* by a relation called inherence (*samavāya*). According to *Caraka*, "sāmānya (similarity) occupies the first place in the list of items indicating the scope of Ayurveda. Because, *sāmānya* is a state of generality or similarity which is always responsible for augmentation of all three categories viz., matter, quality and action. The *sāmānya* is not only related to created things but also to all the beings belonging to the three categories mentioned above"[30]. It is said by *Caraka* in a verse -

सर्वदा सर्वभावानां सामान्यं वृद्धिकारणम् ।

ह्रासहेतुर्विशेषश्च प्रवृत्तिरुभयस्य तु ॥

Means, "generic concomitance is always the cause of the augmentation of all the beings (whereas) the variant factor, of (their) diminution (provided) both are applied"[31]. Thus, all six *padārtha*s have a practical implication in *dravyaguṇa*, where as they are purely speculative and ontological in philosophy. This instances shows, how the philosophical concepts have got practical utility in Ayurveda.

2.2 Supremacy of *Dravya*

According to the science of *dravyaguṇa*, each *dravya* has five properties as *rasa, guṇa, vīrya, vipāka and karma*. These five properties are also called 'Rasapañcaka'. *Caraka Saṃhitā* considered *dravya* as the supreme among *rasa, guṇa* etc,. *Suśrta Saṃhitā*, *Aṣṭāṅgahṛdaya* and *Aṣṭāṅga saṃgraha* have specifically described about the superiority of *dravya*. According to *Suśrta Saṃhitā*, *dravya* is more important than the quartet (*rasa, guṇa, vīrya* and *vipāka*). Since

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[30] C.S.1.1, p 27
[31] C.S.1.1.44, p.26

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dravya is the 'seat' for the latter elements, it is mentioned in *Suśṛta Saṁhitā* as thus-

पृथक्त्वदर्शिनामेष वादिनं वादसंग्रहः।
चतुर्णामपि सामूस्यमिच्छन्त्यत्र विपश्चितः॥[32]

"These are the collection of postulates of authorities who argue emphasizing importance of each one (*rasa*, *guṇa*, *vīrya* and *vipāka*) separately. Scholars consider the combination of all the four factors as important."[33]

Vāgbhaṭa also expresses the same view -

द्रव्यमेव रसादीनां श्रेष्ठं ते हितदाश्रयाः॥[34]

"*Dravya* is the chief among *rasa* and others. Because all of them are residing in it."[35]

Suśṛta Saṁhitā , observed that *vipāka* depends upon *vīrya*, *vīrya* cannot exist without *rasa* and *rasa* cannot subsist without *dravya*. In this context, it is clear that there is a chain link between the constituents of a *dravya*. Hence *dravya* is inferred to be the supreme entity. The following verse from *Suśṛta Saṁhitā* attests so.

पाको नास्ति विना वीर्यात् वीर्यं नास्ति विना रसात्।
रसो नास्ति विना द्रव्यात् द्रव्यं श्रेष्ठतमं स्मृतम्॥[36]

According to Indian philosophy, all *dravya*s are of *pāñcabhautika* in origin. According to Ayurvedic principles, any *dravya* can be used as a drug. Thus it is stated - 'नास्ति मूलमनौषधम् (*there is no root which not medicinal in nature*). "Any *dravya* can be termed as a drug only on the condition that it is used for a definite

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[32] S.S.1.40.13, p.287

[33] ibid
[34] A.H.19.1, p.135

[35] A.H.19.1, p.135

[36] S.S.1.40.15, p 287

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purpose (*Artha*) and with a rationale (*yukti*). Hence 'purposiveness' and 'rationality' are two essential conditions for any *dravya* to be used as drug."[37] After discussing the characteristics of *dravya*, it demands further knowledge on its classification.

2.3. Classification of *dravyas* in Ayurveda

Classification of *dravyas* was discussed in all ayurvedic texts, because, knowledge of *dravyas* and its *guṇas* is essential to Ayurvedic doctors before administering any drug. *Dravyas* have been classified into various types, these classifications are compiled from various Ayurvedic texts, but major portion taken from the 'Bṛhatrayī' (*Caraka Saṃhitā, Suśṛta Saṃhitā, Aṣṭāṅgahṛdaya*). **While doing the study, interestingly, the classification of dravyas was mentioned nowhere in Aṣṭāṅgahṛdaya.** In *Caraka Saṃhitā* , the *dravya* was classified into three types. From *Suśṛta*'s perspective, a slight deviation is observed. *Suśṛta* classifies the *dravya* into two types. Since his scheme of classification is different from *Caraka* and *Vāgbhata*, it has been represented after the current section. For all practical purposes, the primary classification of *dravyas* on the basis of their origin is three kinds. Discussion on these categories is as follows.

2.3.1. Classification of *Dravyas* in *Saṃhitās*
2.3.1.1. *Caraka Saṃhitā*
2.3.1.1.1. *Jāṅgama*

In *Caraka Saṃhitā* , the *dravya* is classified into three[38] categories. 1.*Jāṅgama* 2.*Oudbhid* and *Pārthiva* are the ontological categories in *Caraka*'s world. A living being which motiles is *Jāṅgama*. A *Jāṅgama* moves independently and spontaneously ('*gacchatīti jaṅgamah*'). All animal related products like flesh, milk, ghee etc., come under this classification. *Caraka Saṃhitā* has enlisted the *Jāṅgama dravyas* as in the below given verse -

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[37] D.G.2, p.10
[38] i) तत्र पुनस्त्रिविधं प्रोक्तं जाङ्गमौद्भिदपार्थिवम् । C.S.1.1.68, p.9
  ii) तत्र द्रव्यं त्रिविधं भौममौद्भिदं जाङ्गममिति । A.S.1.12, p.137

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मधूनि गोरसाः पित्तं वसा मज्जाऽसृगामिषम् ।।

विषमूत्रचर्मरेतोस्थिस्नायु शृङ्गनखाः खुराः ।

जङ्गमेभ्यो प्रयुज्यन्ते केशा लोमानि रोचनाः ।।[39]

"*Madhu, gorasa, pittaṃ, vasā, majjā, asṛg, āmiṣa, viṣa, mūtra, carma, retas, asthi, snāyu, śṛṅga, nakha, khura, keśa, loma, rocana* are *jāṅgama* dravyas."

2.3.1.2. *Aṣṭāṅga Saṃgraha*

According to *Aṣṭāṅga Saṃgraha, madhu* and *ghṛta* etc., are included in *Jāṅgama* category as observed in the following reference - मधुघृतादि जाङ्गमं द्रव्यमाहुः ।[40]

2.3.1.3. *Caraka Saṃhitā*
2.3.1.3.1. *Audbhid*

Audbhid dravyas have plants as their origin. That which springs forth beneath the soil from a seed is called '*audbhid*'.

The *Audbhid* has four sub-types. 1.*Vanaspati*, 2.*Vānaspatya*, 3.*Vīrudh* and 4.*Oṣadhi*[41]. But, in *Suśṛta Saṃhitā*, the *Audbhid* is termed as '*Sthāvara*' and classified further with a slight variation as 1.*Vanaspati*, 2.*Vṛkṣa*, 3.*Vīrudh* and 4.*Oṣadhi*'[42]

The word '*Vṛkṣa*' has been used to refer '*Vānaspatya*', but there is otherwise no difference with regard to the structure of the classification.

[39] C.S.1.68-69, p.9
[40] A .S.1.12, p.137
[41] i)औद्भिदं चतुर्विधम्। वनस्पतिस्तथा वीरुद्वानस्पत्यथ्यौषधिः । ७ २।। C.S.1, p.9
  ii)औद्भिदं पुनर्वनस्पती वानस्पत्ययवीरुदौषधिमेदेन चतुर्विधं भवति । A.S.1.12, p.137
[42] स्थावराश्चतुर्विधाः वनस्पतयो वृक्षा वीरुधः ओषधयः इति । S.S.1.1

Additionally, *Amarakośa* and *Rāja Nighaṇṭu* have included a fifth category, called *'Kṣupa'*. *Kṣupa* is a plant that is short in nature. This classification appears after *Vānaspatya* classification in both texts. Since it bears flowers as well as fruits, it could be included in *Vānaspatya* classification, that is the reason why it was not treated as a separate group in *Bṛhatrayī*. The *Audbhid* category, as mentioned earlier with all its sub-classification is also mentioned in *Amarakośa* and *Rāja Nighaṇṭu*.

2.3.1.4. *Aṣṭāṅga Saṃgraha*

Aṣṭāṅga Saṃgraha followed the same classification as in *Caraka Saṃhitā*, hence, no difference is observed.

2.3.1.2. *Caraka Saṃhitā*
2.3.1.2.1. *Pārthiva*

Sage *Caraka* had categorized all the mineral ores, metals, salts, etc., as *Pārthiva dravyas*. Substances which are found under the soil are known as *Pārthivas*. *Cakrapāṇi* commentary on *Caraka Saṃhitā* defines *Pārthiva* to be a 'transformed form of *Prithiva*[43]'.

According to *Caraka Saṃhitā*, the *Pārthiva* category is -

<div align="center">

सुवर्ण समलाः पञ्चलोहाः सिकता सुधा ।
मनः शिलाले मणयो लवणं गौरिकाञ्जने ॥[44]

</div>

'Suvarṇam, samalāḥ pañcalohāḥ, sikatā, sudhā, manaḥśilā, maṇayaḥ, lavaṇam and *gaurikāñjana'* are considered under *pārthiva* category.

[43]पृथिवी विकाराः पार्थिवम्। C.S.1.1.68

[44] C.S.1.1.70, p.49

2.3.1.3. *Aṣṭāṅga Saṃgraha*
2.3.1.3.1. *Pārthiva*

According to *Aṣṭāṅga Saṃgraha*, the *Pārthiva* category has been described as 'bhauma' - तेषु क्षयमाण हेमादिलवणान्तं प्रायेण भौमम्।[45] (*minerals right from gold, up to salt. are called bhaumas*). Later, the list of pārthiva dravyas has been stated as "*suvarṇa, rūpya, tāmra, kāṃsya, pittala, trapu, sīsa, kṛṣṇaloha, tīkṣṇaloha, māṇikyādi (padmarāga, mahānīla, puṣyarāga, vaiḍūrya, muktā, vidruma, vajra, indra, sphaṭikā), kāca, samudraphena, tuttha, gairika, haratāla, manaḥśilā, srotoñjana, rasāñjana, śilājīt, vaṃśalocana, tugākṣīrī, lavaṇādi (saindhava, sauvarcala, biḍa, sāmudra, romaka, audbhid)*"[46] The term *Bhauma* is synonymous with the term *Pārthiva*.

Base on the above description, it is known that the *Jāṅgama, Oudbhid* and *Pārthiva* s are the major classifications of *dravyas* in Ayurveda *Saṃhitās*. A little latter, each of these shall be dealt with in detail along with their sub-categories.

2.3.2. Classification of *Dravya* in *Suśṛta Samhita*
2.3.2.1. *Jāṅgama* category

As discussed earlier, a living being which motiles is called *Jāṅgama*. *Suśṛta* has classified *Jāṅgama* category into four groups – 1.*Jarāyuja* 2. *Aṇḍaja* 3.*Svedaja* and 4.*Udbhijja*. This is a popular classification in *Saṃhitās* and *Kośas*. Special characteristics of each group are described in what follows.

1. ***Jarāyuja*** :- पशु- मनुष्य व्यालादयो जरायुजाः।[47] Living beings that have reproductive organs with placenta are *Jarāyujas*. *Suśṛta* includes man, lion, tiger and other animals in this category.

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[45] A.S.1.1.12, p.137
[46] A.S.1.12, Pp.139-141
[47] S.S.1.1, Pp.7-8

2. **Aṇḍaja** :- *खग-सर्प-सरीसृप-प्रभृतयोऽण्डजाः ।*[48] *Aṇḍajas* are those which originate from eggs. Aves (birds), reptiles. crows, snakes, lizards, fish etc.

3. **Svedaja** :- *कृमि-कीट-पिपीलिकाप्रभृतयः स्वेदजाः ।*[49] *Svedajas* are the living creatures that born out of sweat. Ants, mosquitoes, insects etc., are considered in this category.

4. **Udbhijja** :- *इन्द्रगोप-मण्डूकप्रभृतयः उद्भिज्जाः ।*[50] The cochineal insect of various kinds is called *indragopa*. A fire-fly is also an *indragopa*. Also, frogs and similar animals come under *Udbhijja* category.

Udbhijja - Etymology vs conventional use

According to Ayurveda, the *Udbhijja* category refers to animals. But, in Sanskrit literature, the *Udbhijja* category refers only to plants. Ayurveda treats classification of plants separately and *Audbhid* category is mentioned already which is discussed earlier. Here, both the words *Udbhijja* and *Audbhid* are derived from a root verb 'भिदृ-भेदने (to break)' the meaning of the verb is suggestively close to plant category, because the plants also emerge from the earth in process of sprouting. So, the derivative meaning (यौगिकार्थ) of the word has been taken into account. Another view suggests that some animals also emerge from the earth, connoting that those animals which live in the earth by building burrows, are also *Udbhijjas*. So, Here, conventional meaning (रूढ्यर्थ) has been taken, which contextually applies.

2.3.2.2. *Audbhid* category :-

A little overlapping can be seen with *Suśṛta's* classification of *oudbhid* category with that of *Caraka* and *Vāgbhata's*. The *Audbhid* category was classified

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[48] S.S.1.1, Pp.7-8
[49] S.S.1.1, Pp.7-8
[50] S.S.1.1, Pp.7-8

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into four groups as- *Vanaspati*, *Vānaspatya*, *Vīrudh* and *Oṣadhis*. This classification is similar in allied Ayurvedic texts. In these texts, their features were also mentioned namely -

1. **Vanaspati** :- 'plants do not possess visible flowers'[51] are *Vanaspatis* Hence they are *apuṣpas* (flowerless). For Instance, *aśvattha, agaru, devadāru, arjuna* etc,.

2. **Vānaspatya** :- 'plants bear both flowers and fruits'[52] are *Vānaspatyas*. For Instance, *āmra, harītaki* etc,. According to *Pāṇini*'s *Aṣṭādhyāyī*, the word 'वानस्पत्य' is a derivative of 'वनस्पति' । So, *Vānaspatya* is an entity that belongs to *Vanaspati*. Except the etymological difference, there is no change in the meaning part. But, conventionally, the list of plants that are included in both categories are quite different as per Ayurvedic scriptures. Grammatically, the term *Vanaspati* belongs to 'पारस्करप्रभृतिगण', which again, an आकृतिगण । *Vanaspati* means king of forest (वनस्य पतिः). According to *Pāṇini sūtra* 'पारस्करप्रभृतीनि च संज्ञायाम् [6-1-157]', 'सुट्' pratyaya is to be assigned and then *Vanaspati* is derived. similar words also appear like बृहस्पति, पारस्कर etc. By adding ष्य[53] pratyaya to *Vanaspati* and getting *ādivṛddhi* the *Vānaspatya* is derived, that means 'pertaining to *Vanaspati (वनस्पतौ भवः)*'. In Ayurveda, the two terms refer to plants, but they are different in feature.s

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[51] i) फलैर्वनस्पतिः । C.S.1.72, p.9
   ii) अपुष्पाः फलवन्तो वनस्पत्याः । S.S.1.1, Pp.7-8
   iii) तत्र फलिनो वनस्पतिः । A.S.1.12, Pp.137
   iv) तैरपुष्पाद्वनस्पतिः । Amara.2.4.6, Pp.129
   v) वनस्पतिः फलितः य पुष्पैर्विना । R.N.1.29, Pp.13
[52] i) पुष्पैर्वानस्पत्यः फलैरपि । C.S.1.72, Pp.9
   ii) फलमूत्रयान्यान्वानस्पत्यः । A.S.1.12, Pp.137
   iii) पुष्पफलवन्तो वृक्षाः । S.S.1.1, Pp.7-8
   iv) वानस्पत्यः फलैः पुष्पात् । Amara.2.4.6, p.129
   v) तौः फलं वानस्पत्यः । R.N1.29, p.13
[53] क्रियाक्रियाप्रयुक्तरूपदाध्यः ।।4.1.157।।

3. **Vīrudh** :- Those plants which twine crawl or climb up are known as *Vīrudhs*. Also, '*Pratāna*'[54] is called *Vīrudh Pratāna* or *Vīrudh* was further sub-categorized as- 'a) *Latā* and b) *Gulma*'[55]।

- **Latā** :- climbers are called '*Latā*' and also they are otherwise called *Vallī*[56]। *vidārī*, *kapikaccu* etc., are climbers.
- **Gulma** :- Shrubs are *gulmas*. These are also climbers. But, can not crawl/or to up as lengthy as the *Latās*. '*Atibala*', '*Śāliparṇī*' etc., are *gulmas*. The *gulma* category consists a cluster of trees.

4. **Oṣadhi** :- Normally, all plants are called as *Oṣadhis*, because of their inherent quality of curing the diseases and protecting health. *Ṛgveda* states *Oṣadhi* thus - 'ओषं रुजं घयति इति औषधि।'[57] (that which cures the diseases is called *oṣadhi*.) But, in Ayurveda, the word *Oṣadhi* comes under *Audbhid* category. Those plants which 'whither away after yielding the fruits or after harvest[58] are known as *Oṣadhis*. Perennial crops like paddy, pulses, wheat, maize etc., are *Oṣadhis*.

2.3.2.3. *Pārthiva* category :-

With reference to *Pārthiva* category, *Suśṛta* says -

पार्थिवाः सुवर्णरजतमणिमुक्तमनः शिलामृत्कपालादयः ॥[59]

Minerals and substances like '*suvarṇa*', '*rajata*', '*maṇi*', '*mukta*', '*manaḥśilā*', '*mṛt*', '*kapāla*' etc., are *pārthiva dravyas*.

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[54] प्रताने वीरुध स्मृताः। C.S.1.72, p.9
[55] प्रतान शब्देन लता गुल्माश्च गृह्यन्तो। C.S.1.72, चक्रपाणि, p.9
[56] वल्लीतुप्रतानिल्लीता। Amara.2.4.6, p.130
[57] A.S.I., p 20
[58] i) ओषध्यः फलपाकान्ताः। C.S.1.72, p.9
ii) फलपाकान्ता त्यौषधिरिति। A.S.1.12, p.137
iii) फलपाकनिष्ठा ओषधय इति। S.S.1.1, Pp.7-8
iv) ओषध्ये फलपाकान्ता। Amara 2.4.6 p.129
v) फलपरीपाकावसानान्विता। R.N.129, p.13
[59] S.S.1.1, Pp.7-8

2.4. *Dravya* Classification in *Rasaśāstra*

In *Rasaśāstra* texts, *dravya* means mostly *pārthiva dravya* only. This *pārthiva dravya* has been classified into many categories as 'rasa', 'mahārasa', 'uparasa', 'sādhāraṇarasa', 'śaktirasa', 'loha', 'upaloha', 'ratna', 'uparatna' and so on. This list is not a unique one as they differ from text to text. However, conventionally these variations can be classified under *pārthiva*, as in the following manner:

1. **Rasa**
2. **Mahārasa**
3. **Uparasa**
4. **Loha**
5. **Ratna**
6. **Uparatna**

The above list is valid when *Ānandakanda* is compared with other *Rasaśāstra* texts.

Pārthiva being the basic building block, there is no harm in accepting *mukta* and *pravāla* as *pārthivas*. But, since these two are animal products, a separate listing can be made as per a view expressed by Sri Yadavji Trikamji.

All the metals and minerals come under *Pārthiva* category. As it was discussed earlier, according to *Ānandakanda*, *Pārthiva* is classified into five types and their respective constituents were also discussed. *Pārthiva's* description is given as under.

2.4.1. *Rasa (pārada)*

Rasa or *pārada* is a fluid metal. As per *purāṇas*, 'rasa' is the originated form of the semen of Lord *Śiva*. मम देहरसो यस्माद्रसस्तेनायमुच्यते इति ।[52] (*It is the essence of my energy, hence it is called 'rasa'*) *Raseśvaradarśana*, a part of *Sarvadarśana*

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[52] S.D.S.9.1, p.160

Saṃgraha of *Madhavacharya*, has a brief discussion about *rasa* and its characteristics.

Rasa has a set of synonyms, amongst which *pārada* is one. Philosophically, 'rasa' acquired 'pāradatva' due to its inherent quality of bestowing the power to cross the farther shore of metempsychosis (संसारस्य परं पारं दत्तेऽसौ पारदः स्मृतः ।). Hence, *rasa* is 'pārada'.

Liberation is the ultimate goal of Indian Philosophy. But, in the view of materialist thinkers, and their counter parts, this liberation is unseen, non perceptible and so on. Therefore, what man can do is to maintain a healthy body by using mercurial preparations and medicaments. It is quoted thus in *Sarvadarśana Saṃgraha* -

"षड्दर्शनेऽपि मुक्तिस्तु दर्शिता पिण्डपातने

करामलकवत्सापि प्रत्यक्षा नोपलभ्यते ।

तस्मात्तं रक्षयेत्पिण्डं रसैश्चैव रसायनैः ।।"[61]

Bhāvaprakāśa of 16th Century, enumerated nine[62] synonyms of *pārada* and it has been treated as *rasa*. He says, 'it is *rasa* because people consume *pārada* to rejuvenate their body', 'Also, *rasa* is synonymous with *dhātu*[63] (tissue)' in other contexts.

"रसायनार्थिभिर्लोकैः पारदो रस्यते यतः ।

ततो रस इति प्रोक्तः स च धातुरपि स्मृतः ॥

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[61] S.D.S.9.4, p.160

[62] पारदो रससाराश्च रसेन्द्रश्च महारसः ।
चपलः शिववीर्यश्च रसः सूतः शिवाह्वयः ॥ Bhava.1.1॥

[63] *Suśṛta* says - "स खल्वाद्यो रस एकैकस्मिन् धातौ त्रीणि त्रीणि कलासहस्राण्यवतिष्ठति का च कलाः, एवं भासेन रसः शुक्रमयति ।(S.S.1.14)

Rasahṛdaya Tantram of Govinda Bhagavatpāda describes why 'Rasa' is supreme amongst all metals.

'काठोष्ध्यो नागे नागं वंगेऽथ ङमपि शुल्बे।
शुल्बं तारे तारं कनके कनकं च लीयते सूते।।
परमात्मनीव नियतं भवति लयो यत्र सर्वसत्त्वानाम्।
एकोऽसौ रसराजश्शरीरमजरामरं कुरुते।।'[64]

'*sūta*' is a synonym to *pārada* and all herbs and metals dissolve in *pārada*. All herbs dissolve in *nāga*, *nāga* in *vanga*, *vanga* in *śulba*, *śulba* in *tāra*, *tāra* in *kanaka* and *kanaka* in *sūta* (*pārada*).

To derive the medicinal effects out of *pārada*, the prescribed detoxification processes are a must. Eighteen types of purification methods were mentioned in *Ānandakanda*. *Raseśvaradaśna*[65] in *Sarvadaśna Sangraha* lists the methods as follows - 1.*Svedana*, 2.*Mardana*, 3.*Mūrcchana*, 4.*Sthāpana*, 5.*Pātana*, 6.*Nirodhana*, 7.*Dīpana*, 8.*Gamana*, 9.*Grāsana*, 10.*Pramāṇa*, 11.*Jāraṇa*, 12.*Pidhāna*, 13.*Garbhadṛti*, 14.*Bāhyadṛti*, 15.*Kṣāraṇa*, 16.*Krāmaṇa*, 17.*Vedha* and 18.*Bhakṣaṇa*.

As per the methodology of *tantrayuktis* (especially '*Atikrāntāvekṣaṇa*') a detailed account of discussion on *rasa* will be made in the fourth chapter, 'A Comparative Study of *Ānandakanda* with other *Rasaśāstra* Texts'.

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[64]R.H.T.1.12-13
[65]स्वेदनमर्दनमूर्छनस्थापनपातननिरोधनियमाश्च
दीपनगमनग्रासप्रमाण मथ जारण पिधानम् ।
गर्भद्रुतिबाह्यद्रुतिबाह्य सारण रागसालाँश्चैव
क्रामावेधौ भक्षणभट्यक्षणचेति रसकर्मेति ॥ S.D.S. 9.17. p.164

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Ānandakanda states some thirty two[66] synonyms for Rasa. Table 2.1 lists them all.

1.	रसेन्द्रः	12.	सूतराट्	23.	अमरः
2.	रसराजः	13.	चपलः	24.	देहदः
3.	रसः	14.	धूत्तुरः	25.	स्कन्दः
4.	सूतः	15.	लोकनाथः	26.	स्कन्देशः
5.	शिवबीजं	16.	प्रभुः	27.	मृत्युनाशनः
6.	शिवः	17.	इन्द्रः	28.	देवः
7.	जैत्रः	18.	भवः	29.	रसायनश्रेष्ठः
8.	रसलोहः	19.	रुद्रतेजः	30.	यशोदः
9.	महारसः	20.	खेचरः	31.	पावनः
10.	रसोत्तमः	21.	रसधातुः	32.	दिव्यरसः
11.	महातेजः	22.	अचिन्त्यजः		

Table 2.1

There is no special attention paid to the above list in *Ānandakanda*, but, in context of *Paradotpatti* in first *Ullāsa* of First *Viśrānti*, five kinds of *rasa/pārada* is defined by the author *Manthāna Bhairava*.

2.4.1.1. Definition of *Rasa* Synonyms

- **Rasaḥ** - 'रसति सर्वधातून्निति रसः'/'रस्यते रोग शान्त्यै इति रसः' (*It is called rasa which helps to nourish all dhātus; Rasa is consumed to cure aging problems and diseases*).

- **Rasendraḥ** - 'रसानां राजा रसेन्द्रः' (*king of all rasas*).

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[66]*Ā.K.1.23.5-10*

- **Pāradaḥ** - 'पारं ददाति रोगपंकाब्धेरिति पारदः' (*That which protects one from the ocean of diseases*). The definition, synonyms of *pārada* are extracted and shown below from the *Ānandakanda* Knowledge Base (AKB).

शब्दः	पारद
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	पृ–शिच्–तन्–पृषो० तस्य दो वा ।
व्युत्पत्तिः	पारं ददाति । रसभेदे (वाच० –) ।
उद्धृत संख्या	1.2.19ᶜ
पर्यायाः	रसेन्द्रः, रसराजः, रसः, सूतः, शिवबीजं, शिवः, जैत्रः, रसलोहं, महारसः, रसोत्तमः, महातेजः, सूतराट्, चपलः, धुत्तुरः, लोकनाथः, प्रभुः, रुद्रः, भवः, रुद्रतेजः, खेचरः, रसधातुः, अचिन्त्यजः, अमरः, देहद, स्कन्द, स्कन्देशः, मृगाशनः, देव, रसाक्षश्रेष्ठ, यशोद, पाकनः, द्विरससः (आ.क० –)

- **Miśrakaḥ** - 'सर्वधातु तेजसां सम्मिश्रवणमत्रेति मिश्रकः' (*That which has potential qualities of all metals*)
- **Sūtaḥ** - 'कायसिद्धिं सूते इति सूतः' (*That which bestows vigor and strength*).

Rasaratna Samuccaya also lists the same set of synonyms with respective definitions[67].

2.4.2. Mahārasa (superior rasas)

Mahārasa category is implicitly not listed in *Ānandakanda*, but these are included along with *Uparasas*. Whereas in other *Rasaśāstra* texts, the *Mahārasa* has been considered as an individual category. In *Rasaratna Samucchaya*, eight *mahārasa dravyas*[68] are described. The list is detailed as follows from the AKB.

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[67] R.R.S.1.75-78, p.11
[68] अभ्रकवैक्रान्त माक्षिक विमलाद्रिजसस्यकम् ।
चपलोरसकश्चेति झारयाष्टौ संग्रहेदसात ॥ R.R.S.2.1, p.14

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2.4.2.2.1. *Abhraka* (Mica)

शब्दः	अभ्रक
लिङ्गम्	न. पुं
कान्तिः	अ
निष्पत्तिः	अभ्र (गतौ) – क्वुन्
व्युत्पत्तिः	धातुभेदे एतत् च गौरीरजोजातं यथोकं रसेश्वरदर्शिने शिववाक्यम् (वाच॰ –) ।
उद्धृतसंख्या	1.4.94
पर्यायाः	गगनं, भृङ्गं, बहुफलं, सुमाभवं (आ.क॰ -), अभ्रपटल, निर्मल, वरपीतक, मेघाह्ल, पीतक, शुभ्र, गिरिजा, गिरिजामल (कै.नि॰ -)

2.4.2.2.2 *Vaikrānta* (Tourmaline)

शब्दः	वैक्रान्त
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	स्वार्थे अण् ।
व्युत्पत्तिः	मणिभेदे विक्रान्तशब्दे दृश्यम् (वाच॰ -) ।
उद्धृतसंख्या	1.10.8
पर्यायाः	विक्रान्तं, नीलवज्रं, कुक्ष्रकं, गोत्रासं, क्षुद्र कुलिशं, चूर्णवज्रं, गोत्रसं (आ.क॰ -)

2.4.2.2.3 *Mākṣika* or *Tāpya* (Copper Pyrite)

शब्दः	ताप्य
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	ताप-यत् ।
व्युत्पत्तिः	तापे हितम् (श.क॰ -) ।

उद्धृत संख्या	1.10.7

पर्यायाः मधुधातु, माक्षीक, हेममाक्षीक, तापीज, ताक्ष्र्य, तापीदेशसमुद्भव (आ.क॰ -), तापीज, माक्षिक, मधुधातु, शिलामधु, वर्त, माक्षिकधातु, संवर्त, बस्माक्षीक (कै.नि॰ -) रजतमाक्षिक

2.4.2.2.4 *Vimalā* (Iron Pyrite)

शब्दः	विमला
लिङ्गम्	त्रि
कान्तिः	अ
निष्पत्तिः	विमल-टाप् ।
व्युत्पत्तिः	विगतां मलो यस्मात् । उपसभेदे (वाच॰ -) ।
उद्धृत संख्या	1.4.257
पर्यायाः	निर्मलः, स्वच्छः, विमलं, स्वच्छधातुकः, तारविमल, हेमविमल (आ.क॰ -) ।

2.4.2.2.5 *Adrija* or *Śilājatu* (Asphlatum punjabianum)

शब्दः	शिलाजतु
लिङ्गम्	नपुं
कान्तिः	उ
निष्पत्तिः	शिल-टाप्-जनि-जतुप् ।
व्युत्पत्तिः	शिलाजातं जतु । पर्वतजाते उपधातुभेदे (वाच॰ -) ।
उद्धृत संख्या	1.4.220
पर्यायाः	अश्मजं, गिरिजं, शैलं, अश्मलाक्षा, शिलाधातु (आ.क॰ -) शिलाह्व, शैलनिर्यास, अद्रिजतु, अश्मजतु, मंदरोत्थ, गिरिज, गिरिसाह्वय, षडलौहसंभव, शिलानिष्यन्दि, पार्वत (कै.नि॰ -)

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2.4.2.2.6 *Sasyaka* (Peackok-ore)

शब्दः	सस्यक
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	सस्य-कन्।
व्युत्पत्तिः	सस्यमिव कायति (वाच० -)।
उद्धृतसंख्या	2.8.218
पर्यायाः	सस्यके (वाच० -)

2.4.2.2.7 *Capalā* (Bismuth)

शब्दः	चपला
लिङ्गम्	स्त्री
कान्तिः	आ
निष्पत्तिः	चुप (मन्दायां)-गतौ कल।
व्युत्पत्तिः	गतौ कल उपधोकास्याकारः (वाच० -)।
उद्धृतसंख्या	2.1.196
पर्यायाः	देहवेधी, लोहवेधी, चपला, रसबन्धिनी (आ.क० -)

2.4.2.2.8 *Rasaka* (Copper sulphate)

शब्दः	रसक
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	स्वार्थे कन्।
व्युत्पत्तिः	-
उद्धृत संख्या	1.23.393

पर्यायाः   खर्परी, तुत्थ खर्परी, अमृतसम्भव (आ.क॰ -)

2.4.3. *Uparasa (secondary rasas)*

Ānandakanda lists forty nine[69] *uparasas* as categorized in the following list.

1. *gandhaka* 2.*tāla* 3.*śilā* 4.*tāpya* 5.*ghana* 6.*hiṅgula* 7.*gairikā* 8.*capalā* 9.*aśmaja* 10.*bhūnāga* 11.*haridrāśmā* 12.*agnijāra* 13.*kharparī* 14.*tuttha* 15.*kaṅkuṣṭha* 16.*girisindūra* 17.*ṭaṅkaṇa* 18.*kampilla* 19.*viṣa* 20.*kāsīsa* 21.*gaurīpāṣāṇa* 22.*bhūkhaga* 23.*poddāraśṛṅgī* 24.*sindūra* 25.*tuvari* 26.*rasāñjana* 27.*nīlāñjana* 28.*sauvīra* 29.*srotoñjana* 30.*ahiphenaka* 31.*puṣpāñjana* 32.*śaṅkha* 33.*śukti* 34.*śambūka* 35.*varāṭaka* 36.*sābunī* 37.*navakṣāra* 38.*cīnakṣāra* 39.*ākhumāraka* 40.*sarja* 41.*guggulu* 42.*lākṣā* 43.*kṣāra* 44.*lavaṇa* 45.*gorocana* 46.*amlavetasa* 47.*kāca* 48.*chagaṇa* 49.*vāluka*

The above list has an overlapping with some of the *Uparasas* with *Jāṅgama* and *Audbhid* categories explained previously. These have been segregated to respective categories, (i.e. in the Table No.4 At fourth chapter) because, in this thesis, based on their genesis, *uparasas* have been classified under *Pārthiva* category.

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[69] गन्धतालशिला राह्यघनहिङ्गुलगौरिकाः ।
चपलाश्मजभूनागहरिद्रिहेमाग्निजारकाः ॥
खर्परीतुत्थकङ्कुठगिरिसिन्दूरटङ्कणाः ।
कम्पिल्लविषकासीसिगौरीपाषाण भूखगाः ॥
पोद्दारशृङ्गी सिन्दूरस्तुवरिश्च रसाञ्जनम् ।
नीलाञ्जनं च सौवीरंस्रोतोञ्जनम् अहेनकम् ॥
पुष्पाञ्जनं शङ्खशुक्तिशाम्बूकाश्च वराटकाः ।
साबुनी च नवक्षारचीनक्षाराखुभारकाः ॥
सर्जगुग्गुलुलाक्षाश्च क्षाराश्च लवणानि च ।
गोरोचनो म्लवेताश्च काचश्छगणवालुकाः ॥
एतो उपरसाः ख्याता रसराजस्य कर्मणि ।Ā.K.2.1.4-8, p.641

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Rasaratna Samuccaya list only **eight** *uparasas*. Namely they are: *1.gandhaka 2.gairika 3.kāsīsa 4.paṭika 5.haritāla 6.maṇiśilā 7.añjana* (five types - *rasāñjana, nīlāñjana, sauvīrāñjana, srotoñjana, puṣpāñjana*) and *8.kaṃkuṣṭha.*[70] The definition, list of synonyms etc., of these *uparasas* have been extracted from AKB.

2.4.3.1 *Gandhaka* (Sulphur)

शब्दः	गन्धक
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	गन्ध-अच्-स्वार्थे क।
व्युत्पत्तिः	गन्धोऽस्त्यस्य। गन्धेन कायति इति अन्यः (वाच० -)।
उद्धृत संख्या	1.13.2
पर्यायाः	गन्धपाषाणः, गन्धाश्मा, गन्धमोदकः, पूतिगन्धः, अतिगन्धः, वटः, सौगन्धिकः, सुगन्धः, दिव्यगन्धः, गन्धः, रसगन्धकः, कुष्ठारि, क्रूरगन्धः, कीटघ्नः (रा.नि० -)

2.4.3.2 *Gairika* (Ochre)

शब्दः	गैरिक
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	गिर-ठञ्।
व्युत्पत्तिः	गिरौ भवम्। उपधातुभेदे तद्गुणादि (वाच० -)।
उद्धृत संख्या	1.10.7
पर्यायाः	रक्तधातुः, गिरिधातुः, गवेधुकं, धातुः, सुरङ्गधातुः, गिरिजा, गिरिमृद्भव (रा.नि० -)

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[70] गन्धहि भौरिकासीसकाद्रीशालशिलाञ्जनम्।
कंकुठं चेयुपरसाश्चाष्टौ पारदकर्मणि ॥ R.R.S. 3.1, p.44

2.4.3.3 *Kāsīsa* (Iron sulphate)

शब्दः	कासीस
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	कासीस-सुप् ।
व्युत्पत्ति	कासीं क्षुद्र कासं स्यति (वाच॰ -) ।
उद्धृत संख्या	1.4.62
पर्यायाः	धातुकासीसं, केसरं, हंसलोम्शं, शोधनं, पांशुकासीसं, शुभ्रं, समाह्वयं (आ.क॰ -)

2.4.3.4 *Paṭika* or *Sphaṭikā* (Alum)

शब्दः	स्फटिका
लिङ्गम्	स्त्री
कान्तिः	आ
निष्पत्तिः	स्फुट-फुल्-टाप्-अत इत्त्वम् ।
व्युत्पत्ति	स्फटिरिव कायति । स्का मख्याते मणौ (वाच॰ -) ।
उद्धृतसंख्या	1.24.12
पर्यायाः	भूमि, तुवरिका, फुल्तुवरी, रञ्जिका, शितिः, चित्रभू , चीनकारः, मञ्जिष्ठा, रागदायिनी, खगः, फटकी, दुग्धपाषाण, नेत्ररोगहा, कर्पूरख्यशिलाधातुर्मञ्जिष्ठारागरञ्जकः (आ.क॰ -)

2.4.3.5 *Haritāla* (Orpiment)

शब्दः	हरिताल
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	हरिताल-सुप् ।

व्युत्पत्तिः	हरिकर्मस्य पीतकर्मस्य तालः प्रतिष्ठा यत्र (वाच० -) ।
उद्धृतसंख्या	1.4.181
पर्यायाः	गोदन्ती, तालक, नटमण्डन, गिरिजाललितं, पीतं, अतिगन्धं, बिडालकं (आ.क० -)

2.4.3.6 Maṇiśilā (Realgar)

शब्दः	मनःशिला
लिङ्गम्	स्री
कान्तिः	आ
निष्पत्तिः	मनःशिल-टाप् ।
व्युत्पत्ति	मनः शब्दवाच्या शिला (वाच० -) ।
उद्धृत संख्या	1.10.7
पर्यायाः	कुनटी, नागास्या, रक्तगन्धक, नेपालिका, नागजिह्वा, कल्याणी (आ.क० -)

2.4.3.7 Añjana (Collyrium)

शब्दः	रसाञ्जन
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	रसाञ्जन-सुप् ।
व्युत्पत्ति	रसजातं पित्तलधातुज अञ्जनम् (वाच० -) ।
उद्धृत संख्या	1.16.69
पर्यायाः	रसोद्भूतं, रसगर्भं, रसाग्रजं, कृतकं, बालभैषज्यं, दार्विक्वाथोद्भवं, दार्विक्वाथोभवं, ताम्र्यशील, वर्यञ्जनं रसनाम, अग्निसार (आ.क० -)

2.4.3.8 *Kaṃkuṣṭha* (Garcinia morella)

शब्दः	कङ्कुष्ठ
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	ककि-उ-स्था-क-ष्वम् ।
व्युत्पत्ति	कङ्कुः तृणभेद तत्र तत्समीपे तिष्ठति । पर्वतीयमृत्तिकाभेदे हिमवत् पादशिखरे कङ्कुष्ठंनामजायते (वाच॰ -) ।
उद्धृत संख्या	21.5
पर्यायाः	काककुष्ठ, रेचक, रागदायक (आ.क॰ -)

2.4.4. *Loha (Mineral)*

A beautiful definition of '*loha*' ('लुह्- *to covet*) has been given in *Rasaratna Samuccaya* - 'लुहति सेव्यमानस्सर्वान् रोगानिति लोह:',('*it is called loha since it eliminates all diseases by its consumption*) In general, धातु is also called a लोह, as reflected in many *Rasaśāstra* texts.

The author of Ānandakanda, Manthāna Bhairava has enlisted twelve *lohas*[71]- 1.*svarṇa* 2.*roupya* 3.*kāntā* 4.*abhrasattva* 5.*tīkṣṇa* 6.*muṇḍaka* 7.*bhujaṅga* 8.*trapusa* 9.*rīti* 10.*kāṃsya* 11.*vartaka* and 12.*maṇḍūra*. The definition, list of synonyms and other related information for these twelve *lohas* is provided in what follows.

2.4.4.1 *Svarṇa* (gold)

शब्दः	स्वर्ण
लिङ्गम्	नपुं
कान्तिः	अ

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[71] स्वर्णरूप्यार्ककान्ताभ्रसत्त्वं तीक्ष्णं च भुण्ड कम् ।।

भुजङ्गत्रपुसं चैव रीतिः कांस्यं च वर्तकम् ।

द्वादशैतानि लोहानि भण्डूरो लोहकिट्टकम् ।। Ā.K 2.1.10, P.642

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निष्पत्तिः	सु-अर्ग-सुप् ।
व्युत्पत्तिः	सुष्ठु अर्ग्यो कार्यो यस्य, कत्त्वने (वाच० -) ।
उद्धृतसंख्या	1.4.198
पर्यायाः	सुवर्ण, कनक, उज्ज्वल, काञ्चन, कल्याण, हाटक हिरण्य, म्रोहर, गाङ्गेय, गैरिक, महारजत, अग्निवीर्य, रुक्म, हेम, तपनीयक, भास्वर, जाम्बूनद, अष्टापद, जातरूप, पिशान, चामीकर, कर्बुर, कार्तस्वर, पिञ्जरकार्, भूतितेजस्, दीप्तामल, दीपिपसेक, मङ्गल्य, सौमेर, शातकुम्भ, शृङ्गार, चन्द्राज, जाम्बव, आग्नेय, निष्क, अग्निशिखा (आ.क० -)

2.4.4.2 *Roupya* or *Rajata* (sliver)

शब्दः	रजत
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	रञ्ज्-अतच्-नलोफ् ।
व्युत्पत्तिः	रूप्ये (वाच० -) ।
उद्धृतसंख्या	1.4.160
पर्यायाः	रौप्यं, शुभ्रं, वसुश्रेष्ठं, रुचिरं, चन्द्रलोहकं, तसरूप्यं, चन्द्रभूति, रौप्यकं, कलधौतं, सौधं, चन्द्रहासं, तारकं (आ.क० -)

2.4.4.3 *Kāntā* (types of Iron)

शब्दः	कान्त लोह
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	कन (दीप्तौ)-कम्-वा क-लोह ।
व्युत्पत्तिः	कान्तं प्रियं लोहं यस्य अयस्कान्ते कान्तलोह लौहसारे । कान्तशब्देत दग्राद्युक्तम् (वाच० -) ।

उद्धृतसंख्या	1.7.140
पर्यायाः	अयस्कान्तं, कान्तं, कृष्णलोहकं, कान्तायसं, महालोहं, चललोहं (आ.क० -)

2.4.4.4 *Abhrasattva* or *Abhraka* (Mica)

शब्दः	अभ्रकं
लिङ्गम्	नं, पुं
कान्तिः	अ
निष्पत्तिः	अभ्र (गतौ) –क्वुन्
व्युत्पत्तिः	धातुभेदे एतत् च गौरीरजोजातं यथोक्तं रसेश्वरदर्शने शिववाक्यम् (वाच० –) ।
उद्धृतसंख्या	1.4.94
पर्यायाः	गगनं, भृङ्गं, बहुफनं, उमाभवं (आ.क० -) अभ्रपटल, निर्मल, वरपीतक, मेधाछ, पीतक, शुभ्र, गिरिजा, गिरिजामल (कै.नि० -)

2.4.4.5 *Tikṣṇa* (types of Iron)

शब्दः	तीक्ष्ण लोह
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	तीक्ष्ण -लोह-सुप्।
व्युत्पत्तिः	लौहभेदे (वाच० -) ।
उद्धृतसंख्या	1.4.297
पर्यायाः	शस्त्रायसं, शस्त्रं, पिण्डं, पिण्डायसं, शठं, आयसं, निशितं, तीव्रं, लोहं, खड्गं, मुण्डजं, अयः, चित्रायसं, चीनजं (आ.क० -)

2.4.4.6 *Muṇḍaka* (types of Iron)

शब्दः	मुण्डलोह
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	मुडि-घञ् ।
व्युत्पत्तिः	मुण्डायसे (वाच० -) ।
उद्धृत संख्या	1.7.140
पर्यायाः	मुण्डायसं, लोहं, कृष्ण लौहं, शिलोद्भवं(आ.क० -)

2.4.4.7 *Bhujaṅga* or *Nāga* (Lead-pb)

शब्दः	नागं
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	नग-अण् ।
व्युत्पत्तिः	नगे पर्वते भक । न गच्छतीति वा (वाच० -) ।
उद्धृत संख्या	1.4.178
पर्यायाः	सीसकं, जडं, शीतं, यक्नोष्टं, भुजङ्गं, भोगिनं, नागं, उरगं, कुवङ्गं, परिपिष्टकं, कृष्णायसं, फामतारं, शुद्धिकरं, शिरावृत्तं, वङ्गं, चीन पिष्टं (आ.क० -)

2.4.4.8 *Trapusa* (tin-Sn)

शब्दः	त्रपु
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	त्रप-उन् ।
व्युत्पत्ति	अग्नि दृष्ट्वा त्रपां लज्जते इव । सीसके (वाच० -) ।

उद्धृत संख्या	1.4.180
पर्यायाः	त्रपुसमारूपं, वङ्गं, कुटिलं, हिमं, कुरूप्यं, बिच्चटं, रङ्गं, पूति गन्धं, रसाङ्कयं, स्वच्छं, उष्मासहत्वं, सूक्ष्मपत्रकर, रुङ्नाशः, रूप्यकर्सां (आ.क०-)

2.4.4.9 *Rīti* or *Pittala* (Brass)

शब्दः	पित्तल
लिङ्गम्	त्रि
कान्तिः	अ
निष्पत्तिः	पित्त-लच् । ला-क ।
व्युत्पत्तिः	पित्तमस्त्यास्याधिक्येन । पित्तं लाति (वाच०-) ।
उद्धृत संख्या	2.7.1
पर्यायाः	रीति, सुर्का, सितकनकं, पिङ्गलं, लोहतकं, आरकूटं, पिङ्गललोहं, पीतकं (आ.क०-)

2.4.4.10 *Kāṃsya* (White Copper)

शब्दः	कांस्यं
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	कांस्य-सुप् ।
व्युत्पत्तिः	-
उद्धृत संख्या	1.18.201
पर्यायाः	सौराष्ट्रिकं, घोषं, कांस्यिय, वह्निलोहकं, दीप्तलोहं, घोषयुप्यं, दीप्तकं, सौराष्ट्रभवं (आ.क०-)

2.4.4.11 *Vartaka* (Bell Metal)

शब्दः	वर्तक
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	वृत्-णिच्-अच् ।
व्युत्पत्तिः	वर्तर्त्ते इति (वाच० -) ।
उद्धृत संख्या	2.7.18
पर्यायाः	वर्तितृड्ग, वर्तकं, लोहसंकर, नीलिका, नीललोहं, लोहकं, व्ट्टलोहकं (आ.क० -)

2.4.4.12 *Maṇḍūra* (Iron Oxide)

शब्दः	मण्डूर
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	मडि-ऊरच् ।
व्युत्पत्तिः	लौह्मले (वाच० -) ।
उद्धृत संख्या	2.7.101
पर्यायाः	लोहकिट्ट, किट्ट, लोहचूर्ण, अयोमल, लोहज, कृष्णचूर्ण, काष्ण्र्य, लोहमल (रा.नि० -)

In contrast to *Ānandakanda*, *Rasaratna Samuccaya* mentions 'nine *lohas*' in the धातु category. Again, for the ease of recognition, these *lohas* have been classified into three[72] groups -

◆ *Śuddhalohas (suvarṇa, rajata, tāmra, tīkṣṇa)*

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[72] शुद्धलोहं कनकं रजतं भानुलोहहं भसारं पूति लोहं द्विताय भुदिा नाग वंगाभिधानम् ।
भिश्रं लोहं त्रिताय भुदिा पित्तलं कांस्यर्या धातुलोहे लुह इति भाः सोपि कर्भार्थवाची ॥ R.R.S.5.1, p.89

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◆ *Pūtilohas (nāga, vaṃga)*

◆ *Miśralohas (pittala, kāṃsya, varta)*

Such kind of group wise classification is not observed in *Ānandakanda. The use of* पित्तल, कांस्य *and* वर्त *and their inclusion under* मिश्रलोह *indicates that there used to be a good knowledge of metal alloys and those alloys were instrumental treatments.*

2.4.5. *Ratna* (precious stones)

Ānandakanda lists out some nine[73] *Ratnas*, and *Rasaratna Samuccaya* echoes the same number.

Sl No.	Anandakanda	Rasasaratna Samucchaya
1.	*māṇikya*	*padmarāga*
2.	*Muktā phala*	*muktāphala*
3.	*vidruma*	*pravāla*
4.	*marakata*	*garuḍa*
5.	*puṣya*	*puṣparāga*
6.	*bhidura*	*vajra*
7.	*nīla*	*nīla*
8.	*gomedhaka*	*gomedhaka*
9.	*viḍūraka*	*vaiḍhūryaṃ*

Table 2.2

The nine *Ratna*s have been illustrated with grammatical details from the AKB.

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[73] माणिक्यमुक्ताफलविद्रुमाणि तार्क्ष्यं च पुष्यं मिदुरं च नीलम् ।
गोमेधकं चाथ विडुरकं च क्रमेण रत्नानि नवग्रहाणाम् ॥ *Ā.K.2.1.11*

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2.4.5.1 *Māṇikya* or *Padmarāga* (Ruby)

शब्दः	पद्मराग
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	पद्मराग-सुप्-अम् (अतो॰ -) ।
व्युत्पत्तिः	पद्मस्येव रागोऽस्य । रक्तकर्माणिभेदे तल्लक्षणादि (वाच॰ -) ।
उद्धृत संख्या	1.18.178
पर्यायाः	माणिक्यं, शोणरत्नं, रत्नराट्, रविरत्नकं, शृङ्गारि, रत्नमाणिक्यं, तरलः, रत्ननायकः, रागदृक्, रत्नं, शोणोपल, सौगन्धिकं, लोहितकं, कुरुबिन्दं, शरेन्दुकं (आ.क॰ -)

2.4.5.2 *Muktāphala* (Pearl)

शब्दः	मुक्ता
लिङ्गम्	स्त्री
कान्तिः	आ
निष्पत्तिः	मुच-क ।
व्युत्पत्तिः	रत्नायां (वाच॰ -) ।
उद्धृत संख्या	1.18.178
पर्यायाः	सौम्या, मौक्तिकं, शौक्तिकेयं, तारं, तारा, शौक्तिकं, तारका, अम्भसारं, शीतलं, नीरजं, नक्षत्रं, इन्दुरत्नं, वलक्षं, मुक्ताफलं, बिन्दुफलं, शौक्तेयकं, शुक्तिमणिः, शशिप्रियं, स्वच्छं, हिमं, हैमवतं, शुभ्रं, सुधांशुरत्नं (आ.क॰ -)

2.4.5.3 *Vidruma* or *Pravāla* (Coral)

शब्दः	विद्रुम
लिङ्गम्	पुं
कान्तिः	अ

निष्पत्तिः	किद्रु-मः ।
व्युत्पत्तिः	विशिष्टो द्रुमः । प्रवालरत्नहेतुकुक्षो (वाच॰ -) ।
उद्धृत संख्या	1.18.178
पर्यायाः	प्रवालः, अङ्गारकमणिः, अम्भोधिपल्लवः, भौमरत्नं, रकाङ्ग, रकाङ्कुर, लतामणिः (आ.क॰ -)

2.4.5.4 *Marakata* or *Garuḍa* (Emerald)

शब्दः	मरकत
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	त्_-ड ।
व्युत्पत्तिः	मरकं मारभियं तरूयोन । हरिन्मणि मणिभेदे (वाच॰ -) ।
उद्धृत संख्या	1.15.512
पर्यायाः	मरकतं, रौक्षियं, गारूत्मत्, हरिन्मणिः, सौफर्ग, गरूडोदगिर्ग, बुधरत्नं, अश्मगर्भज, गरलारि, वायवीर्यं, गारूडं, तार्ग्य (आ.क॰ -)

2.4.5.5 *Puṣya* (Topaz)

शब्दः	पुष्यराग
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	पुष्यराग-सुप्-अम् (अतो॰ -) ।
व्युत्पत्तिः	-
उद्धृत संख्या	2.8.41
पर्यायाः	पीतः, पीतस्फुटिकं, पीतरत्नं, पीताश्मा, गुरुरत्नं, पीतमणिः (आ.क॰ -)

2.4.5.6 *Bhidura* or *Vajra* (Diamond)

शब्दः	पवि
लिङ्गम्	पुं
कान्तिः	इ
निष्पत्तिः	पू-शोधे इ ।
व्युत्पत्तिः	कश्रे (वाच० -) ।
उद्धृत संख्या	2.8.42
पर्यायाः	कश्रं, इन्द्रायुधं, वीरं, भिदुरं, कुलिशं, अभेद्यम्, असिरं, रत्नं, दृढं, भार्गवकं, हीरकं (आ.क० -)

2.4.5.7 *Nila* (Sapphire)

शब्दः	नीलं
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	नील-स्वार्थे कन् वा ।
व्युत्पत्तिः	काचलको (वाच० -) । नीलेन कॉन कायति । (भावप्र० -) ।
उद्धृत संख्या	2.1.281
पर्यायाः	सौरिरत्नं, नीलाश्मा, नीलरत्नकः, नीलोपलः, तृणग्राही, महानीलः, सुनीलकः, इन्द्रनीलमणि (आ.क० -)

2.4.5.8 *Gomedhaka* (Zircon)

शब्दः	गोमेद
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	गो-मिद्-अच् ।

व्युत्पत्तिः	मणिभेदे । गौरिव मेधति (वाच॰ -) ।
उद्धृतसंख्या	1.18.180
पर्यायाः	गोमेदक, राहुरत्नं, तमोमणिः, स्वभर्नु, पिङ्गस्फटिक (आ.क॰ -)

2.4.5.9 *Viḍūraka* or *Vaiḍhūryaṃ* (Cat's eye)

शब्दः	वैडूर्य
लिङ्गम्	नपुं
कान्तिः	अ
निष्पत्तिः	विडुर-अण्-कन् ।
व्युत्पत्तिः	विदूरे गिरौ भवः । मणिभेदे केतुरत्ने (वाच॰ -) ।
उद्धृतसंख्या	1.18.180
पर्यायाः	केतुरत्नं, खश्यव्वङ्कुरजं, विडुरभूमिजं, रत्नंप्रावृष्य (आ.क॰ -)

2.4.6. *Uparatna* (semi-precious stones)

In the text, *Ānandakanda*, nine[74] semiprecious stones such as – *1.sūryakānta 2.candrakānta 3.tārakānta 4.kāntaka 5.vaikrānta 6.nṛpāvartaḥ 7.sasyaka 8.vimalā 9.peroja* have been described. It can be assumed that based on their quality for conventional purpose or medicinal purpose, they are called *'Upa Ratnas'*.

2.4.6.1. *Sūryakānta* (Sun stone)

शब्दः	सूर्यकान्त
लिङ्गम्	पुं
कान्तिः	अ

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[74] सूर्यकान्ताश्चन्द्रकान्तास्तारकान्तास्तु कान्तकाः ।
वैक्रान्ताश्च नृपावर्ताः सस्यको विमला तथा ।
पेरोजश्चनवैतानि ह्युपरत्नानि निर्दिशेत् । ।Ā.K.2.1.12, p.643

निष्पत्तिः	सूर्यकान्त-सुप् ।
व्युत्पत्तिः	सूर्यस्य कान्तः प्रियः । स्फटिकमणौ (वाच० -) ।
उद्धृतसंख्या	2.8.166
पर्यायाः	तपनमणिः, तपनः, रविकान्तः, दीप्तोपलः, अग्निगर्भः, ज्वलनाश्मा, अर्कोपल (आ.क० -)

2.4.6.2. *Candrakānta* (Moonstone)

शब्दः	चन्द्रकान्त
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	चन्द्रकान्त-सुप् ।
व्युत्पत्तिः	चन्द्रः कान्तोऽभीष्टो यस्य । मणिभेदे (वाच० -) ।
उद्धृतसंख्या	2.8.173
पर्यायाः	इन्दुकान्त, चन्द्राश्मा, संत्रबोपल, शीताश्मा, चन्द्रिकाद्रावः, शशिकान्त (आ.क० -)

2.4.6.3. *Tārakānta* or *Sphaṭika* (Rock Crystal)

शब्दः	स्फटिक
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	स्वार्थे क वा ह्रस्क ।
व्युत्पत्तिः	स्फटिरिव कायति । स्कनामख्यातं मणौ (वाच० -) ।
उद्धृतसंख्या	1.2.46
पर्यायाः	भूमिः, तुवरिका, फुल्लतुवरी, रञ्जिका, श्वितिः, चित्रभू, चीत्रकारः, मञ्जिष्ठा, रागदायिनी, खगः, फटकी, दुग्धपाषाण, नेत्ररोगहा, कर्पूराख्यशिलाधातुः, मञ्जिष्ठा, रागङ्गक (आ.क० -)

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2.4.6.4. *Kāntaka* (Iron)

शब्दः	कान्तक
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	कन् (दीप्तौ)-कम्-वा क-लोह ।
व्युत्पत्तिः	कान्तं प्रियं लोहं यस्य अयस्कान्ते कान्तलोह लौहसारे । कान्तशब्दे तदगुणाद्युक्तम् (वाच० -) ।
उद्धृतसंख्या	2.1.12
पर्यायाः	अयस्कान्तं, कान्तं, कृष्ण लोहकं, कान्तायसं, महालोहं, काललोहं (आ.क० -)

2.4.6.5. *Vaikrānta* (Tourmaline)

शब्दः	वैक्रान्त
लिङ्गम्	न पुं
कान्तिः	अ
निष्पत्तिः	स्वार्थे अण् ।
व्युत्पत्तिः	मणिभेदे विक्रान्तशब्दे द्रष्टव्यम् (वाच० -) ।
उद्धृतसंख्या	1.10.8
पर्यायाः	विक्रान्तं, नीलवज्रं, कुवज्रकं, गोनासं, क्षुद्र कुलिशं, चूर्णवज्रं, गोत्र सं (आ.क० -)

2.4.6.6. *Nṛpāvartaḥ* or *Rājāvartaḥ* (Lapis Lazuli or Altra Marine)

शब्दः	राजावर्त
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	आ-वृत-घिच्-अण् ।

व्युत्पत्तिः	राजन्न मावर्त्तयति अनकुलयति । उपरत्नभेदे (वाच॰ -) ।
उद्धृतसंख्या	2.8.195
पर्यायाः	नृपावर्त्तः, राजट्यावर्तकः, आवर्तमणिः, आवर्तः (आ.क॰ -)

2.4.6.7. *Sasyaka* (Peackok-ore)

शब्दः	सस्यक
लिङ्गम्	पुं
कान्तिः	अ
निष्पत्तिः	कै-क ।
व्युत्पत्तिः	सस्यमिव कायति (वाच॰ -) ।
उद्धृतसंख्या	2.8.218
पर्यायाः	सस्यक (वाच॰ -)

2.4.6.8. *Vimalā* (Iron Pyrite)

शब्दः	विमल
लिङ्गम्	त्रि
वर्णान्तः	अ
निष्पत्तिः	विमल-सुप् ।
व्युत्पत्तिः	विगतां मलो यस्मात् । ऊररसभेदे (वाच॰-) ।
उद्धृतसंख्या	1.4.257
पर्यायाः	निर्मलः, स्कछछः, विमलः, स्कछछधातुकः, तारविमल, हेमविमल (आ.क॰-)

2.4.6.9. *Peroja* (Turavaise)

शब्दः	पेरोज
लिङ्गम्	पुं, स्त्री

कान्तिः	आ
निष्पत्तिः	पेराज-टाप् ।
व्युत्पत्तिः	उपमगिभेदे (वाच०-) ।
उद्धृतसंख्या	2.8.218
पर्यायाः	हस्ति अश्मा, विषाराति, हरिन्मगिः (आ.क०-)

All the above mentioned *dravyas* under '*Pārthiva*' classification are used according to their need in preparing medicines with *pārada* (mercury). Naturally, all metals have toxicity. To remove the toxicity, eighteen purification methods (अष्टादश संस्काराः) were prescribed as already discussed at '*rasa*' (2.4.1.).

2.5. *Rasapañcaka*

In Ayurveda, substances (*dravyas*) of natural origin, including whole plants or their parts, animal parts and minerals, are used as medicines, either alone or in combinations. In addition, various other measures are used in an attempt to maintain health in a healthy person and alleviate disorders of the body and mind in the sick. In the beginning of this chapter, classifications of *dravyas* are discussed. Each *dravya* has five properties as **Rasa, Guṇa, Vīrya, Vikāka, Karma**. These five properties are called '**Rasapañcaka**'. The functioning of *Rasapañcaka* has been stated in *Bhadanta Nāgārjuna*'s *Rasavaiśeṣika* thus – 'द्रव्यमाश्रयलक्षणं पञ्चानाम्।'[75] (*dravya is the locus of Rasapañcaka*) So, this statement attests that a *dravya* acquires five properties and not more or less than that. But, in some texts of *Dravyaguṇa vijñāna*, '*prabhāva*' was added as the sixth one. It is briefly described further.

2.5.1. *Rasa* (taste) :

Rasa is taste. 'रसलक्षणमास्वादः।'[76] - "*the characteristic of rasa is taste,*" is the definition offered in *Rasavaiśeṣika*. It is the property of a medicine identified by the

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[75] R.V.1.84
[76] R.V.S.1, p.85

tongue. Though *rasa* is taste, the word itself is polysemous. What follows here is the description on various meanings of *rasa*.

- *Rasa* = *Dhātu* (chyle) – 'the body fluids including blood circulating throughout the body.'[77]

शोणितत्वं तृतीयेऽह्नि, चतुर्थे मांसतामपि ।
मेद आहारोऽद्धतनः श्वो हि रसत्वं गच्छति नृणाम्
त्वं पञ्चमे, षष्ठे त्वस्थित्वं, सप्तमे त्वियात्
मज्जतां, शुक्रतां याति नियमादष्टमे नृणाम्[78] ॥

- *Rasa* = *Pārada* (mercury) – 'the element which digests other metals '[79] like gold, silver etc.

Caraka has probably referred to *rasa* as *pārada* at *cikistāsthāna* 7.71. Whereas *Chakrapāṇi* interprets *pārada* as '*Rasottama*' alongside the clarified butter.

- *Rasa* = *Swarasa* (extracted juice) – the fresh juice extracted from a herb.

Swarasa is of five types[80] of *kashāya* (decoctions). *Caraka* says – 'यन्त्रनिष्पीडिताद्द्रव्यात् रसः स्वरस ऊयते[81]' (juice extracted from a *dravya* using an equipment is *swarasa*).

- *Rasa* = *sthāyībhāva* (emotion) - In Sanskrit literature, 'rasa' means emotion and eight such *rasa*s have been discussed in *Amarakośa*, namely -

"शृङ्गारवीरकरुणाद्भुतहास्यभयानकाः ।
बीभत्सरौद्रे च रसा---------------॥"[82]

But, *Mammata* in *Kāvyaprakāśa* has added '*śānta*' as also the ninth *rasa*.

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[77] अहरहर्गच्छतिरियतो रसः। S.S.1.14; रस – ग्रहौ इति धात्वर्थ ।
[78] Chakrapani Commentary on 6.15.13.113 of C.S.
[79] रसति भक्षयति सर्वान् लोहान इति रसः।Ā.K.1.1.5
[80] 1.स्वरस 2.कल्क 3.श्रुा 4.शीत 5.फाण्ट
[81] C.S. 1.4.5
[82] Amara.1.7.17, P.77

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However, in context of *Dravyaguṇa Śāstra*, *rasa* is always taste. There are six varieties of tastes accepted in *Śāstras*. In a medicine, when certain *rasa* is predominant, that acquires an inherent property to enhance such property in the body and decreases its opposite. Now the types of *rasa* are being explained as per Ayurveda and *darshanas*.

2.5.1.1. *Madhura*[83] (sweet) :

Cakrapani stated *madhura* to be 'सोमगुणाति रेकान्मधुरः'[84] । *Madhura rasa* will coat entire oral cavity with its sweet taste, a feeling of generalized well being and promotes pleasure and strength to body organs. It naturally attracts ants and flies.

2.5.1.2. *Āmla*[85] (sour) :

It washes or cleanses the oral cavity, it results in secretion, tingling sensation of teeth, blinking of eyes due to its sour taste. It is one of the *trirasas*[86].

2.5.1.3. *Lavaṇa*[87] (salt) :

It spreads all over the oral cavity and causes dryness due to osmosis (*syandana*). It also results in burning sensation in the buccal cavity and throat. *Vāgbhaṭa* in *Aṣṭāṅgahṛdaya* while narrating the quality of *lavaṇa* says - 'तत्राद्या मारुतं घ्नन्ति...'. Which means the '*mathura*', '*āmla*', '*lavaṇa*' have an inherent capacity to alleviate the *Vāta*.

2.5.1.4. *Kaṭu*[88] (pungent) :

It stimulates the tip of the tongue, causes burning sensation over the tongue and oral cavity, results in watering the eyes, mouth, and nose. It also produces

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[83] मधु - माधुर्यमस्यास्ति इति मधुरः । Amara.1.5.9, Pp 58-59

[84] Chakrapani on C.S. 1.26.24

[85] अम्यतो शब्धतो भोक्तुमिति अम्लम् । Amara.1.5.9, Pp 58-59

[86] मधुराम्लकषायं च विशेषिभि गुरूस्तिलम् । पित्तश्लेष्महरं मध्यम् । C.S.1.27

[87] लुनाति जाड्यम इति लवणम । Amara.1.5.9, Pp.58-59

[88] कटति आवृणोति इति कटुः । Amara.1.5.9, Pp 58-59

burning in the buccal cavity. *Kaṭu* alleviates the *kapha* related problems in the body.

2.5.1.5. *Tikta*[89] (bitter) :

It constricts the entire oral cavity and disallows other taste receptions. It reduces the desire to eat, causes burning in the throat. *Tikta* alleviates *kapha*.

2.5.1.6. *Kaṣāya*[90] (astringent) :

It produces a feeling of stiffness of tongue, dryness and stiffness in the throat and other channels of the body. It results in catching pain in the throat. *Kaṣāya* also alleviates *kapha*.

2.5.2. *Guṇa* :

In *Rasavaiśeṣika*[91], characteristic features of *guṇa* are mentioned as - 'विश्वलक्षणाः गुणाः'[92] (*guṇas are endowed with universal characteristics*) । *guṇas* can be understood as the attributes or properties of *dravyas*. They inherently reside in *dravyas* but do not directly produce any actions, but, they cause to produce specific actions in the drugs. As per *Rasapañcaka* theory, *guṇa* and *karma* both exist in a drug. They are not independent of the *dravya*[93]. The relation that *dravya* shares with *guṇa* is called *samavāya* (inherence). From the Ayurvedic perspective, a single *dravya* may have several properties. Incidentally, a specific property can be found in many drugs. The Ayurvedic concept of *guṇa* is similar in many ways to that of *Sāmkhya* and *Vaiśeṣika* schools of philosophy.

Some of the *guṇas* in Ayurveda do have a striking similarity with the 24 *guṇas*[94] enumerated in *Kaṇāda*'s *Vaiśeṣika Sūtra*. Generally, *guṇa* in Sanskrit means

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[89]रोजयति इति तिक्तः । Amara.1.5.9, Pp 58-59

[90]कषति कण्ठम् इति कषाय । Amara.1.5.9, Pp 58-59

[91]A text written by *Bhadanta Nāgārjuna* in 7th A.D.

[92]R.V.S.1, p.85

[93]क्रिया-गुण यद्द्रव्यम् । T.S., p.1

[94]रूप-रस-गन्ध-स्पर्श-सङ्ख्या-परिमाण-पृथक्त्व-संयोग-विभाग-परत्व-अपरत्व-गुरुत्व-द्रवत्व-स्नेह-शब्द-बुद्धि-सुख-दुःख-

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'string' or a single thread it may mean a subdivision, species, kind, quality or an operational principle of tendency."[95] *Guṇa* is a school specific technical term in Indian philosophy. In the Indian grammatical tradition, (*vyākaraṇa*) *guṇa* stands for a function that is applied in the context of euphonic combinations. In *Sāmkhya* school of philosophy and *Śrimad Bhagavdgīta*, *guṇa* implies *triguṇas* (trio of tendencies) which are *Satva* (creation), *Rajas* (preservation), and *Tamas* (destruction). The *triguṇas* delude world[96]. However this concept is important in view of its function in therapeutics in Ayurveda. Whereas *Vaiśeṣika guṇa*s are a list of properties that *dravya*s are attributed with. In Ayurveda, total of forty one *guṇa*s have been listed in four groups.

'सार्थाः गुर्वादयो बुधिप्रयलान्तः परादयः गुणाः प्रोक्ताः।'[97]

That means, *Gurvādi* or physico-pharmacological *guṇa*s includes twenty (*1.guru, 2.laghu, 3.śīta, 4.uṣṇa, 5.snigdha, 6.rūkṣa, 7.manda, 8.tīkṣṇa, 9.sthira, 10.sara, 11.mṛdu, 12.kaṭhina, 13.viśada, 14.picchila, 15.ślakṣṇa, 16.khara, 17.sthūla, 18.sūkṣma, 19.sāndra, 20.drava*), *Parādi* or pharmacological includes ten, (*1.para, 2.apara, 3.yukti, 4.samkhyā, 5.samyoga, 6.vibhāga, 7.pṛthaktva, 8.parimāṇa, 9.samskāra, 10.abhyāsa*), *Viśeṣa* or specific (those related to sensory organs) includes five (*1.śabda, 2.sparśa, 3.rūpa, 4.rasa, 5.gandha*) and *Ādhyatmika* or psychological/mental *guṇa*s are six (*1.budhi, 2.icchā, 3.dveṣa, 4.sukha, 5.duḥkha, 6.prayatna*), hence, the sum of the *guṇa*s is forty one.

Suśṛta has added two more *guṇa*s to the list of forty one, *Vyavāyi* and *Vikāsi* respectively. *Bhadantha Nāgārjuna* mentioned two more *guṇa*s in his text *Rasavaiśeṣika* namely, 'Surabhi' and 'Asurabhi'. Nonetheless, it will be separate

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इच्छा-द्वेष-प्रयत्न-धर्म-अधर्म-संस्काराः । T.S., Pp 2-3

[95]http://en.wikipedia.org/wiki/Gu%E1%B9%87a

[96]त्रिभिर्गुण मयैर्भावैः सर्वमिदं जगत् ।
मोहितं नाभिजानाति भामेभ्यः परमव्ययम् ॥ S.B.G. 7.13

[97]C.S.1.1.48

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discussion on the number of *guṇa*s.

The *Gurvādi guṇa*s are the most important from the pharmacological point of view. They are a set of twenty[98] *guṇa*s with ten of these being the opposite attribute to the other. As per Ayurveda principles, *Sāmānya* or generality is the logic behind increase and *Viśeṣa* or particularity is the reason behind decrease for several factors. These twenty *guṇa*s listed below stem out of the *pañca mahābhūta* theory. They are important factors, inherent in *dravya*s, and are responsible for their selection for therapeutic purposes. An action cannot take place without the *guṇa* s responsible for that action being a *loci*.

2.5.2.1. *Gurvādi Guṇa*

As stated in Caraka samhita, *Rasa* is the primordial cause in the genesis of various types of *guṇa*s. "*Prakṛti* indicates the nature of the substance, i.e. inherent attributes (heaviness etc.) of diets and drugs. E.g. *masha (Phaseolus radiatus Linn.)* is heavy and *mudga (Phascolus mungo Linn.)* is light and meat of *sukara* (Boar) is heavy and that of *ena* (Deer) is light[99]." Ingredients which are heavy in nature, aggravates the *kapha*[100]. For instance, when a mother's *Vāta* lost its homeostasis due to the heaviness of the food items that she has consumed, it afflicts her breast milk. "The child feeding on this breast-milk suffers from vomiting, gripping pain and excessive salivation[101]." The following table 2.3 describes the opposite qualities of discussed *guṇa*s

S. No.	*Guṇa*	English Equivalent	Indication
1&2	*Guru X Laghu*	Heavy X Light	Weight
3&4	*Manda X Tīkṣṇa*	Sharp X Dull	Intensity

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[98] गुर्वादयस्तु गुरुलघुशीतोष्णस्निग्धरूक्षमन्दतीक्ष्णस्थिरसरमृदुकठिनविशदपिच्छिलश्लक्ष्ण खरस्थूलसूक्ष्मसान्द्रद्रवा विंशतिः | Chakrapani on C.S.1.1.48

[99] C.S. 3.1.22

[100] गुर्वादिभिर्हेतुभिश्च पूर्वया कुपिताः कफः | C.S.6.30.217

[101] C.S. 6.30.246.

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5&6	*Uṣṇa X Śīta*	Hot X Cold	Temperature
7&8	*Rūkṣa X Snigdha*	Dry X Moist	Emollience
9&10	*Ślakṣṇa X Khara*	Smooth X Rough	Texture
11&12	*Drava X Sāndra*	Liquid X Dense	Viscosity
13&14	*Kaṭhina X Mṛdu*	Hard X Soft	Compressibility
15&16	*Sara X Sthira*	Mobile X Static	Fluidity
17&18	*Sūkṣma X Sthūla*	Subtle X Gross	Density
19&20	*Viśada X Piccila*	Clear X Sticky	Adhesion

Table 2.3

2.5.2.1.1. *Guru* (Heavy)

Jala and *Pṛthvī* are responsible for making things heavier. The *Guṇa* that makes things heavier is known as *Guru*. This *guṇa* increases the *Kapha doṣa* and decreases the *Vāta doṣa*. *Guru dravyas* tend to increase bulk and weight of the body. On the other hand, in *Caraka Saṃhitā*, it has been said that sudden intake of substances that are exceedingly heavy in nature leads to endogenous swelling.

2.5.2.1.2. *Laghu* (Light)

Agni, *Ākāśa* and *vāyu* are responsible for making things lighter and the *guṇa* (property) that makes things lighter is known as *laghu* (light). "Whatever is capable to reduce the body is know as 'laṅghana[102]'. *Laṅghana* is based on *laghu guṇa*."This *guṇa* suppresses the 'kapha' *doṣa* in the body and aggravates the *Vāta doṣa* . The purification of the body *srotas* (channels) and aggravation of *agni* (appetizer) in the body is due to this *guṇa*.

2.5.2.1.3. *Manda* (dull)

Mandatva or dullness is the *guṇa* that is responsible for developing dullness or depression in the body. Excess of *jala* is responsible for the generation of this

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[102]C.S. 1.22.9

guṇa having slow activity and weak strength of action. *Mandtva* (dullness) also aggravates the *kapha doṣa* and suppresses *pitta doṣa* in the body. The main function of this *guṇa* is *Śamana* (suppression) apart from being responsible for *gatyavarodha* (retardation), *Śaithilya* (dullness), *Alpakriyata* (weak action) and *Cirkarita* (slow action). Foods that are incompletely formed, like curds, are *manda* in nature. Such foods obstructs the channels of circulation.

2.5.2.1.4. *Tikṣṇa* (sharp)

It is the opposite of *mandatva* (dullness) in context of its functioning, property and speed of reaction. This *guṇa* is fast in action, helps in *śodhana* (evacuation) of the body, aggravates *pitta doṣa*, suppresses *kapha doṣa* in the body and is responsible for *Dāha* (burn), *Pāka* (digest), *Sravakara* (to secrete) and *Lekhana* (scraping). *Tikṣṇa* (sharpness) is found in *Agni*.

2.5.2.1.5. *Uṣṇa* (Hot)

Warmth or hotness it is the opposite of *śīta guṇa*. *Uṣṇa* (heat) increases the body heat and aggravates the *pitta doṣa* while suppressing *vāta* and *kapha doṣa* in the body. *Agni* is responsible for it. The main function of this *guṇa* is to induce sweat, *Tikṣṇa* (thirst) and *Dāha* (burning sensation).

2.5.2.1.6. *Śīta* (Cold)

This *guṇa* is responsible for decreasing the warmth (*uṣṇata*) of the body and increasing the coldness. *Jala* is responsible for this *guṇa*. This guna has the property of curing *mūrchā* (syncope), *Tṛṣṇa (thirst)* and *Dāha* (burning sensation) in the body.

2.5.2.1.7. *Rūkṣa* (dryness)

This *guṇa* is responsible for generating dryness in the body. Found in *Pṛthvī* and *Vāyu*. It aggravates *vāta doṣa* and suppresses *Kapha doṣa* in the body. The main function of this *guṇa* is *Śamsana* (to absorb) besides developing roughness and reduction of strength and complexion

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2.5.2.1.8. *Snigdha* (Moist)

It is the main *guṇa* of *Jala* (water). *Snigdhatā* is responsible for s piṇḍībhāvana (clinging). It is also responsible for the development of softness and smoothness. Apart from the main function of generating *bala* this *guṇa* generates *Mṛdutva* (soften), *Bala* (strengthen), *Varṇa* (skin complexion). It aggravates *kapha doṣa* while suppressing the *vāta doṣa* in the body.

2.5.2.1.9. *Ślakṣṇa* (Smooth)

Main function of this *guṇa* is *Ropaṇa* besides the other functions that are mentioned in *piccila guṇa*. *Ślakṣṇa* (smoothness) is produced when stone or metal are rubbed on. The difference between *piccila guṇa* and *Ślakṣṇa guṇa* is that the former has smoothness due to *Sneha* (viscosity) and latter has smoothness due to lack of *Sneha* (viscosity).

2.5.2.1.10. *Khara* (Roughness)

Found in *Vāyu mahābhūta*, it aggravates *vāta doṣa* in the body and has the main function of *Lekhana* (to scrap) besides the functions to decrease the quantum of *Dhātus*.

2.5.2.1.11. *Drava* (Liquid)

It has the capability of *Pravāhī* (flowing) and increases *Rasādi dhātu* and the quantum of *Mala*.

2.5.2.1.12. *Sāndra* (Dense)

This *guṇa* is the property of *Pṛthvī* and aggravates *kapha* in the body. The main purpose of this *guṇa* is *Prasādana* (replenishing) and *Dhātu vardhana* (increase tissues) apart form *sthūlatā* and *bṛmhaṇa* (growth).

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2.5.2.1.13. *Kaṭhina* (Hard)

This *guṇa* makes the body firm and hard. It is present in *Pṛthvī* it increases the *dhātu* in the body and dries the excretory wastes. *Vāta doṣa* is aggravated by this *guṇa* (property). The main function of this *guṇa* is *Dṛdhīkaraṇa* (strengthening) and to make *dhātus* firm and dry the *Mala* (excretory product).

2.5.2.1.14. *Mṛdu* (Soft)

Found in the *Ākāśa* (space) and *Jala* (water), *mṛudutva* aggravates *kapha doṣa* in the body. The purposes of this *guṇa* are preventing *Dāha* (burn), *Pāka* (suppurating), *Srāva* (secretions) and developing *mṛudutā* (softness).

2.5.2.1.15. *Sara* (Mobile)

The purpose of this *guṇa* is mobility it scrapes the *dhātus* of the body and aggravates *vāta doṣa* in the body. It is found in *Vāyu* and *Agni*. This *guṇa* is responsible for releasing *Mala* (excretory product) from the body. It is useful in *śodhana cikitsa* (evacuation therapy).

2.5.2.1.16. *Sthira* (Static)

This is present in *Pṛthvī*. *Sthira* (static) aggravates the *kapha doṣa* and suppresses the *vāta doṣa* in the body. The purpose of this *guṇa* is *Dhāraṇa* (to hold) apart from *Gatiśaithilya* (immobility), *Sthirata* of *dhātus* (stabilize *dhātus*) and *Sthambhana* (cease secretion). *Avarodha* (obstruction) is created by this *guṇa*.

2.5.2.1.17. *Sūkṣma* (Subtle)

Found in *Vāyu*, *Agni* and *Ākāśa*, this aggravates *vāta doṣa* in the body and has the main function of *Vivarṇa* (discoloration). This is also responsible for *Sūkṣma srotogamī* (micro-cirulation), absorption of *Mala* (excretory product) and *laghupāka* (easy digestion).

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2.5.2.1.18. *Sthūla* (Gross)

This *guṇa* is the property of *Pṛthvī*. This *guṇa* is responsible for the functions of *samvarṇa* (promote complexion). Promotes bulk, *Srotorodha* (obstructs channels of circulation), *Sandhidardhya* (strengthens joints), and *Śakti* (strength).

2.5.2.1.19. *Viśada* (Clear)

It is the *guṇa* of *Pṛthvī*, *Vāyu*, *Tejas* and *Ākāśa*. It has the capacity of *Prakṣālana* (cleansing), which removes *Piccilata* (stickiness). It is *Kledaśoṣaṇa* and *Vraṇaropaṇa* (healing). This *guṇa* suppresses the *vāta doṣa* and the *Kapha doṣa* in the body.

2.5.2.1.20. *Piccila* (Sticky)

It is the *Sāṃsiddhika Guṇa* of *Jala*. This *guṇa* aggravates *kapha doṣa* and suppresses *vāta doṣa* in the body. It is important for the joining of two elements, increase of the *dhātus* and strengthening the body.

The discussed twenty *Guṇas*, so far, contribute towards specific actions through the *dravyas* they reside in. All these physical properties and their manifestation as pharmacological action can be summarized as follows.

S. No.	Guna (Attribute)	Karma (Pharmacological Action)
1.	*Guru*	Tonic
2.	*Laghu*	Reduces
3.	*Manda*	Pacifies
4.	*Tīkṣṇa*	Cleanses
5.	*Uṣṇa*	Induces Perspiration
6.	*Śīta*	Condenses
7.	*Rūkṣa*	Dries
8.	*Snigdha*	Produces Moisture

9.	Ślakṣṇa	Stimulates Growth
10.	Khara	Ratifies
11.	Drava	Dissolves
12.	Sāndra	Nourishes
13.	Kaṭhina	Fastens, Hardens
14.	Mṛdu	Relaxes
15.	Sara	Excites
16.	Sthira	Supports
17.	Sūkṣma	Penetrates
18.	Sthūla	Covers or protects
19.	Viśada	Cleanses
20	Piccila	Forms a coating

Table 2.4

2.5.3. *Vīrya*:

The verbal root for *Vīrya* is '*vīr*(=*vikranta*)', means that which is powerful or potent in nature. The term signifies the potency of the medicine. In *Rasavaiśeṣika*, *Vīrya* has been described as - 'कर्मलक्षणं वीर्यम्[103], which means it produces *karma* (action). *Vīrya* is interpreted differently in terms of *guṇa*, *karma* or *dravya* but the first view (*guṇa-vīryavāda*) is accepted in practice. According to this view, *guṇas* are potent enough to produce action are termed as '*Vīrya*'. Eight *Vīryas* are mentioned out of twenty *guṇas* having potentiality to attain the state of *Vīrya*, as 'गुरु, लघु, स्निग्ध, रूक्ष, तीक्ष्ण, मन्द, शीत, उष्ण।'[104] Again on the basis of traditional style of generalization, *Vīryas* have been grouped into two broad categories which represent the primordial factors of *Soma* and *Agni*, initiators of creation of the living world. Namely they are - *Sīta (cooling)* and *Uṣṇa (heating)*.

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[103]R.V.S.1, p.85

[104]वीर्याणि केचित् गुरुलघुस्निग्धरूक्षा तिक्ष्ण मन्दशीतोष्णभेदेनाष्टविधभाहु । A.A.S 1 17 , p.165

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Drugs and diets which are sweet in taste do normally have a cooling effect. Those with sour or pungent taste are potentially hot. Similarly, rock salt having saline taste and *Āmalaka* (*Emblica officinalis*) having sour taste are hot (*Uṣṇavīrya*). *Arka* (*Calotropis gigantean*), *Agaru* (*Aquilaria agalocha*) and *Gudūci* (*Tinospora cordiofolia*) — the three herbs at the end of the list would be bitter in taste are hot in potency[105].

2.5.4. *vipāka*:

In *Rasavaiśeṣika*, the definition of *vipāka* has been told thus - 'परिणामलक्षणः विपाकः[106]', which means '*vipāka* possesses change as its characteristic would be brought by digestion and assimilation. The concept of *vipāka* has been proposed and delineated by sages like *Caraka*, *Vāgbhaṭa*, *Parāśara* etc. The *rasas* undergo a transformational process due to *vipāka*. There are three *vipākas* attributed to the six *rasas* -

- *Madhura* and *Lavaṇa* become *madhura vipāka* in taste.

"Cow ghee is the best of all the unctuous substances. It is auspicious, cold in potency and sweet both in taste as well as *vipāka*. When administered according to the prescribed procedure, it increases, thousand times in potency and develops manifold utilities[107]."

- *Āmla guṇa* becomes *āmla vipāka* in taste.

"*Kulatta* (*Dolichos biflorus*) is hot in potency, astringent in taste and sour in *vipāka*. It reduces semen and alleviates the vitiated *kapha* as well as *vāta*. It is constipative

[105] लवणं सैन्धवं नोष्ण भम्लमाभलकं तथा ।

  अर्कागुरुगुडूचीनां तिक्तानामुष्णमुच्यते ॥ C.S.1.26.49

[106] R.V.S.1, p.85

[107] सर्वस्नेहोत्तमं शीतं मधुरं रसपाकयोः ।

  सहस्रवीर्यं विधिभिर्घृतं कर्मसहस्रकृत ॥ C.S.1.27.232

and is useful for patients suffering from coughing, hic-cup, dyspnoea and piles[108]."
Similarly, "curd is appetizer, digestive stimulant, aphrodisiac, unctuous, strength promoting, alleviator of *vāta*, auspicious and nourishing. It is sour in *vipāka* and hot in potency."

- *Kaṭu*, *Tikta* and *Kaṣāya* become *Kaṭu vipāka* in taste.

"*Kaṭu vipāka* aggravates *vāta*, reduces semen and obstructs the passage of stool and urine[109]." Both *citraka* (*plumbago zeylanica Linn*) and *danti* (*Balisspermum montanun Muell-Arg*) are pungent in taste as well as *vipāka*[110]." Hence, there are only three *vipākas* that are possible on the whole combination of *rasas*.

2.5.5. *Karma*:

The definition of *Karma* is- 'क्रियालक्षणं कर्म।'[111] which means 'action is the definition of *Karma*. *Karma* as special property of the drugs, cannot be explained by their elemental composition. But is inferred.

Generally in *Nyāya* Philosophy five types of *Karma* has been mentioned as 'उत्क्षेपण', 'अपक्षेपण', 'आकुञ्चन', 'प्रसारण' and 'गमन' respectively. These five types of karmas come under several motions like ballistic motion and so on. Similarly, in *Vyākaraṇa* also karma is mentioned as an object where the agent desires most the fruit of his/her action to be rested with. Also, *Karma* relates to the past deeds in previous incarnations according to Indian philosophy.

As mentioned earlier, in the context of *dravyaguṇa*, karma is a property of *dravya*. *Karma* is inferred by the action of a drug. *Karma* do not inherit any special

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[108] उष्माः कषायाः पाकेम्लाः कफशुक्रानिलापहाः ।
  कुलत्था ग्राहिणः कासहिक्ककरीयासार्शसां हिताः ॥ C.S.1.27.26
[109] शुक्रहा बद्धविष्मूत्रो विपाको यात्राः कटुः ।
  मधुरः सृष्टविष्मूत्रो विपाकः कफशुक्रलः ॥ C.S.1.27.61
[110] कटुका कटुकः पाके वीर्योष्णा श्लेष्मको भताः । C.S.1.27.68
[111] R.V.S.1, p.86

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classification as reflected in the Ayurveda texts, but based on its pharmacological action, a number of classifications are explained in *dravyaguṇa* texts. The following list narrates several such classifications. *dīpana, pācana, śaṃsana, anulomana, sraṃśana, bhedana, recana, lehana, chedana, grāhī, sthambhana, madakarī, pramatī, vyavāyī, vikāsī, abhisyandī, asurī, yogavāhī, sūkṣma, prāṇahara, vidāhī, jīvanīya, bṛṃhaṇa, balya, sandhānīya, vayaḥ sthāpana, rasāyana, hṛdya, kaṇṭhya, vamana* etc,.

It is discussed in this chapter about the fundamental characteristics of *dravyaguṇa*. In developing the AKB, I have referred to five *guṇas rasa, guṇa, vīrya, vipāka* and *karma* from an Ayurvedic perspective. The information has been collected from *dravyaguṇa* texts and Ayurvedic lexicons.

CHAPTER 3

Structure of Ānandakanda

3.1. Introduction

It is observed by critics that "the ancient history of mineral processing in Indian sub-continent is a fascinating subject." [A.K. *Biswas* 1986]. *Rasaśāstra* is one of the important branches of Ayurveda that has been especially molded for obtaining therapeutic benefits from mineral materials. *Rasaśāstra* mainly deals with two things 1. *Loha vedha* (Transformation of lower metals into higher/noble metals) and 2. *Deha vedha* (Making the body stable and strong by therapeutics).

During medieval period, a number of books were written by describing several aspects of *Rasaśāstra*. *Ānandakanda* is also one such important text written in 13th century. *Ānandakanda* means 'Roots of Bliss'. It has been referred by as 'the most encyclopedic work of the entire Hindu alchemical canon [Dominik Wujastyk 2002].'[112] This text was supposed to be written by *Manthāna Bhairava*, a *Rāja Vaidya* of the Island of *Śrīlaṅkā*. Though the author of the text is seemingly clear, in beginning of the text, the before the invocation it is mentioned that 'भैरवोक्तोऽयं ग्रन्थः' (*this book has been narrated/authored by Bhairava*). This gives room for some ambiguity, whether *Manthāna Bhairava* and *Bhairava* are one and the same or they are different.

This text was published in 1952 based on three important sources. The first one was based on a manuscript obtained from *Tanzore* library. The second was based on a manuscript from Mysore '*Rāṣṭriya Prācya Grantha Saṃgrahālaya*' in Telugu script and the third one was based on the material obtained from '*Akhila Bhāratīya*

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[112]Dominik Wujastyk 'Cannabis in Traditional Indian herbal Medicine' edited by Ana Salema (Lisbon: Universidade Nova de lisboa, 2002), Pp.45-73

Vaidya Saṃmelana Patrikā'. In 1969, a version was also published by *Veturi Sankara Sastri* who was the editor of *Sri Dhanvantari Patrika* in Telugu, published from *Muktyala* in *Andhra Pradesh*. That version was based on the set of compiled articles published in the same journal. The articles were published in a series starting from 6th issue of 26th Volume May 1963 to 10th issue of Volume 32, September 1969. Recently, It is made available as '*Siddhiprada*' Hindi commentary written by Prof. *Siddhi Nandan Mishra* at *Sampūrṇānanda* Sanskrit University, *Vāranasi*. This was published by Chaukhamba Orientalia in 2008.

The contents of *Ānandakanda* is dialog between Lord *Śiva* and Godess *Pārvatī*. This text was written in two parts named as *Viśrāntis*. Each *Viśrānti* comprises a number of chapters called *Ullāsas*. The first *Viśrānti* is known as '*Amṛtīkaraṇa Viśrānti*' that contains twenty six *Ullāsas*. And the second *Viśrānti* is known as '*Kriyākaraṇa Viśrānti*', which contains ten *Ullāsas*. In this authoritative text, Lord *Śiva* has been referred as '*Bhairava*' and *Pārvatī* has been referred as '*Bhairavī*'. The same terminology continued throughout the text. Now, we will explain contents of the two *Viśrāntis* as follows.

3.2. *Amṛtīkaraṇa Viśrānti:* ·

As just stated before, this part contains 26 *Ullāsas*, each *Ullāsa* is named in the form of Sanskrit numerical order up to twenty six *Ullāsa*. For instance, *prathamollāsa*, *dvitīyollāsa* and so on and so forth. Each *Ullāsa* of this *Viśrānti* was analyzed for its content. A brief description of subject matter in each *Ullāsa* is given below for clarity of information.

Ullāsa No.	*Amṛtīkaraṇa viśrānti*
1.	*Rasotpatti, nirukti, doṣa* and *avasthās*
2.	Qualities of students of *rasaśāstra* and *kaṅkiṇi*, Worship of mercury, *Rasaśālā*
3.	*Rasa dīkṣā karma* and *bheda* (order and types)

4.	*Aṣṭādaśa saṃskāras* types of specialized processes adopted for *bījadṛti* (liquid state), *satva pātana* (Metal extraction procedures)
5.	*Khecara, bhūcarī Jāraṇa Prakāra* (digestion procedures in vapor and solid state)
6.	*Deha vedha karmā* (strengthening of body), *śarīraśuddhi* (Purification of body), *kṣetrīkaraṇa, aroṭa rasa seva karma* (method of ingestion of mercury). *Khetha baddha rasa seva karma, pathya-apathya* (non-congenious diet), *sapta dhātu vedha*
7.	*Ratnotpatti* (genesis of precious stones), *lakṣaṇa* (characteristic features), *bheda* (types), *samskāra rasāyana, Odana dṛti guṇa, svarṇa* (gold), *kānta* (magnetic iron) and *abhraka* (mica)
8.	*Rasāyana sevākarma* (procedure of rejuvenation therapy)
9.	*Rasāyanahara rasa samskāra, rasa bhasma karm, jaratāra samaraṇam, aroṭa rasa*
10.	*Pañcādaśa guṭikā nirmāṇa vidhi*
11.	*Jīvati eva divya yoga siddhi, bhūta kālāntaka rasa*
12.	*śrīśaile siddha lābha prakāra*
13.	*Gandhaka samskāra*
14.	*viṣa utpatti, bheda, samskāra, guṇa, upadrava, cikitsā*
15.	*Divyauṣadhi rasāyana*
16.	*Aṅkola kalpa etc. Abhyaṅga, mahā nīli tailam, udvartana-keśarañjana kalpa divyauṣadhi grahaṇa yoga sthala nirdeśa and grahaṇa vidhi* (Description of place of collection and protocol of collection of divine medicinal plants)
17.	*Uṣahpāna rasāyana* (medicinal water consumed early mornings). *pīta jala lakṣaṇa, jala ajīrṇa lakṣaṇa* and its *parihāra* (indigestion of drinking water and its management) *Uṣahpāna pāna guṇa, nāsapāna rasāyana.*
18.	*Sadācāra rasāyana, Dina caryā*
19.	*ṛtu carya, pācakāgni svarūpa*
20.	*Yogi, jīvanmukta lakṣaṇa and sādhanopāya*

21.	*Yoga siddhi, kūṭi nirmāṇa vidhi and amarī kalpa*
22.	*Vandāka kalpa and Vandākaharaṇa vidhi*
23.	*Viśeṣa rasa samskāra, rasa śodhana and bhasma vidhi, mūrchaṇa, bandhana, gandha pisṭhī, mūlika bandha etc.*
24.	*Mahārasa, uparasa, loha and rasa bhandhas used for vedha*
25.	*Paribhāsā (Technical Terminology)*
26.	*Yantras, koṣṭhī, mūṣa, puṭa etc.* and their description (Equipment, furnaces, crucibles, quantum of heat required for incineration)

Table 3.1

3.3. *Kriyākaraṇa Viśrānti* :-

This part contains ten *Ullāsas*, each *Ullāsa* is titled in Sanskrit numerical order. For instance, *prathamollāsa, dvitīyollāsa* etc,. Each *Ullāsa* has been analyzed for its content. The findings are given below.

Ullāsa No.	*Kriyākaraṇa viśrānti*
1.	*Śodhana māraṇa vidhiḥ* of *uparasa* (purification and incineration methods), *Dvādasa loha* (metals), *Nava ratna* (precious stones) and *Nava uparatna* (semi precious stones), *Gandhaka siddhi* types, *Gandhaka taila sattva pātana* and types.
2.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *svarṇa* (gold)
3.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *rajata* (silver)
4.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *tāmra* (copper)
5.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *kānta, tīkṣṇa* and *muṇda loha* (iron)

6.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *vaṅga* (tin) and *nāga* (lead)
7.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *pittala* (brass), *kāmsya* (bronze) *varta loha*
8.	*Śodhana māraṇa vidhiḥ* (purification and incineration methods) etc. of *ratna* (precious stones)
9.	*Divyauṣadhi* (divine plants) description
10.	*Mahauṣadhi (medicines having great therapeutic values) description. pariśiṣṭam paribhāsa (technical terminology) bandha. Prakirṇakam-garbha sāra yantram etc.*

Table 3.2

3.4. Discussion – Salient Concepts

Ānandakanda is an excellent reference text to know the detailed account of 'dehavedha', and 'lohavedha' concepts of *Rasaśāstra*. The author of the text i.e *Manthāna Bhairava* was believed to be the chief royal physician in the court of king of *Śrīlaṅkā*. This indicates that the knowledge of the *Rasaśāstra* in olden days has been flourished not only in India but also in foreign countries like *Śrīlaṅkā*. There is an interesting historical link to a place called *ŚrīŚailam*. The author dedicated the entire twelfth *Ullāsa* of first *Viśrānti* specifically to 'Śrīśailam' a place in *Nallamala* forest of *Karnool* district in *Andhara Pradesh*. It is a famous pilgrimage and abode of lord *Śiva* known as *Mallikārjuna*. This is also one of the places where the renowned *Rasa siddha, Nāgārjuna* had moved about extensively. This indicates that the author was well acquainted with *Andhra Pradesh*. This factor is also vivid through the numerous Telugu terms that we come across in this text.

Each part of this book is named as *Viśrānti* which means the state of tranquility and feeling of ease. Each chapter of this book is known as *Ullāsa*. It Indicates that as one goes through the book one gets delighted and attains happiness.

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In Sanskrit literature, terms such as '*ullāsa*', '*taraṅga*', '*stabaka*' etc. are commonly used to denote chapters. But the term '*Viśrānti*' is unique in its usage.

3.4.1. Characteristics of *Pārada*

Pārada, the chief ingredient of *Rasaśāstra* has been described in detail along with *doṣa*, *Aṣṭādaśa samskāras*, *bandha*, *bhasma nirmāṇa vidhi*, *rasa bhasma sevana vidhi*, *apathya janya vikāra* etc. The *doṣas* of *pārada* are described separately.

They are fifteen *Naisargika doṣas* namely - *pārthiva*, *apya*, *āgneya*, *anila*, *gaja carma*, *pundari*, *visarpa*, *asahyāgni*, *hridrā*, *rakta carma*, *nāraṅga*, *rakta binduka*, *maṇḍūka* and *mala*.

Seven *Oupādhika doṣas* namely - *kālika*, *malinī kapotī*, *rakta*, *kañcuka*, *salomī*, *gairika* and *piṅgalī* and three *yogika doṣas* namely - *Nāga*, *Vaṅga* and *viṣa*. *Yantras* (48 type of equipments), *koṣṭhi* (3 types of furance), *mūṣā* (20 type of crucibles), *puṭa* (quantum of heat required for incineration of material) have also been described in 25th *ullāsa*, 1st *viśrānti*.

Fifteen *Guṭika* for *kramaṇa* of *pārada* have been mentioned in 10th *ullāsa*,

Sixteen *Rasa siddhas* are mentioned in 3rd *ullāsa*, 1st *viśrānti*. Before starting *rasa karma*, one should offer prayer to those *rasa siddhas*. Thirty eight *divyauṣadhi Kalpas* (formulations of divine herbs) have been mentioned for *rasāyana* purpose and several diseases in 5th *ullāsa*, 1st *viśrānti*.

Eighteen types of *viṣa* (poisonous herbs) their *śodhana* (detoxification methods) the treatment of adverse effects of these poisonous herbs and their utility for *rasāyana* purpose have been mentioned in detail in 14th *ullāsa*, 1st *Vistanti*.

More than 60 technical terms of *Rasaśāstra* have been described in *paribhāsa* chapter in 25th *ullāsa*, 1st *viśrānti*. For different *bhasmas* viz for *siddha rasa* 1/2 part, *svarṇa bhasma* 1/3 part, *rajata bhasma* 1/4 part, *tāmra bhasma* 1/6 part, *kānta bhasma* 1/8 part and for *ratna bhasma* 1/16 part have been ordained. The melting stage of a material during *satvapātana* termed as 'rekhāvartha' instead of 'Bījāvarta'.

3.4.2. Different *Kalpas* and *Oshadhis*

In the first *viśrānti*, *Aṅkola kalpa*, *rasāyana kalpas*, *Mahā kāmesvarī kalpa*, *abhyaṅgana kalpa* (*mahānīlitaila*, *candanāditaila*), *udavarti kalpa* and *kṣīra*, *añjana kalpas* have been mentioned in 16th *ullāsa*, 1st *viśrānti*. Pharmaco-therapeutic properties of eighty eight *Mahauṣadhis* (herbs having greater therapeutic value) have been mentioned in 9th *ullāsa*, 2nd *viśrānti*. Sixty four *Divyauṣadhis* have been mentioned in 10th *ullāsa*, 2nd *viśrānti*. These are useful in various *rasa karmas*.

3.4.3. *Uparasa, Loha, Ratna* and *Uparatnas*

In this text, the first eight *ullāsas* of 2nd *viśrānti* consists information on *uparasa, dvādaśa loha, navaratna* and *nava uparatna* are described in detail. *Pārada* has been considered *Mahārasa* and other materials are including in *uparasa* category. This *uparasa* category comprises following 48 substances, namely they are - gandhaka, tāla, śilā, tāpya, ghana, hiṅgula, gairikā, capalā, aśmaja, bhūnāga, haridrāśmā, agnijāra, kharparī, tuttha, kaṅkuṣṭha, girisindūra, ṭaṅkaṇa, kampilla, viṣa, kāsīsa, gaurīpāṣāṇa, bhūkhaga, poddāraśṛṅgī, sindūra, tuvari, rasāñjanaṃ, nīlāñjanaṃ, sauvīraṃ, srotoñjanaṃ, ahiphenakaṃ, puṣpāñjanaṃ, śaṅkha, śukti, śambūka, varāṭaka, sābunī, navakṣāra, cīnakṣāra, ākhumāraka, sarja, guggulu, lākṣā, kṣārāḥ, lavaṇāni, gorocana, amlavetasa, kāca, cchagaṇa and vāluka.

Dvādaśa lohas are described in detail in 2nd to 7th *ullāsa*, 2nd *viśrānti*. They are – svarṇa, rajata, tāmra, kāntaloha, abhraka satva, tīkṣṇā, muṇḍa, bhujaṅga (nāga), trapu (vaṅga), rīti (pittala) kāmsya and varta loha. *Maṇḍura* is known as *loha kiṭṭa*.

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Uparatna are described in detail in 8th *ullāsa*, 2nd *viśrānti*. They are – *sūryakānta, candrakānta, tarakānta, kāntaka, vaikrānta, nṛpāvartā, sasyaka, vimala* and *phirojaka*.

3.4.4. Ayurveda/Yoga Concepts

Other than the subject matter of *Rasaśāstra*, we also noticed many important preventive aspects of Ayurveda in this text at various places. These include *dinacarya, ṛtucarya, sadāchāra rasāyana, jalapāna, pācakāgni svarūpa* etc.

Importance of knowledge and practice of yoga in attaining *rasa siddhi* has been highlighted by the author in this text. He has mentioned *ṣaḍaṅga yoga* (excluding *yama* and *niyama*). While describing the qualities of a *śiṣya* (student) of *Rasaśāstra*, narrating him as '*satkarma nirata sūri*' in the 2nd *ullāsa* of 1st *viśrānti*. In the 2nd *viśrānti*, synonyms of some of important herbs and metals was the topic discussed that went on till 10th *ullāsa*.

3.4.5. Animal (Products) – *Bhūnāga*

Considering the opinion of Dr. A.K. *Biswas*, for centuries, mineral engineering has been practiced in India. Also, he spoke about the extraction of metallic content from the metabolic product of *bhūnāga* (earthworm) described in *Rasaratna Samucchaya*. In *Ānandakanda*, *bhūnāga*[113] has been described for medicinal purposes. Along with herbs and a set of minerals, its use has been highlighted in contexts of '*Jārana*', '*Siddhabiḍa*' and other such concepts.

Most importantly, *dravya* classifications have been discussed very lucidly by the author. This scheme has been adopted for a *Rasaśāstra* ontology for the software interface developed for the present work. Regarding '*Pārthiva*' category, to correlate the classifications, a comparative study is done considering *Ānandakanda* with five other *Rasaśāstra* texts. This context will be discussed in the fourth chapter.

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[113]भूनागः धिरीनागश्च भूलग्ना रक्तजन्तुकः ।

बिरिजः धिरिजन्तुश्च विषघ्नो रक्तखण्डकः ॥*Ā*.K. 2.1218

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As discussed before, *Ānandakanda* includes many alchemical processes, besides numerous metallic preparations, that has been labeled as a *tāntric* text. We feel that whether this text is a *tāntric* one or not, it is a treasure house of *Rasaśāstra* information. At this juncture, we would like to conclude this chapter by quoting Dr. *Biswas*'s historical note on Indian alchemy.

"Alchemy was introduced in Europe during the 12th Century A.D., and as recently as the beginnings of 17th Century Europe was still debating on the older theories of elements, and *Libavius* wrote his *Alchymia*. Thus the Indian record on science was not inferior to the global standard till the balance was finally tilted in favor of Europe during Eighteenth century, when the modern concept of elements, atoms, molecules and chemical bonds added new understanding to the old techniques, and finally made the Indian science obsolete [A.K. *Biswas* 1980:42]."

CHAPTER 4

A study of Pārthiva category in Ānandakanda and other Rasaśāstra texts

4.1. Introduction

Rasaśāstra has a prominent role in Ayurvedic Pharmaceutics. It mainly deals with conversion of lower metals and uses mercury and other substances of mineral origin in the Ayurvedic formularies. As discussed in the second chapter, *Caraka* has classified the *dravya* (substance) into three types as *Audbhid* (Plant origin), *Jāṅgama* (animal origin) and *Pārthiva* (mineral origin). According to him, all earthly things like metals, minerals and precious stones come under *Pārthiva* category. *Rasaśāstra* texts have contextualized the same category by describing as 'Śaktirasa', 'Rasa', 'Mahārasa', 'Uparasa', 'Sādhāraṇarasa', 'Loha', 'Ratna', 'Uparatna' as its sub-categories. Some *Rasaśāstra* texts, followed a little different categorization. However, all these classifications have been broadly considered as viz. 'Rasa', 'Mahārasa', 'Uparasa', 'Loha', 'Ratna', and 'Uparatna'. To record such variations, Ānandakanda, has been compared with five other popular *Rasaśāstra* texts to show its significance and place in the history of *Rasaśāstra*.

4.2. Drugs of mineral origin

Mercury, as a metal, is highly toxic and it has to be thoroughly processed before its use as a drug. A great controversy prevails over the toxicity of many metallic drugs used in *Rasaśāstra*. However, there are eighteen purification methods described in literature, to detoxify the impurities of mercury and other metals. Only after purification processes, they can be used in combination with other herbal drugs. Mercury belongs to drugs of mineral origin. There are certain advantages while using

drugs of mineral origin (As per the convention of '*atikrāntāvekṣaṇam*', this aspect has been discussed in the first chapter). The observations are as follows -

- ◆ "Suggested dosage of drugs of mineral origin is very little in quantity (*alpamātropayogitvam*)
- ◆ Drugs of mineral origin are easily palatable (*aruceḥ aprasaṅgaḥ*)
- ◆ Drugs of mineral origin bestow one with quick health. (*kṣipramārogyadāyitvam*)[114]"

These textual references are substantive in establishing the supremacy of *rasa* drugs over herbal preparations. Nevertheless, all substances of mineral origin are called '*Pārthiva*' in the *Rasaśāstra* texts.

4.3. *Pārthiva* category in *Ānandakanda*

As discussed in the previous chapter, Ānandakanda has two major divisions called *Viśrāntis* – 1. *Amṛtīkaraṇa Viśrānti* and 2. *Kriyākaraṇa Viśrānti*. These two divisions have got subdivisions called '*Ullāsas*'. The structure of Ānandakanda has already been presented in the third chapter. First *Ullāsa* of first *Viśrānti* describes *pārada* as the only *rasa*. Great importance has been given to mercurial preparations in this *Viśrānti*. In the first *Ullāsa* of second *Viśrānti*, *Uparasa*, *Loha*, *Ratna*, *Uparatna* categories and their classifications are discussed. However, as already been said, all these sub-classifications come under *Pārthiva* category. **Table 4.1** summarizes the categorical division of *Pārthiva Dravyas*. Essentially, forty nine *Uparasas* are listed, in which nine *Audbhid dravyas*, ten *Jāṅgama dravyas* and thirty *Pārthiva dravyas* are further categorized. Interestingly, some twelve *Mahārasas* are included in the '*Uparasa*' category, which is noteworthy for further studies in this direction.

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[114]alpamātropayogitvāt aruceraprasaṅgataḥ ।

kṣipramārogyadāyitvāt auṣadhebhyo dhiko rasaḥ ॥ R.M.1.4 ॥

Categories	Contents
Uparasa	"gandhaka, tāla, śilā, tāpya, ghana, hiṅgula, gairikā, capalā, aśmaja (śilājatu), haridrāśmā, kharparī, tuttha, girisindūra, ṭaṅkaṇa, kāsīsa, gaurīpāṣāṇa, bhūkhaga, sindūra, tuvari, rasāñjanaṃ, nīlāñjanaṃ, sauvīraṃ, srotoñjanaṃ, puṣpāñjanaṃ, sābuṇī, navasāra, ākhumāraka, lavaṇāni, kāca, • **Audbhid** - ahiphenaka, kampillaka, cīnakṣāra, sarja, guggulu, lākṣā, kṣārāḥ, kankuṣṭha, āmlavetasa • **Jaṅgama**- bhūnāga, agnijāra, viṣa, poddāraśṛṅgī, śaṅkha, śukti, śambūka, varāṭaka, gorocana, chagaṇa (vanophala) • **Mahārasas** - tāpya, hiṅgula, capalā, aśmaja (śilājatu), tuttha, gaurīpāṣāṇa, kharparī, srotoñjanam, rasāñjanam, nīlāñjanam, sauvīrāñjanam, puṣpāñjanam"[115]
Loha	svarṇa, rūpya, kāntā, abhrasattva, tīkṣṇa, muṇḍaka, bhujaṅga, trapusa, rītiḥ, kāṃsya, vartaka, maṇḍūra (lohakiṭṭa)'[116]
Ratna	māṇikya, muktāphala, vidrumā, tārkṣya, puṣya, bhidura, nīla, gomedhaka, viḍūraka[117]
Uparatna	sūryakānta, candrakānta, tārakānta, kāntaka, vaikrānta, nṛpāvartaḥ, sasyaka, vimalā, peroja[118]

Table 4. 1 *Pārthiva* category of *Ānandakanda*

Interestingly, it is not clear, why the term '*Mahārasa*' comes under '*Uparasa*' category as per the above tabular information.

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[115] Ā.K 2.1.4-8. p.341
[116] Ā.K 2.1.9 -10, p.342
[117] Ā.K 2.1.11, p.342
[118] Ā.K 2.1.12, p.343

Hereafter, using the above information, a comparison has been made with some five popular texts of *Rasaśāstra*. A brief introduction of all five texts has been provided before proceeding to the results of comparative study. The list of texts are 'Rasahṛdaya Tantram', 'Rasendramaṅgalam', 'Rasārṇavam', 'Rasaratnasamuccaya' and 'Rasaratnākara.'

4.4. Five *Rasaśāstra* texts
4.4.1. *Rasahṛdaya Tantram*

Govinda *Bhagavatpāda*, the guru of *Śrī Ādiśaṅkarācārya* has authored *Rasahṛdaya Tantram* sometime in 7th century A.D. Chronologically, this text precedes *Ānandakanda* and has been written in a *vedāntic* style. Chapters are named as *Avabodhas*. Rasa has been referred as 'Pārada'. 'Mahārasa', 'Uparasa', and 'Loha' categories with their respective constituents have been discussed by the author in this text. *Rasahṛdaya Tantra* speaks mostly about 'dehavedha', but almost references to treating diseases. 'This book explains 18 purification methods of mercury, several mineral formulations, process of administration, and diet[119].

4.4.2. *Rasendramaṅgalam*

Nāgārjuna's authorship has been attributed to this text, sometime between 7-8 century A.D. Hence, *Rasendramaṅgalam* is prior to *Ānandakanda*'s composition. This text gives a lot of details regarding the use of *pārada* that has been named as 'sūta'. Classifications on 'Mahārasa', 'Uparasa', 'Sādharanarasa' and 'Loha' were discussed which are considered under *Pārthiva* category. Though the list of contents are not mentioned for each classification, their practical use in medicinal preparations has been discussed in the text.

4.4.3. *Rasārṇavam*

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[119]http://www.divinewellness.com/ayurveda/alchemy.html

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The text was believed to be written in 12th century A.D. Chronologically, this text precedes *Ānandakanda*. A detailed account of transforming lower metals to noble metals, and other features such as transformational changes in color, flame and flair of each metal has been discussed by the author. The chapters in this text are called *pāṭalas*. This text describes metallic categories as 'rasa', 'Mahārasa', 'Uparasa' and 'Loha'. Prof. P.C. Ray has done extensive work on this text. Also, *Rasārṇava* speaks mostly about 'dehavedha', but almost references to treating diseases. 'This book talks about instruments, preparation of various formulations, different types of measurements, and extraction of metals from ores[120].'

4.4.4. *Rasaratna Samuccaya*

This text was written by *Vāgbhaṭa*, probably between 13th to 14th centuries A.D. *Rasaśāstra* acquired a wide popularity in this period. *Rasaratnasamuccaya* has condensed all the *Rasaśāstra* knowledge from earlier texts to made it more popular. Through this text, a detailed description of *Yantras* is found in this magnum opus of Indian alchemy. 'This book has thirty chapters and is divided into two parts. The first part contains eleven chapters and deals with the classification of metals and minerals, purification and ashing procedures, and extraction from the ore, among other topics. The second part has 19 chapters, which deal with diseases and their treatments, etiological factors, line of treatments and mineral preparations. The details of constructing the pharmacy are also discussed[121].'

4.4.5. *Rasaratnākara*

This text was written by Nityānādhasimha, in the 13th century A.D. It has five chapters namely 1. *Rasakāṇḍa*, 2. *Rasendrakāṇḍa*, 3. *Vaidikakāṇḍa*, 4. *Rasāyanakāṇḍa* and 5. *Mantrakāṇḍa*. It is considered that the first three chapters are related to Ayurveda. In this text, *Mahārasa*, *Uparasa*, *Loha* and *Upaloha* classifications are mentioned.

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[120]ibid
[121]ibid

Ānandakanda depicts a clear structure of *Pārthiva* category. It is observed that the *'Uparatna'* category is exclusive to *Ānandakanda*, in comparison with other texts.

Table 4.2 demonstrates the clear picture of *Pārthiva* category and its sub-categories. The first column lists the total six texts and the next column describes the listed categories. The '+' sign indicates the existence of respective category in the listed texts and the '-' sign indicates the absence of the respective category.

Distribution of sub categories of *pārthiva*

Text	Categories				
	Mahārasa	*Uparasa*	*Loha*	*Ratna*	*Uparatna*
1. *Ānandakanda*	-	+	+	+	+
2. *Rasahṛdaya Tantram*	+	+	+	-	-
3. *Rasendramaṅgalam*	+	+	+	-	-
4. *Rasārṇavam*	+	+	+	-	-
5. *Rasaratna Samuccaya*	+	+	+	+	-
6. *Rasaratnākara*	+	+	+	-	-

Table 4.2

Certain sub categories are typical to respective texts as evident from the above table. Now, each of these sub categories are analysed with reference *Ānandakanda* correlated with other five texts. This study facilitates one to look at the distribution of *Pārthiva* category in a more detailed manner. Accordingly, similarities and dissimilarities can be observed for future work.

4.5. Pārthiva reflected as Sub-category in texts

4.5.1. *Mahārasa*

After *rasa*, the next important group of minerals and their importance in formulations is called *Mahārasa*. **Table 4.3** details the minerals involved in the *Mahārasa* category. As said earlier, *Ānandakanda* has not referred to any *Mahārasa* but included all the *Mahārasas* mentioned in the *Uparasa* category. Except *Ānandakanda*, all remaining texts have referred to *Mahārasas* in respective category.

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Description of 'Mahārasa' category

Text	Reference	*Mahārasas*
1. *Ānandakanda*	*No*	-
2. *Rasahṛdaya Tantram*	*Yes*	'vaikrānta, kāntapāṣāṇa, sasyaka, mākṣika, vimalā, śilājatu, darada, rasaka' [122]
3. *Rasendramaṅgalam*	*Yes*	vaikrānta, mākṣika, vimalā, śilājatu, tutta, capalā
4. *Rasārṇavam*	*Yes*	'mākṣika, vimalā, śailā (śilājatu), capalā, rasaka, sasyaka, darada, srotoñjana' [123]
5. *Rasaratna Samuccaya*	*Yes*	'abhraka, vaikrānta, mākṣika, vimalā, śilājatu, tuttha, capalā, karparī' [124]
6. *Rasaratnākara*	*Yes*	'rasaka, vimalā, tāpya, capalā, tuttha, añjana, hiṅgula, sasyaka,' [125]

Table 4.3

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[122]R.H.T.9.4, p.127
[123]R.M.7.2, p.83
[124]R.R.S.2.1, p.14
[125]R.R.2.3.1, p.58

4.5.2. *Uparasa*

The next important group of minerals based on the level of importance in formulations, after *Mahārasa*, are called *Uparasas*. **Table 4.4** details this category.

Description of 'Uparasa' category

Text	Uparasas
1. **Ānandakanda**	gandhaka, tāla, śilā, tāpya, ghana, hiṅgula, gairikā, capalā, aśmaja (śilājatu), bhūnāga, haridrāśmā, agnijāra, kharparī, tuttha, kaṅkuṣṭha, girisindūra, ṭaṅkaṇa, kampilla, viṣa, kāsīsa, gauṛīpāṣāṇa, bhūkhaga, poddāraśṛṅgī, sindūra, tuvari, rasāñjanaṃ, nīlāñjanaṃ, sauvīraṃ, srotoñjanaṃ, ahiphenakaṃ, puṣpāñjanaṃ, śaṅkha, śukti, śambūka, varāṭaka, sābuṇī, navasāra, cīnakṣāra, ākhumāraka, sarja, guggulu, lākṣā, kṣārāḥ, lavaṇāni, gorocana, amlavetasa, kāca, cchagaṇa, vālukā[126]
2. **Rasahṛdaya Tantram**	gandhaka, gairika, manaḥśilā, haratāla, khecara, añjana, kaṅkuṣṭha, kāsīsa'[127]
3. **Rasendramaṅgalam**	gandhaka, gairika, kāsīsa, kāṃkṣī, sphaṭikā, haritāla, manaḥśilā añjana, kaṅkuṣṭha
4. **Rasārṇavam**	'gandhaka, tālaka, śilā, saurāṣṭrī, khura, gairika, rājāvarta, kaṅkuṣṭha'[128]
5. **Rasaratna Samuccaya**	'gandhaka, gairika, kasīsa, sphaṭikā, haritāla, maṇiśilā, añjana, kaṅkuṣṭha'[129]
6. **Rasaratnākara**	'gandhaka, kāsīsa, śilājatu, kaṅkuṣṭha, bhūnāga, rājāvarta, gairika'[130]

Table 4.4

[126] Ā.K.2.1.4-9, p.341
[127] R.H.T.95, p.128
[128] R.M.7.56, p.94
[129] R.R.S.3.1, p.44
[130] R.R.3.158, p.57

Contents of *Uparasa* in *Ānandakanda* is more in number in comparison with other texts. *Rasaratnākara* refers to seven *Uparasas* whereas remaining texts have referred eight.

4.5.3. Loha (Metal)

'*Luh*' is the verbal root for the term '*Loha*', which means 'to extract'. The *Loha* group contains metals like gold, silver, etc. According to the listed texts such metals are called '*dhātu varga*'. **Table 4.5** describes all the '*Lohas*' from the listed texts.

Description of 'Loha'

Text	Lohas
1. **Ānandakanda**	*svarṇa, rūpya, kāntā, abhrasattvaṃ, tīkṣṇaṃ, muṇḍakam, bhujaṅgaṃ, trapusaṃ, rītiḥ, kāṃsyaṃ, vartakaṃ , maṇḍūra (lohakiṭṭa)*[131]
2. **Rasahṛdaya Tantram**	*svarṇa, rajata, tāmra, nāga, vaṅga, kānta, tīkṣṇā, muṇḍa, abhrakasattva*[132]
3. **Rasendramaṅgalam**	*svarṇa, tāra, tāmra, abhraka, nāga*
4. **Rasārṇavam**	*suvarṇa, rajata, tāmra, tīkṣṇā, vaṅga, bhujaṅga*[133]
5. **Rasaratna Samuccaya**	*suvarṇa, rajata, tāmra, tīkṣṇā, nāga, vaṅga, kāṃsya, vartā*[134]
6. **Rasaratnākara**	*svarṇa, tāra, tāmra, nāga, vaṅga, kānta, tīkṣṇā, muṇḍa, kāṃsya, vartā, ghoṣakam*[135]

Table 4.5

Ānandakanda has referred to 12 *Lohas*, whereas *Rasaratnākara* has 11 to its credit, *Rasahṛdaya Tantram* has stated 9 *Lohas*, wherein *Rasaratnasamuccaya*

[131] Ā.K.2.1.9-10, p 342
[132] R.H.T.9.6, p.128
[133] R.M.7.97, p.100
[134] R.R.S.5.1, p.76
[135] R.R.1.8.1

described 8 only, *Rasārṇavam* has a reference to 6 *Lohas* and *Rasendramaṅgalam* quotes about 5 lohas only. With a slight variation in *Rasaratnākara*, the loha category has been described as '*Dhātu* (mineral)' and the metal '*maṇḍūra* (*lohakiṭṭa*)' as *Upadhātu* whereas *Ānandakanda* has included *maṇḍūra* in the '*Loha*' category itself.

4.5.4. *Ratna (Gem stones)*

Ratnas are precious stones. They have a great impact on human beings with regard to health and also have an astrological importance, especially in Indian context. People wear gem stones to reduce the negative planetary influence on humans. For each of the nine planets, respective gem stones are attributed in the tradition. Ancient Indians have realized the potential of these stones and accordingly interpreted their curative powers in disease etc. **Table 4.6** describes various '*Ratnas*.'

Description of 'Ratna'

Text	Reference	Ratnas
1. *Ānandakanda*	+	*māṇikya, muktāphala, vidrumā, tārkṣya, puṣya, bhidura, nīla, gomedhaka, viḍūraka*[136]
2. *Rasahṛdaya Tantram*	-	*No*
3. *Rasendramaṅgalam*	-	*No*
4. *Rasārṇavam*	-	*No*
5. *Rasaratna Samuccaya*	+	*padmarāga, muktaphala, pravala, garuḍa, puṣyarāga, vajram, nīlam, vaiḍūryam, gomedakam*[137]
6. *Rasaratnākara*	-	*No*

Table 4.6

From the above table, it can be stated that except *Ānandakanda* and Rasaratnasamuccaya, all remaining texts have no specific category called '*Ratna*'. But, interestingly, their utility in processing in formulations has been discussed in different contexts.

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[136] *Ā.K.2.1.11, p.342
[137] R.R.S.4.1-6, p.74

4.5.5. *Uparatna (semi gem stones)*

Upratnas are gem like stones or rather called semiprecious gems. Depending on the luster, hardness and transparency, these sub stones are categorized and named as *'Uparatnas'*. Very interestingly, amongst the referred six texts of *Rasaśāstra*, only *Ānandakanda* has a definite list of *'Uparatnas'*. **Table 4.7** lists out the contents of *'Uparatna'* category from *Ānandakanda*.

Description of 'Uparatna'

Text	Reference	*Uparatna*
1. *Ānandakanda*	+	*sūryakānta, candrakānta, tārakānta, kāntaka, vaikrānta, nṛpāvartaḥ, sasyaka, vimalā, peroja* [134]
2. *Rasahṛdaya Tantram*	-	*No*
3. *Rasendramaṅgalam*	-	*No*
4. *Rasārṇavam*	-	*No*
5. *Rasaratna Samuccaya*	-	*No*
6. *Rasaratnākara*	-	*No*

Table 4.7

Apparently, there is no list called *'Uparatna'* as such, texts other than *Ānandakanda* have references to stones that can be considered under *Uparatna* category at various places. Their contextual use and processing methods can be found in the respective texts, as stated before.

In *Ānandakanda*, *Uparatna* category is unique and completely different from all the other *Rasaśāstra* texts. One distinctive feature that makes *Ānandakanda*

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[134] *Ā*.K.2.1.12, p 343

unique is that it was not influenced by any previous *Rasaśāstra* Texts.

4.6. Summary

The complete absence of *Mahārasa* category in *Ānandakanda* and inclusion of *dravyas* of herbal and animal origin along with mineral origin in its *Uparasa* category making it a formidable list of forty nine, stands testimony to the uniqueness of *Ānandakanda*. Perhaps, it also offer pointers to an independent South Indian *Rasaśāstra* tradition.

It is a matter of conjecture why animal and herbal *dravyas* were included along with *Pārthiva* under *Uparasa* category. It could be perhaps due to importance these *dravyas* have in purification and processing of minerals that they were considered worthy enough to be categorised along with them. *Ānandakanda*'s list of *Pārthiva* dravyas seems to be complete as it rightly considered gems and semi-precious stones meriting separate categorisation rather than treating them as mere ingredients used in processing methods.

The evolution of *Pārthiva dravyas* used in *Rasaśāstra* and their categorization spanning over a period of 700 years starts from 7th Century AD to 14th Century A.D. across North and South India demonstrates the influence of the preceding *Rasaśāstra* texts over each succeeding texts. The next and final chapter explains the efforts made in digitizing the *Ānandakanda* contents in developing the AKB.

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CHAPTER 5

Ānandakanda Knowledge Base

5.1. Introduction

Now, we live in a computer age. Technology is being incorporated in every aspect of academic research. With the advent of computers, at least, for the past seventy five years, the world is enjoying the advantages of using computers in various fields. Establishing their utility, these machines facilitate the data processing very smooth. After the advent of Internet, global boundaries are rather disappeared. Information flow started to flood the knowledge seekers.

Computers can store large numbers of data. "A modern digital computer represents data using the binary numeral system. Text, numbers, pictures, audio, and nearly any other form of information can be converted into a string of bits, or binary digits, each of which has a value of 1 or 0. The most common unit of storage is the byte, equal to 8 bits. A piece of information can be handled by any computer or device whose storage space is large enough to accommodate the binary representation of the piece of information, or simply data[139]." For example, the entire one lakh (1,00,000) verses of the great epic Mahabharata can be digitized to a mere 10 Mega Bytes of data, which can be ported to a tiny USB drive.

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[139]http://en.wikipedia.org/wiki/Computer_storage

Digitization means creating a computerized representation of a printed analog. More specifically, 'digitizing means simply capturing an analog signal in digital form[140]'. An electronic text (e-text) facilitates one to browse through the contents of text. The main distinction between a printed text and e-text is that searching for some information is not easy in the former, but, the latter, offers the search results almost in no time. The data can be indexed alphabetically, say, verses or words in a Sanskrit text. Once a text is digitized, the required strings of data can be copied and used for referencing purpose in authoring books, articles in context of academic research. So, the time spent in either searching or typing the required verse/quotation is drastically saved.

Considering the previous Mahabharata example, any text, that has been made electronically accessible, can be shared through storage media like Compact Disk, USB drives besides downloading it from websites. Searchable electronic versions of texts make academic life very simple. Also, text books are going through a 21st century electronic revolution as many Indian, foreign Universities have introduced e-learning systems. E-texts are very useful even to students. In one of the foreign University websites it is stated thus - "Once text is in an electronic format the text can be adapted to the student by methods such as enlarging the font, using text-to-speech software, changing the contrast between the text and background, and using summary analysis programs[141]."

5.2. Advantages and Disadvantages of E-Texts

Instructors must analyze the situation to decide if the use of electronic forms text will provide students with better access to the reading materials[142]. The following table

[140]http://en.wikipedia.org/wiki/Digitization
[141]http://www.unf.edu/~tcavanau/presentations/SITE/ElectronicTextsasCourseTextbook.htm
[142]ibid

describes the pros and cons of e-texts.

Advantages of E-texts	Disadvantages of E-texts
✓ Cost (depending on book)	✘ Book desired is not available
✓ Scaffolds and supports built in	✘ Formats differences
✓ Hyperlinking to other resources	✘ Internet access needed
✓ Text to speech output	✘ Computer access needed
✓ Direct linking to sections of books for students to read	✘ Not having a hard copy to reference sections in class
✓ Weight of book	✘ Reluctance of faculty/ students to go with electronic versions of texts
✓ Interior text searching	
✓ Annotation logs	

Table 5.1

Particularly in higher education, most academic researchers found it advantageous using electronic versions of printed texts. E-texts are made available by research groups in many world languages.

5.3. Sanskrit E-Texts

Indologists from India and other countries have immensely contributed to the corpus of Sanskrit e-texts. To mention a few -

1. Göttingen Register of Electronic Texts in Indian Languages[143] (GRETIL) that has digitized Indological materials from Central and Southeast Asia. From Vedic

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[143]http://gretil.sub.uni-goettingen.de/gretil.htm

literature to classical Sanskrit literature numerous texts made available with this site.

2. Thesaurus Indogermanischer Text- und Sprachmaterialien[144] (TITUS) is another web resource that offers many Vedic and Sanskrit e-texts.

3. The Digital Library of India[145] (DLI) has a unique number of Sanskrit e-texts, including Ayurveda *Saṃhitās*. But most of the texts are in image form and search through such database is not an easy task.

4. Sanskrit Documents[146] website is one of the oldest digital archives of Sanskrit texts on internet. Beginning from Vedic literature to *Stotra* literature, texts can be downloaded in 'pdf' format.

5. Kyoto University's archive has a limited number of texts but important texts, which includes Ayurvedic[147] texts also.

6. Indological e-text archive[148] has good number of Vedic and Sanskrit texts.

7. Brown University's 'The Sanskrit Library[149]' has a very good corpus of Vedic and Sanskrit texts.

8. Internet Text Archive[150] has good collection of scanned Sanskrit texts including Ayurveda texts.

9. Muktabodha Indological Text Collection[151] has e-texts on Tantra, *Śaivasiddhānta* and *Āgama* Vedic literature.

10. A website on Search and Retrieval of Indic Texts[152] (SARIT) provides effective search facility on Sanskrit texts.

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[144] http://titus.uni-frankfurt.de/indexe.htm
[145] http://www.new.dli.ernet.in/
[146] http://sanskritdocuments.org/
[147] http://www.cc.kyoto-su.ac.jp/~yanom/sanskrit/ayurveda/
[148] http://indology.info/etexts/archive/etext/
[149] http://sanskritlibrary.org/tomcat/sl/TextsList
[150] http://archive.org/details/texts
[151] http://muktalib5.org/dl_catalog/dl_catalog_user_interface/dl_user_interface_frameset.htm
[152] http://sarit.indology.info/basic.shtml

11. Department of Sanskrit Studies[153], University of Hyderabad has digitized a good number of *Nyāya*, *Vyākaraṇa* and a few Ayurveda texts.

12. Pandanus Sanskrit e-texts[154] provide access to about fifty Sanskrit *kāvyas*. The database allows only to search the e-text corpus but not for browsing.

5.4. Ayurveda/Rasaśātra E-texts

As mentioned in the introduction of this thesis, very few efforts have been noticed in the electronic version of Ayurveda or *Rasaśātra* texts. Dr. Oliver Helwig's efforts are noteworthy in this context. His website lists more than a dozen of *Rasaśātra* texts with search facility. Really his efforts are praiseworthy.

With regard to Ayurveda software, Center for Development of Advanced Computing (C-DAC) has developed a software (s/w) called 'AYUSOFT. This s/w facilitates the Ayurvedic physicians to get statistical probabilities of diseases in the diagnostic process.

Tilak Maharashtra Vidyapeeth's '*Triṣkandha Ayurvediya Kośa*[155]' project has developed software to obtain knowledge about the causes, the symptoms, the treatment pertaining to health and diseases.

5.5. Ānandakanda Knowledge Base (AKB)

The current chapter discusses the actual interface developed for *Ānandakanda*. As discussed earlier, as per the convention of *tantrayukti* '*atikrāntāvekṣaṇa*', terms pertaining to plants, animal products and minerals have been discussed. This

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[153]http://sanskrit.uohyd.ac.in/
[154]http://iuff.cuni.cz/pandanus/electronictexts/
[155]http://www.tmv.edu.in/santripro2.asp

classification is based on *Cakara Saṃhitā*. Total Six hundred sixty three (663) terms are indexed, which are unique in nature. To each term, that belongs to respective categories, additional information such as *liṅga* (gender), *varṇānta* (vowel/consonant ending), *niṣpatti* (grammatical derivation), *vyutpatti* (etymology), *paryāya* (synonyms) and *udhṛtasaṃkhyā* (reference number) has been manually tagged, consulting Sanskrit and Ayurveda *Nighaṇṭus*. For the terms which do not have any associated synonyms in *Ānandakanda*, they are incorporated from the referred sources.

The interface has a search facility. A certain tagging convention is followed to access the database. Entries in word index (663 words), were made as the head words for which additional information, has been supplemented. If the queried word belongs to the plant category, the interface is arranged in such a way that the related *Rasapañcaka* (five qualities of pharmaco-dynamics of a drug) information is also displayed. The *Rasapañcaka* consists the following information- 1.*rasa* (taste) 2. *guṇa* (Physical Property) 3. *vīrya* (potency) 4. *vipāka* (Metabolic after effect) and 5. *karma* (action). It also includes respective Latin name and its family information. In the interface, the *dravya* classification has been done based on the primary *dravya*. The ontological classification of *dravya* has been discussed before in a chapter titled 'Importance of *Dravya* Classification in Ayurveda and *Rasaśāstra*'. Taking *padārtha* as the basic building block, the ontological categories like 'dravya', 'sthāvara' (*pārthiva* and *audbhid*), 'jāṅgama' were accommodated.

Each of such concepts is like a node, expanding by which respective terminology is displayed that has been linked with grammatical information and *Rasapañcaka*. The function of each software module is discussed with supporting screen shots. Following list demonstrates the modules that are developed during developing the *Ānandakanda*

Knowledge Base:

1. *Ullāsa* Search
2. *Ullāsa* Tagging
3. Topic Index
4. Word Search
5. *Rasapañcaka* Search
6. *Rasaśāstra* Ontology

5.5.1. Ullāsa Search

This module provides information on the total thirty six *Ullāsa*s spread into two *Viśrāntis* (*Amṛtīkaraṇaviśrānti, Kriyākaraṇaviśrānti*). Each *Ullāsa* describes certain contexts. The total thirty six *Ullāsa*s (along with related information) are detailed as per the tabular information given below. Contents of the *Viśrānti*s has been discussed in third chapter titled 'Structure of Anandakanda.'

5.5.2. *Ullāsa* Tagging

Each *Ullāsa* has been separated as a text file and Hyper Text Markup Language (HTML) has been used to each file for tagging plain text in to a structural text. A list box is created which contains all thirty six *Ullāsa*s which are abbreviated as **A.K-1.1** through **A.K.2.10**, including both *Viśrānti*s. The numbering system followed is in two levels. The first level refers to the '*Viśrānti*' and the second level to the '*Ullāsa*'. So, A.K-1.1 means first *Ullāsa* in first *Viśrānti* in *Ānandakanda*. All the thirty six *Ullāsa*s can be browsed through an on line option with respective headings. For instance, if the queried chapter is **A.K-1.1**, the result is shows as below -

कैलासशिखरासीनं कालकन्दर्पनाशनम् ।
प्रसन्नं परमेशानं जगदानन्दकारणम् ॥ १ .१.१ ॥
प्रणम्य परया भक्त्या भैरवी स्तुतिगातनोत् ।
देवदेव महादेव जन्मदारिद्र्यनाशन ॥ १ .१.२ ॥
प्रसीद करुणामूर्ते प्रसन्न परमेश्वर ।
दिव्यागमरहस्यानि कुलकौलादिकानि च ॥ १ .१.३ ॥
जाने तव प्रसादेन मायामङ्गलविग्रह ।
श्रोतुमिच्छामि सर्वेश तव दिव्यरसायनम् ॥ १ .१.४ ॥
जराजन्मामयघ्नं च खेचरत्वादिसिद्धिदम् ।
दारिद्र्यदुःखशमनं ब्रह्मत्वादिवरप्रदम् ॥ १ .१.५ ॥

ईश्वर उवाच

साधु साधु गुहाभागे सर्वलोकोपकारिणि ।
तत्सर्वं जायते सूताच्छुद्धात्मप्राणवल्लभे ॥ १ .१.६ ॥
सर्वलोकोपकारार्थं गुह्यात् गुह्यतमं हितम् ।
रसेन्द्रस्य समुत्पत्तिं लक्षणं च सुरार्चिते ॥ १ .१.७ ॥
तत्सर्वं सम्प्रवक्ष्यामि शृणु भैरवि सम्प्रति ।

5.5.3. Topic Index

This module contains all topics which are discussed in *Ānandakanda*. For instance, *Rasotpatti*, *Gandhaka śuddhi* etc. Additionally, *yantras*, *koṣṭhīs*, *mūṣās* were also mentioned. Extensible Markup Language (XML) has been used to tag each topic from beginning to end in each *Ullāsa*, on the back end of the interface. The titles of topics have been highlighted and made as a separate list. Total 567 topics have been identified which are available through a list box. List of all topics is provided at Appendix-B. Searching options are created for a quick reference. The advantage of this

module is that each topic can be selected and read instantly. For example, the desired topic is वज्रद्रुति, the result is as follows -

<div align="center">

वज्रद्रुतिः

त्रिक्षारं चणकाम्लं च रामठं चाम्लवेतसम् ।
ज्वालामुखी चेक्षुरकं स्थलकुम्भीरसेन च ॥ 1.7.10 ॥
पिष्ट्वा स्नुहार्कयोः क्षीरैस् तद्गोले मृदु हीरकम् ।
निक्षिपेत्तच्च जम्बीरे दोलायन्त्रे त्र्यहं पचेत् ॥ 1.7.11 ॥
एवं कृतो हीरकस्य द्रुतिर् भवति सूतवत् ।

</div>

5.5.4. Word Search

This module has a provision to search from the index of 663 terms that are classified into three groups pertaining to plants, animal products and minerals. The terminology, category wise, has been alphabetically arranged. One can select the required category to get information on a word while selecting the desired encoding scheme. Two notations are used here – 'WX' and 'UNICODE-DEVANAGARI'. As the user inputs character in the text field, the software offers on-fly suggestions. To develop this module, Scripting language Practical Extraction and Reporting Language (PERL) and Common Gateway Interface (CGI) have been used.

Each term is tagged with information in lines of conventional dictionary structure, i.e. शब्द (term) लिङ्ग (gender), वर्णान्तः (end letter), निष्पत्तिः (grammatical derivation), उद्धृतसंख्या (textual reference), व्युत्पत्तिः (Etymology) and पर्यायाः (synonyms). All these elements are automatically generated for each term. For लिङ्ग (gender), वर्णान्तः (end letter), निष्पत्तिः (grammatical derivation) and व्युत्पत्तिः (Etymology), Sanskrit and

Ayurveda lexicons such as *Śabdakalpadruma*, *Vācaspatyam*, *Amarakośa* and *Bhāvaprakāśa* (Ayurvedic materiamedica) have been referred. For synonyms, *Ānandakanda* and other Ayurvedic dictionaries such as *Danvantari Nighaṇṭuḥ*, *Rāja Nighaṇṭuḥ*, *Kaiyadeva Nighaṇṭuḥ*, along with *Bhāvaprakāśa*, and other above mentioned Sanskrit dictionaries have been consulted. In short, table 2 below indicates the structuring of the elements of this work.

Elements incorporated in word search module

Elements	Meanings
1. शब्दः	Term
2. लिङ्गम्	Gender
3. वर्णान्तः	End letter
4. निष्पत्तिः	Grammatical Derivation
5. व्युत्पत्तिः	Etymology
6. उद्धृत संख्या	Textual Reference
7. पर्यायाः	Synonyms

Table 2

Each of the elements is elaborated as follows:

5.5.4.1. शब्दः (Technical Term) :- Sage *Patañjali* said in *Mahābhāāṣya* - 'One word properly known and used, fulfills the desires here in this world and hereafter.' According to Sanskrit grammar, शब्दः and पदम् synonymously convey the same meaning, in many cases. Words have a great philosophical significance. Any word is made of a substantive/stem and *sup/tin* suffixes. A substantive denotes a meaning, but does not embedded with gender and number information. In the database, complete words are only indexed, instead of the substantives.

5.5.4.2. लिङ्गम् (gender) :- In Sanskrit usage, gender specification is very important. There are three genders as per Sanskrit grammar, 'पुलिङ्गम्' (masculine), 'स्त्रीलिङ्गम्' (feminine) and 'नपुंसकलिङ्गम्' (neuter). Some words may acquire all the three gender suffixes. In the interface, genders are indicated as 'पुं' (masculine), 'स्त्री' (feminine), 'नपुं' (neuter) and 'त्रिषु' (three genders).

5.5.4.3. वर्णान्तः (word ending) :- Word ending means declensional ending. As said before, substantives are declined using the 'sup' or 'tin' suffixes. In this case, it is *sup* suffixes only. If the desired word is 'हरीतकी', then the word declined in 'ī' ending.

5.5.4.4. निष्पत्तिः (Grammatical Derivation) :- In Indian grammatical tradition, it is believed that all words emerge from the verbal root[156] by adding respective suffixes as 'घञ्', 'टाप्' etc. This element provides formation on the verbal root and suffix involved in formation of the word/technical term.

5.5.4.5. व्युत्पत्तिः (Etymology) :- The व्युत्पत्तिः (Etymology) is also called 'निरुक्तम्' in Sanskrit. Etymology is the study of the history of words and their origins, and how their form and meaning have changed over time for languages with a long literary history. Sage *Yāska's 'Niruktam'* is the first ever book (probably in world literature) on Vedic etymology[157]. Also, he has clearly defined what is a noun and what a verb is. It gives clarity in the context of complex senses of the words. For instance, the term '*ajamoda*' has the following etymology - अजस्य मोद इव मोदो गन्धो यस्याः। अजं मोदयति वा।"

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[156] सर्वाणि नामानि धातुजभाह, शकटस्य च तोकम्। Nirukta 1.1
[157] अर्थावबोधे पर्यज्ञात् यथोक्तं तत् निरुक्तम् इति निरुक्तस्यार्थः।

5.5.4.6. उद्धृत संख्या **(Textual Reference) :-** This element denotes the textual reference of each terminology, which has been extracted from *Ānandakanda*.

5.5.4.7. पर्यायाः **(Synonyms) :-** This element contains synonyms of the terms which have been compiled from Ayurveda dictionaries, besides *Ānandakanda*. In this context, it is necessary to understand formation of synonyms for Ayurvedic terms. Some drugs having a plant origin have named after animals/animal parts whose parts closely resemble the herbs in context. For instance, terms like "काकनासा" (resembling the nose of a crow) for *Martynia diandra* seeds, "मण्डुकपर्णी" (leaf resembles like a frog's leg) for *Centella Asiatica*, etc., were used to refer to plants and plant based drugs. There might be some science behind naming these herbs, intelligently. Probably, name of the plant itself conveys the morphology in identifying the plants. The philosophy of Ayurvedic terminology and its classification had been described in some Ayurvedic texts. There are seven categories in to which all Ayurvedic terms are classified. The following verse makes it clear.

<center>नामानि क्वचिदिह रूढितः स्वभावात् देश्योक्त्या क्वचन च लाञ्छनोपमानाभ्याम् ।
वीर्येण क्वचिदिति राह्वयादिदेशात् द्रव्याणां ध्रुवमिति सम्बोधितानि ॥ [158]</center>

'रूढि' (Usage), 'स्वभाव' (Physical feature), 'देश्योक्ति' (Local usage), 'लाञ्छनम्' (Out ward signs of things named), 'उपमानम्' (Comparison), 'वीर्य' (Inherent energy), 'इतराह्वयादिदेश' (Names of foreign origin). Based on the origin of the name herbs may be categorized. Examples for each category is as follows-

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[158] R.N.1.13, p.4

5.5.4.7.1. रूढि (Usage) :-

Example - गुडूची । 'गुड-रक्षणे' is the verbal root in गुडूची । The etymological meaning of गुडूची is 'that which protects health' (गुडति). Conventional usage of the term than the derivational meaning matters in this category.

5.5.4.7.2. स्वभाव (Physical feature) :-

Example - शतावरी । शतावरी means 'that which spreads in hundred ways' (शतमावृणोति). Physical properties (non-medicinal) inherent in the drug for which they are named.

5.5.4.7.3. देश्योक्ति (Local usage) :-

Example - एलावालुक । It is called by different names in different regions.

5.5.4.7.4. लाञ्छनम् (symbolic in nature) :-

Example - गोजिह्वा । The literal meaning is 'a drug, whose touch is as coarse as the touch of the tongue of a cow'. Hence, लाञ्छनम् is symbolic for some nomenclature.

5.5.4.7.5. उपमानम् (Comparison) :-

Example - मण्डूकपर्णी । Its leaves look like frog's leg. So it is called as thus. The drugs under this category bear names by a great resemblance to other animated beings.

5.5.4.7.6. वीर्य (Inherent potency) :-

Example - पुत्रजीव । The herb has inherent potency (वीर्य) to bestow male progeny. So it is called पुत्रजीव । Here the specific medicinal action of the drug is the reason for its categorization.

5.5.4.7.7. इतराह्यादिदेश (Names of foreign origin) :-

Example - नेपालि निम्ब । Terms in this category are popular by their geographical origin.

The knowledge of लिङ्गम् (gender), वर्णान्तः (end letter), निष्पत्तिः (grammatical derivation), व्युत्पत्तिः (Etymology), पर्यायाः (synonyms) reduces some amount of ambiguity regarding the nomenclature. For instance, if मुनिपत्र is used instead of अगस्त्यपत्र in a text, that gives room to an ambiguity. By tagging relevant information to the terminology, the textual confusion can be reduced. The current software module provides information to the indexed terms based on three classifications, i.e. plants, animal products and minerals. For instance, examples from each classified category are demonstrated as follows.

- from the plant category, information on अगरु is displayed as below:

लिङ्गम्	नपुं
वर्णान्तः	उ
निष्पत्तिः	न-गृ-उ ।
व्युत्पत्तिः	१. न गिरतीति (वाच० -) । २. न गुरु विद्यते अन्यत् सौगन्धिकं द्रव्यं अस्मात् इति (भावप्र० -)।
पर्यायाः	कृष्णागरु, शृङ्गारं, विश्वरूपक, शीर्ष, कालागरु, केश्य, वसुक, कृष्णकाष्ठं, धूपार्द्धं, वल्लर, गन्धराजक (राज.नि० -)

- From the animal product category, information on नख is as follows:

लिङ्गम्	पुं
वर्णान्तः	अ
निष्पत्तिः	नञ्-खन-नलोपः ।

व्युपत्तिः   न खं छिद्रम्त्र नभ्रा्ड्तियादि । न खन्पते (वाच०-) ।

पर्यायाः   कररुहः, शिल्पी, शुक्तिः, शङ्गः, खुरः, शकः, वलः, कोशी, करजः, हनुः, नागहनुः,
          पाणिजः, बदरीपत्र, धृप्प, पण्यविलासिनी, सन्धिनाल, पाणिरुहः (रा.नि०-)

- From the minerals category, information on गन्धक, is as follows:

लिङ्गम्   पुं
कान्तिः   अ

निष्पत्तिः   गन्ध-अच्-स्वार्थे क ।
व्युपत्तिः   गन्धोऽस्त्यस्य । गन्धेन कायति इति अन्यः (वाच०-) ।
पर्यायाः   गन्धपाषाणः, गन्धाश्मा, गन्धमोक्षः, पूतिगन्धः, अतिगन्धः, वटः, सौगन्धिकः,
          सुगन्धः, द्वियम्घः, गन्धः, रसगन्धकः, कुष्ठारिः, क्रूरगन्धः, कीटघ्नः (रा.नि०-)

5.6. *Rasapañcaka Search:*-

This module provides information on the phramaco-dynamics of drugs i.e. रस, गुण, वीर्य, विपाक and कर्म which are conventionally known as 'Rasapañcaka', along with Latin names and botanical families. To each term, the *Rasapañcaka* information along with Latin name and its respective family are automatically assigned. Selection of term, encoding schemes and on-fly dynamic suggestions is same with that of the 'Word search' module. Following are the marked five properties in the database as reflected in the Table 5.3 -

<div align="center">Specification of <i>Rasapañcaka</i></div>

Properties	Meanings
• रस	Taste
• गुण	Physical Property

• वीर्य	potency
• विपाक	Metabolic after effect
• कर्म	Action

Table 5.3

The knowledge of 'रसपञ्चक' or pharmco-dynamics of drugs is essential to Ayurvedic physicians to prepare medicines. This module facilitates such information for indexed terminology based on three (Plant, Animal product and Minerals) broad classifications.

- From the Plant category, the pharmaco-dynamics of अपराजिता is as given below:

Latin/ English name	Clitria ternatea
Family	Fabaceae
रसः	कटु, तिक्त, कषाय
गुणाः	लघु, रूक्ष
वीर्यम्	शीत
विपाकः	कटु
कर्म	त्रिदोषहर, चक्षुष्य, मेध्य, विषहर

- From the Minerals category, the pharmaco-dynamics of कस्तूरी, is as given below:

Latin/ English name	Moschus moschiferus
रसः	तिक्त, कटु
गुणः	लघु, रूक्ष, तीक्ष्ण
वीर्यम्	उष्ण
विपाकः	कटु
कर्म	कफवातशामक, वृष्य

- From the category of Animal Products the pharmaco-dynamics of शिलाजतु, is as follows:

Latin/ English name	Asphlatum punjabianum
रसः	मधुर, कटु, तिक्त
गुणः	लघु, रूक्ष
वीर्यम्	शितलं
विपाकः	कटु
कर्म	कफ वातशामक

5.7. *Rasaśāstra* Ontology :-

Rasaśāstra ontology module provides ontological structure of the *dravyas* in an expanding tree form. 'Ontology' is a term of Greek origin. It means 'study of being or existence or reality.' The study of existence of entities, their classification based on similarities or differences, the hierarchy involved in it come more closer to the philosophical studies.

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Ontology also plays an important role in Knowledge Representation. The basic building block in *Rasaśāstra* ontology is 'पदार्थ'. For a term like *अग्निजार*, the hierarchical link is as follows –

पदार्थ → *द्रव्य* →

पदार्थ → द्रव्य → *जाङ्गम* →

पदार्थ → द्रव्य → जाङ्गम → *अण्डज* →

पदार्थ → द्रव्य → जाङ्गम → अण्डज → *अग्निजार*

To each constituent of *Rasaśāstra* ontology, it is always possible to go back and forth to retrieve the desired information. HTML has been used to design the structure of hierarchy which expands depending upon the moving space ahead. To each ontological category and its constituents, hyper links are created to go to the next level, along with the grammatical and *Rasapañcaka* information. The *Rasaśāstra* ontological structure can be depicted as follows -

5.7.1.पदार्थ

⬇

5.7.1.2. द्रव्य

⬇

5.7.1.2.1.स्थावर

5.7.1.2.1.1.पार्थिव

⬇

5.7.1.2.1.1.1. रस

5.7.1.2.1.1.2. उपरस

5.7.1.2.1.1.3. लोह

5.7.1.2.1.1.4. रत्न

5.11.1.2.1.1.5. उपरत्न

5.7.2.1.2.औ द्भिद्

⬇

5.7.2.1.2.1.वनस्पति

5.7.2.1.2.2.वानस्पत्य

5.7.2.1.2.3.वीरुध्

⬇

5.7.2.1.2.3.1.प्रतान

5.7.2.1.2.3.2.लता

5.7.2.1.2.3.3.दिव्यौषधि

5.7.2.1.2.4.औ षधि

5.7.1.2.2. जङ्गम

⬇

5.7.1.2.2.1.जरायुज

5.7.1.2.2.2.अण्डज

5.7.1.2.2.3.स्वेदज

5.7.1.2.2.4.उद्भिज्ज

5.8. Technical Aspects in developing AKB

'*Ānandakanda knowledge base*' has been presented as a Web Interface. It is developed with 'apache 2.0' web server, programming language 'Perl' and scripting language 'CGI'. XML and HTML are used to get plain text into a structural text. Each aspect is explained as -

5.8.1. Apache

Apache runs as multiple processes, each of which is capable of handling incoming 'HTTP' requests. "Apache is a free software and developed by the Apache Software Foundation (ASF). Normally, it has been designed for Unix servers, the Apache Web server has been ported to Windows and other network operating systems (NOS). The other form of this story is that Apache is simply another way of saying that it was "A Patchy" server. The Apache provides a full range of Web server features, including CGI, SSL and virtual domains and also supports plug-in modules for extensibility"[159]. The Apache server has two versions Apache 1.3 and Apache 2.0 respectively. Apache is reliable, free, and relatively easy to configure".

5.8.2. Perl

Perl is a artificial programming language, which is created for performing some computer applications. Perl stands for "Practical Extraction and Report Language". "It has been developed in 1986 by Larry Wall. He is a American computer programmer and linguist. Perl is a very easy and flexible language for linguistic performances"[160]. It is the popular choice due to its pattern matching capability, and its availability on many platforms like UNIX, Win32 etc.

[159] *apachecon.com/2007/notes/t02-notes.pdf*
[160] wikipedia.org/wiki/Larry_Wall

5.8.3. CGI

CGI is an acronym of "Common Gateway Interface". It is a method used by web servers to run external programs known as CGI scripts to generate web content dynamically. Whenever a web page queries a database, a CGI script is usually called upon to do the work. "CGI is simply a specification, it defines a standard way for web servers to run CGI scripts and for those programs to send their results back to the server. The job of the CGI script is to read information that the browser has sent (via the server) and to generate some form of valid response usually visible content. Once it has completed its task, the CGI script finishes and exits. Perl is a very popular language for CGI scripting."[161]

5.8.4. XML

XML stands for 'Extensible Markup Language.' "XML was designed to be self-descriptive to transport and store data, with focus on what data is. It is important to understand that XML is not a replacement for HTML. In most web applications, XML is used to transport data"[162]. The XML tags are not defined in any standard structure for instance -

<div>
<title>घुटिकासिद्धिः</tiltle>
<sloka>प्रणम्य परया भक्त्या भैरवं भैरवी शिवम्।
उवाच विनयेनेदं लोकानां हितकांक्षिणी ।। 1.10.1 ।। </sloka>

</div>

[161] blob.perl.org/books/beginning-perl/3145_Chap12.pdf
[162] http://www.w3schools.com/xml/xml_whatis.asp

5.8.5. HTML

HTML stands for 'Hyper Text Mark-up Language.' "it was designed to display data, with focus on how data looks. HTML is a markup language. A markup language is a set of markup tags. The tags describe document content. HTML documents contain HTML tags and plain text. HTML documents are also called web pages"[163]. HTML tags are defined in a standard structure, for instance -

```
<html>
<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
<style>
<div#bgcolor {
width:400px;
}
</style>
</head>
<body>
<center>
<div id="slokas" style="margin-left:10px;">
```

5.8.5.1. An example from the flat text

कैलासशिखरासीनं कालकन्दर्पनाशनम् ।
प्रसन्नं परमेशानं जगदानन्दकारणम् ॥ १.१.१ ॥
प्रणम्य परया भक्त्या भैरवी स्तुतिमातनोत् ।
देवदेव महादेव जन्मदारिद्र्यनाशन ॥ १.१.२ ॥

---

[163]http://www.w3schools.com/html/html_intro.asp

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प्रसीद करुणामूर्ते प्रसन्न परमेश्वर ।\<br /\>

दिव्यागमरहस्यानि कुलकौलादिकानि च ॥ १ .१.३ ॥\<br /\>

जाने तव प्रसादेन मायामङ्गलविग्रह ।\<br /\>

श्रोतुमिच्छामि सर्वेश तव दिव्यरसायनम् ॥ १ .१.४ ॥\<br /\>

जराजन्मामयघ्नं च खेचरत्वादिसिद्धिदम् ।\<br /\>

दारिद्र्यदुःखशमनं ब्रह्मत्वादिवरप्रदम् ॥ १ .१.५ ॥\<br /\>

\<div id='bgcolor" style ="background-color:brown;"\>

\<p style="text-size:15px;color:white;"\>ईश्वर उवाच \</p\>

\</div\>\</body\>\</html\>

DISCUSSION

This part discusses the problems and observations with regard to the comparative study done at fourth chapter and developing web interface for 'Ānandakanda Knowledge Base' (AKB) dealt in the fifth chapter.

Ayurveda is the indigenous medical system that has been considered under Complimentary and Alternative Medicine (CAM) by the WHO. Ayurveda has eight branches. 'Rasāyana' is one of the branches. During *Buddhist* period and after that, the *Rasāyana* branch was instrumental in fostering *Rasaśāstra* discipline. *Rasaśāstra* mainly deals with metallic preparations that makes use of *pārada* (mercury), heavily. This aspect belongs to *dehavedha* concept. *Pārada* was also used in transmutation of lower metals to higher metals. This aspect belongs to *lohavedha* concept. *Rasauṣadhis* bestow quick health, hence, they become popular in the medieval India.

Explaining 'rasa' compositions, a number of texts and treatises were written and compiled. 'Ānandakanda' is a magnum opus amongst all such texts. This text is believed to have been written during the 13th century A.D. by *Manthāna Bhairava* who was one of the disciples of world renowned *Āchārya Nāgārjuna*. The geographical location identified with the text is *Śriśailam* in *Andhra Pradesh*, India.

The present dissertation is aimed at the making of a digitized lexical resource on single drugs that appear in *Ānandakanda*, alongside a comparative study with five popular *Rasaśāstra* texts. Technical terminology/nomenclature related to plants, minerals and animal products has been extracted using computational tagging schemes. In doing so, I have encountered some difficulties which needs an elaboration. It is described in

what follows here.

Nomenclature Statistics

In developing the on line data base of *Ānandakanda*, some practical problems have been encountered. For some of the technical terms, while preparing the word index (total 663 technical terms mentioned), no clear description was available, hence, their meaning cannot be determined. For instance, if the term is '*śilā*', it was a bit difficult to decide as which herb it exactly refers to. Because, *śilā* can either refer to '*manaśśilā*' (realgar) or '*śilājit*' (asphlatum punjabianum). In this context, Ayurveda lexicons like *Bhāvaprakāśa* and Hindi commentary of *Ānandakanda* have been consulted. Sometimes, the commentary and sometimes the lexicons have cleared the ambiguities arisen during the annotation process.

The technical terminology pertaining to Plants (544 nos.) in the text is 82%. Animal products (21 nos.) 3% and Minerals (98 nos.) is 15% as per figure 1.

Figure 1

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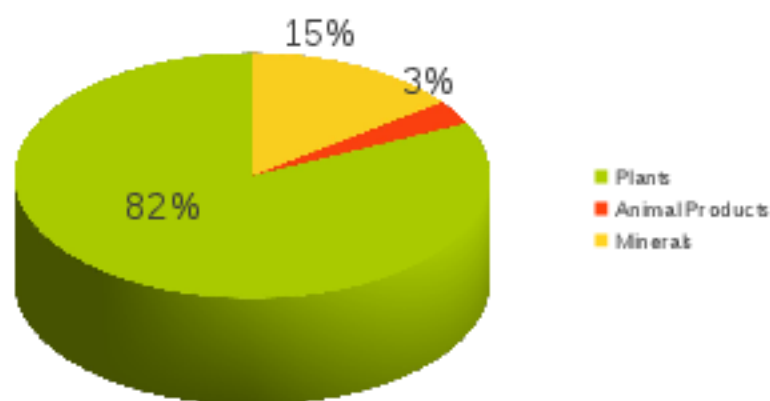
In context of word search, the etymology cannot be traceable to 124 terms and synonyms also are not available to 76 terms. Chart 1 describes this situation-

Chart 1

In the *Rasapañcaka* search module, 180 Latin names, 136 *Rasa* information, 142 *Guṇa* information, 137 *Vīrya* information, 149 *Vipāka* information, 128 *karma* information could not be provided. Chart 2 demonstrates the tagged information to the respective categories.

Chart 2

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In this text, four types of *Oṣadhis* have been mentioned such as *Rasauṣadhi, Siddhauṣadhi, Mahauṣadhi, Divyauṣadhi*. Amongst these groups, the list of drugs are mentioned only under *Divyauṣadhi*. This group is inserted as a sub- category under '*Latā*' category of '*Vīrudh*'. But the 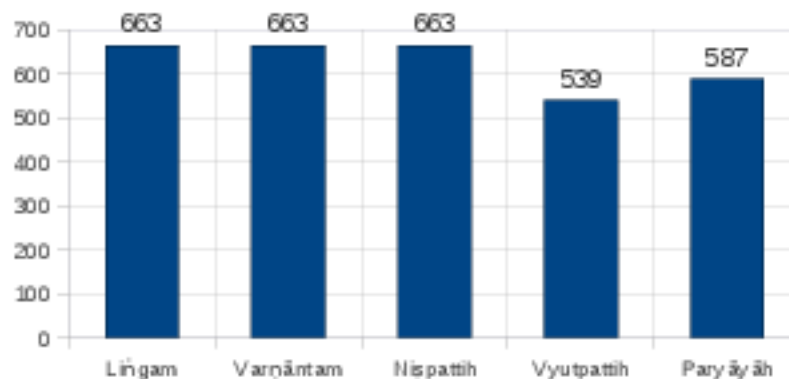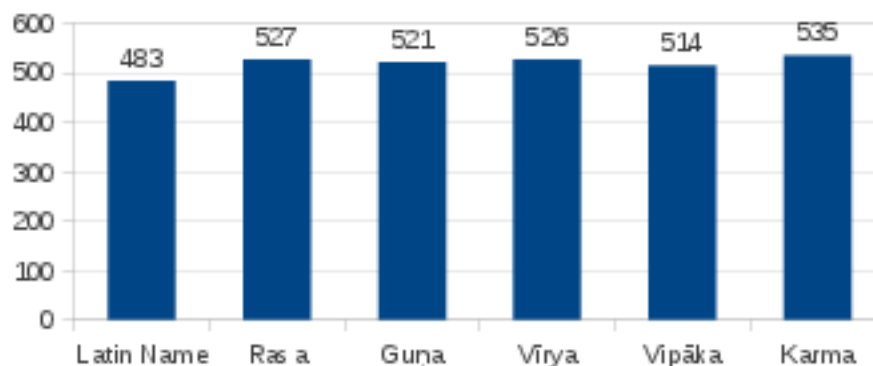rest of the groups are only just defined. The entire terminology that is categorized is based on *dravya* classification which is mentioned in '*Bṛhatrayī*'.

Cakara Saṃhitā', '*Suśṛta Saṃhitā* mentioned some *vargas* like *Jīvanīya, Dīpanīya* etc., of which each *varga* has ten components of drugs. But the ontological representation in the interface has a limitation in including the above *vargas*.

Ekadeśa Words – Full Meanings

In *Ānandakanda*, some terms are looking like acronyms in English. For instance, *śilā, tāla, damanī, dantī, kumārī* etc. Terms like *śilā* have two interpretations as '*manaḥ śilā*' or '*śilājatu*'. In this context, it is constructed that the term *śilā* means '*manaḥ śilā*' This is done while referring to the Hindi commentary, '*Siddhiprada*' on *Ānandakanda* and some *Dravyaguṇa* texts (referred in the bibliography). Similarly, interpretation of actual context of nomenclature like *tāla-haritāla, damanī-agnidamanī, dantī (vajradantī/brahmadantī)-vajradantī, kumārī-ghṛtakumārī* etc. is decided on previous postulations.

This type of *Ekadeśa* words are natural in Sanskrit literature. A maxim, 'नामैकदेशे नाममात्रग्रहणम् ।' (*even, a fragmented part of a word can convey its full meaning*) confirms such use of short words. Nouns like '*gandha*', '*bhama*', '*bheema*' etc., convey '*Gandhamadāna*', '*Satyabhama*', and '*Bhimasena*', respectively.

Spelling Variations

In *Ānandakanda*, some words are seem different in structure such as *kacora*, *sāṅgerī*, *cakragopa*, *dhuttura*, *dūrvā*, *vāstūka*, *koṣātakī* etc,. In this context, *kacora-karcūra*, *sāṅgerī-cāṅgerī*, *dhuttura-dhattūra*, *dūrvā-durvā*, *vāstūka-vāstuka*, *koṣātakī* (*koṣātakī* and *kośātakī* two variations are given in *Ānandakanda* itself)-*kośātakī* etc. are considered by referring to related commentaries, Ayurveda *Nighaṇṭus*, *Śabdakalpadruma*, *Vācaspatyam* and *Amarakośa* as well. These differences might have cropped up while knowledge was being transmitted orally to students or a dictation was given for writing the text. In Sanskrit literature, such terminology has been compiled in dictionaries. Probably there might be some unpublished manuscripts in Ayurveda which detail the spelling variations of plant nomenclature.

Obscure and Synonymous Words

Also, in this text, instead of some popular terms, their synonyms have been used as in the case of '*munipatra*', '*ādityapatra*', '*kanyā*', '*aśmabhedī*' etc. In this context, it would deem necessary to add that *munipatra* stands for *agatsyapatra*, *ādityapatra* stands for *arkapatra*, *kanyā* stands for *ghṛtakumārī* and *aśmabhedī* stands for *pāṣāṇabhedī* and so on. Sanskrit *Nighaṇṭus* and Hindi commentary of *Ānandakanda* come handy in resolving such cases. Some obscure words are also noticed, such as '*dīnārī*' (A.K. 1.24.127) etc. In some cases like '*tāram*', there is a overlapping of meanings as the term refers either to 'copper' or 'pearl'.

Oshadhi Categories

Ānandakanda refers to four groups of *Oṣadhis* -

- *Rasauṣadhi*
- *Siddhauṣadhi*
- *Mahauṣadhi*
- *Divyauṣadhi*

Amongst the four groups, the list of drugs is mentioned only under the fourth group - '*Divyauṣadhis*', but rest of the groups just referred to the herbs that may come under any group. The drugs under '*Divyauṣadhis*' group are not listed in any *Rasaśāstra* texts and Ayurveda *Nighaṇṭus*, other than the text in context. But, a lateral text like *Rasakāmadhenu* has a discussion on the above. But, not in depth. Owing to these difficulties, it was not easy to collect the grammatical and *Rasapañcaka* information to *Divyauṣadhi* related terms. For this, *Śabdakalpadruma*, *Vācaspatyam*, *Amarakośa*, *Bhāvaprakāśa*, *Dhanvantari Nighaṇṭu*, *Rāja Nighaṇṭus*, *Kaiyadeva Nighaṇṭus* and *Sarasvatī Nighaṇṭus* come for the rescue. Also, in those dictionaries, some of the *Divyauṣadhi* group terms are not available. Based on such unavailabilities, the grammatical and *Rasapañcaka* information has become null.

Dravya Classification

The entire terminology that has been categorized and indexed is based on *dravya* classification scheme which is available in '*Bṛhatrayī*'. This scheme is developed as an *Rasaśāstra* and/or Ayurveda ontology in the dissertation. In fact, Sage *Caraka* has classified plants into two broad groups, '*virecana*' (purgatives) and '*kaṣāya*' (astringents). There are hundreds of drugs under each group. All such drugs have been re-grouped

based on their pharmacological actions. It seemed that the *dravya* classification, starting from *Padārtha* to *Oṣadhi* bears no textual interlink with groups defined for pharmacological actions. For instance, the herb 'harītakī' can come under the 'māraka' (killing agents) group and also possible to be included in other groups as stated before. But one cannot easily discern whether this herb belongs to 'Vanaspati', 'Vānaspatya', 'Vīrudh' or 'Oṣadhi' types. This calls for a practical expertise in deciding the ontological classification of the herbs described. Hence, texts are not specific in linking the pharmacological action to genealogical types. This problem is encountered not only exclusive to *Bṛhatrayī*, but also to all ayurvedic *Nighaṇṭus*. Further, each *Nighaṇṭu* has its own categorization of *dravya*.

Apparently at this juncture, two broad categories emerge from the discussion, with respect to developing further database purposes.

- Classification based on ontological (*dravya*) characteristics.
- Classification based on herbs grouped under pharmacological actions, like *Jīvanīya* (vitalizers), *Dīpanīya* (stimulants) *Bṛmhanīya* (anabolic) etc.

Indeed, it would be very interesting in understanding the interlinks between these two categories and whether there would be any difficulties in doing so. In such a case, terms like 'harītakī' would bear more nested links impregnated with more information. Then it is possible to link up all the *vargas* (pharmacological) enumerated by *Caraka* (50), *Suśṛta* (37) and Bhāvamiśra (10). We think, this would lead to a magnanimous future research work.

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A comparative study on the classification of *vargas* of *Caraka* and *Suśṛta* has done by Dr. P.V. *Sharma*, a renowned Ayurvedic scholar in his text, ' *Dravyaguṇa vijñāna*'. Such information is invaluable in understanding the interlinks of two broad categories spoken as per the observations. Be it diet or medicine, that constitutes the concept of *dravya* in Ayurveda. It signifies an intelligent adaptation of fundamental philosophical principles which is exclusive to this ancient medical science. So, it is an interesting journey from ontology to pharmacology in Ayurveda or *Rasaśāstra*, for researchers, especially, who concentrate on theoretical research.

To sum up the above, sub classification of *Pārthiva* category is not mentioned in *Bṛhatrayī* but only an incomplete list of contents is noticed. Unlike *Bṛhatrayī*, *Ānandakanda* clearly mentions such classifications and contents of such lists.

Comparative Study

In connection with the comparative study of *pārthiva* category of *Ānandakanda* with *Rasahṛdaya Tantram, Rasendramaṅgalam, Rasārṇavam, Rasaratna Samuccaya* and *Rasaratnākara*, interesting issues are noticed.

- The characterization of *Pārthiva dravyas* in *Ānandakanda* varies in form and content from the other *Rasaśāstra* texts.
- Without an iota of doubt, '*Rasa*' is '*pārada* (mercury)' described in all the texts.
- A certain category, called '*mahārasa*' was referred to in the texts other than *Ānandakanda*, whereas *Ānandakanda* offers no note of this category.
- The crux of treating *Mahārasas* in *Ānandakanda* is such that, since *pārada* is the only *rasa*, rest of the minerals/metals should come under *Uparasas*, which are 49 in number.

- Description of 'Loha' category is same in all texts.

- *Rasaratnākara* describes about 'Upaloha' category additionally, wherein 'maṇḍūra' is the only member of the group.

- The list of *Lohas* in other texts is not exhaustive compared to *Ānandakanda* and *Rasa ratnākara*. The number of constituents in *Ratna* category is common to both *Rasaratna Samuccaya* and *Ānandakanda* texts. Interestingly, the remaining texts, do not explicitly refer to the constituents of *Ratna* category but, they describe use and processing methods of *Ratnas*.

- Only *Ānandakanda* has exclusive information on *Uparatna* category.

- *Rasendramaṅgalam* and *Rasaratna Samuccaya* have a separate discussion on eight '*Sādhāraṇarasas*'. They are -'*kampillaka, gaurīpāṣāṇa, navasāra, kaparda, agnijāra, girisindūra, hiṅgula, mṛddāraśṛṅgī*'[164] But keeping its typical treatment of *rasas*, *Ānandakanda* included the above in *Uparasa* category.

[164] R.R.S.3.126 -127, p.65

CONCLUSION

In the present dissertation, '*Ānandakanda* Knowlede Base', as discussed in the previous chapter, there are some short comings which are due to the limitation of the resources available. But still we feel, this is a novel effort to develop on line database and lexical resource for *Rasaśāstra* ontology, especially *Ānandakanda*, unfortunately a least addressed text in the domain.

'*Ānandakanda* Knowledge Base' enables one to gain traditional Indian medical knowledge pertaining to plants, animal products and metals. The present work could successfully list out all the *dravyas* in *Ānandakanda* with references. The interface presents a digital lexical resource for the gamut of medicinal *dravyas* from *Ānandakanda*.

In the thesis, it has been attempted to examine each *dravya*, used for medicinal purposes, for its 'gender', 'substantive ending', 'word derivation', 'etymological analysis', 'synonyms' and '*Rasapañcaka* .'

A thorough compilation of a database consisting plants and minerals based on their pharmacological action that can create cross links to the ontology of *dravya* gives an clarion call for attention. Also, the database can contain nomenclature related with all '*ekadeśa* words' used in *Rasaśāstra* texts, of the pertinent categories before validating through all Ayurvedic dictionaries. At the same time, spelling variations can also be corrected.

More number of *Rasaśāstra* texts can be compared in properly understanding the 'dravya' classification. In this context, the 'padārtha' has been identified as the basic building block of *Rasaśāstra* ontology, which has accounted a greater discussion in Indian philosophical texts.

The present work is aimed at reducing practical problems connected with searching Ayurveda terminology from selected Ayurveda *Nighaṇṭus*. Ayurveda *Nighaṇṭus* are individually not comprehensive of all the nomenclature that is used in medical world. This due to the fact that the dictionaries enlist the related synonyms instead of the term in question. This renders a great difficulty in deriving proper contextual meanings. Nevertheless, this work provides some pointers to continue in this direction.

The current research work may benefit Ayurvedic students and Sanskrit Scholars doing research in *Rasaśāstra* and also in Ayurveda. Taking the present work as a model, it is possible to develop the 'Online *Rasaśāstra* Ontology' by making a corpora of all the Ayurveda *Nighaṇṭus* under a single platform. Further, this can be extended to Ayurveda too. This further work would be gigantic in nature and would demand collaboration between Sanskrit Scholars, Ayurvedic experts and people technically trained in computer programming.

APPENDIX-1

WORD INDEX IN ĀNANDAKANDA

Word	Reference No.
1. अक्ष	1.18.63
2. अक्षरा	2.9.79
3. अगरु	1.18.96
4. अग्निजार	2.1.236
5. अग्निदमनी	1.2.180
6. अङ्क्षोल	1.22.14
7. अजमोदा	1.15.422
8. अतसी	2.8.143
9. अतिमुक्त	1.18.173
10. अतिविषा	1.6.11
11. अत्यम्लपर्णी	2.10.49
12. अपत्री	2.9.106
13. अपराजिता	1.4.31
14. अपामार्ग	1.18.34
15. अब्दक	1.17.74
16. अभया	1.15.143

17.	अभ्रकं	1.4.94
18.	अमृतस्रवा	2.10.214
19.	अरिमेद	1.18.36
20.	अरिष्ट	1.19.80
21.	अर्कपत्र	1.7.169
22.	अर्क	1.18.34
23.	अर्जुन	1.18.34
24.	अलम्बुषा	1.4.138
25.	अलाबुका	1.15.145
26.	अशोक	1.18.35
27.	अश्वगन्धा	1.7.53
28.	अश्वत्थ	1.22.23
29.	असन	1.18.55
30.	अहिफेनक	2.1.290
31.	अहिमार	1.9.16
32.	अंशुमती	1.18.140
33.	आकाशवल्ली	2.10.196
34.	आकुली	1.4.31
35.	आखुकर्णी	2.10.16
36.	आखुपाषाण	2.1.319

37.	आदित्यभक्ता	2.10.82
38.	आमलकी	1.17.74
39.	आम्र	1.18.35
40.	आम्रातक	1.18.34
41.	आम्लपत्री	2.10.223
42.	आम्लवेतस	2.1.349
43.	आरग्वध	1.4.40
44.	आर्द्रक	1.4.20
45.	आर्कोकी	1.12.46
46.	इक्षु	1.7.40
47.	इङ्गुदी	1.7.53
48.	इन्द्रवल्ली	1.15.258
49.	इन्द्रवारुणी	1.24.131
50.	इरिन्दिरी	1.23.295
51.	इटिका	1.4.17
52.	ईश्वरी	2.9.100
53.	ऊच्चटा	2.9.100
54.	उदुम्बुर	1.18.35
55.	उपोदकी	1.17.38

56.	उर्वारु	2.10.29
57.	उशीर	1.16.44
58.	ऋद्धि	2.10.140
59.	ऋषभक	1.18.142
60.	एकवीर	1.7.171
61.	एरण्ड	1.16.64
62.	एलवालुक	1.15.448
63.	एला	1.16.14
64.	ककुभ	1.4.444
65.	कच्छुठ	2.1.5
66.	कच्छोल	1.16.44
67.	कचूर	1.16.26
68.	कच्छुद्रव	1.16.27
69.	कज्जली	1.25.4
70.	कञ्चुकी	1.7.53
71.	कटुका	1.19.84
72.	कटुकीफल	1.16.27
73.	कटुतुम्बी	1.23.376
74.	कण्टकारी	1.23.727
75.	कतक	1.17.43

76.	कत्तृणं	1.18.65
77.	कदम्ब	1.19.32
78.	कर्पर्द	1.2.50
79.	कपिकच्छु	1.24.193
80.	कपित्थ	1.23.208
81.	कपोति	1.1.44
82.	कमलकन्द	1.19.40
83.	कमल	1.18.97
84.	कम्पिलक	2.1.5
85.	करञ्ज	1.18.34
86.	करवीर	1.18.173
87.	करीरी	2.9.106
88.	ककर्टी	1.14.13
89.	ककोर्टी	1.4.62
90.	कर्णस्फोटा	2.10.150
91.	कर्णिकार	1.22.42
92.	कर्त्तरी	1.23.408
93.	कर्दम	2.8.161
94.	कर्पूर	1.17.13

95.	कल्हार	1.2.29
96.	कशेरुक	1.17.85
97.	कस्तूरी	1.16.26
98.	काकजङ्घ	1.23.50
99.	काकतुण्डी	1.16.14
100.	काकनासा	2.10.36
101.	काकमाची	1.4.38
102.	काकाण्डी	1.23.49
103.	काकिनी	2.9.102
104.	काकोदुम्बुर	1.23.66
105.	काकोली	1.18.142
106.	काच	2.1.350
107.	काचलवण	2.1.339
108.	काञ्चनार	1.23.723
109.	काञ्जी	1.24.130
110.	काण्डीर	2.10.120
111.	कान्तकरञ्ज	1.23.574
112.	कान्तक	2.1.12
113.	कान्तलोह	1.7.140
114.	कारवल्ली	2.1.363

115.	कारवी	2.10.4
116.	कार्पासी	1.4.192
117.	कालकूट	1.14.13
118.	कालमञ्जरी	1.23.49
119.	कालिका	1.1.44
120.	कालिङ्ग	2.8.51
121.	काश्मरी	1.18.139
122.	काठ	1.26.233
123.	कासन	1.18.36
124.	कासमर्द	1.17.42
125.	कासीस	1.4.62
126.	कांस्यं	1.18.201
127.	कीटमारी	1.9.16
128.	कुक्कुटी	1.4.437
129.	कुङ्कुम	1.18.438
130.	कुटजवल्ली	2.9.107
131.	कुडुहछी	1.23.70
132.	कुनटी	1.23.346
133.	कुन्तली	1.17.40

134.	कुन्द	1.18.173
135.	कुबेराक्षी	1.4.126
136.	कुमारी	1.25.57
137.	कुरण्ड	1.9.80
138.	कुरव	1.18.173
139.	कुलत्थ	1.18.140
140.	कुलीरास्थि	1.4.222
141.	कुशा	1.19.59
142.	कुष्ठ	1.18.143
143.	कुसुम्भिक	1.6.96
144.	कुस्तुम्बरी	1.17.41
145.	कूटज	1.22.51
146.	कूर्मवली	2.9.108
147.	कूष्माण्डी	1.17.35
148.	कृष्ण-आखुकर्णी	2.10.16
149.	कृष्णधत्तूर	1.4.25
150.	कृष्णपुष्प	1.15.124
151.	कृष्णबीजा	1.4.39
152.	कृष्णलता	2.9.37
153.	केतकी	1.17.13

154.	कैडर्य	1.17.42
155.	कोकिलाक्षी	1.7.171
156.	कोद्रव	1.4.11
157.	कोल	1.18.140
158.	कोलिशा	2.1.352
159.	कोविदार	1.18.65
160.	कोशातकी	1.17.38
161.	क्रमुक	1.18.122
162.	क्षीरकन्द	1.4.30
163.	क्षीरकाकोली	2.10.137
164.	क्षुद्रदन्तिका	1.17.39
165.	क्षुद्रमीन	1.7.99
166.	खदिर	1.18.34
167.	खर्जूर	1.18.66
168.	खर्परी	1.4.284
169.	खुर	1.4.189
170.	गजचर्म	1.1.47
171.	गजपिप्पली	1.6.15
172.	गन्धक	1.13.2

173.	गन्धर्वा	2.9.104
174.	गरुडवल्ली	2.9.60
175.	गाङ्गेरुका	1.17.41
176.	गिरिकर्णिका	1.4.14
177.	गिरिज	1.1.45
178.	गिरिसिन्दूर	2.1.5
179.	गुग्गुल	1.4.186
180.	गुञ्जा	1.4.189
181.	गुड्ची	1.15.117
182.	गृध्रकर्णी	1.4.515
183.	गृहधूम	1.4.16
184.	गैरिक	1.10.7
185.	गोक्षुर	1.16.26
186.	गोजिह्वा	1.4.31
187.	गोधूम	1.4.11
188.	गोनसा	2.9.100
189.	गोपयष्टिका	1.18.96
190.	गोपाली	2.5.22
191.	गोमारी	2.9.66
192.	गोमेद	1.18.180

193.	गोरक्षदुग्धी	2.10.126
194.	गोरष्टी	1.17.36
195.	गोरम्भा	1.24.127
196.	गोरोचनलता	2.9.106
197.	गोरोचन	2.9.77
198.	गोशृङ्गी	2.9.101
199.	गौरीपाषाण	2.1.268
200.	ग्रन्थिक	1.14.13
201.	घनापत्रं	1.6.11
202.	चक्रगोप	1.4.192
203.	चक्रमर्द	1.15.224
204.	चणक	1.7.40
205.	चणा	1.4.11
206.	चतुर्जातक	1.16.26
207.	चन्द्रकान्त	2.8.173
208.	चपला	2.1.196
209.	चमरिका	2.9.105
210.	चम्पक	1.18.34
211.	चाङ्गेरी	1.4.38

212.	चाण्डाली वल्लरी	2.9.102
213.	चिञ्चा	1.4.155
214.	चित्रक	1.23.207
215.	चित्रवल्ली	2.9.109
216.	चिल्ली	1.17.37
217.	चोरक	1.16.45
218.	छत्रिणी	2.9.101
219.	छुछुन्धरी	1.4.194
220.	जटामांसी	1.15.353
221.	जतुका	2.10.167
222.	जपा	1.4.438
223.	जम्बीरनिम्ब	1.4.343
224.	जम्बू	1.19.85
225.	जयन्ती	2.1.243
226.	जया	1.4.39
227.	जलकणा	1.4.98
228.	जलकुम्भी	1.23.198
229.	जल	1.1.42
230.	जलमण्डनिका	1.16.91
231.	जलशुक्ति	2.1.303

232.	जलूकाभा	1.4.369
233.	जवा	1.19.79
234.	जातिमल्लिका	1.17.13
235.	जातिपत्री	1.16.46
236.	जातीपुष्म	1.18.172
237.	जातीफल	1.16.27
238.	जीरक	1.16.26
239.	जीवक	1.18.142
240.	जीवन्ती	1.15.143
241.	जेपाल	1.23.40
242.	ज्योतिद्रुम	1.15.263
243.	ज्योतिर्नाम्नी	2.9.48
244.	ज्योतिष्मती	1.15.267
245.	टङ्कण	2.4.46
246.	टुण्टुक	1.18.139
247.	डाहु	1.18.66
248.	तगर	1.16.26
249.	तण्डुलीय	1.4.125
250.	तमालक	1.22.40

251.	ताप्य	1.10.7
252.	ताम्रचूड़	1.6.104
253.	ताम्र	2.1.246
254.	ताम्रवल्ली	2.9.102
255.	तारकान्त	2.1.12
256.	ताल	1.4.181
257.	तालमूली	1.7.169
258.	तालीश	1.16.27
259.	तित्तशाक	1.4.138
260.	तिन्दुक	1.18.64
261.	तिलकल्क	1.7.99
262.	तिलपर्णी	1.4.40
263.	तिल	1.4.337
264.	तिल्वक	1.18.64
265.	तीक्ष्णलोह	1.4.297
266.	तीक्ष्णा	1.7.140
267.	तुगा	1.16.26
268.	तुत्थं	1.14.40
269.	तुम्बिनी	2.9.104
270.	तुम्बुरु	1.4.98

271.	तुरुष्क	1.16.44
272.	तुलसी	1.24.129
273.	तुवरक	1.15.588
274.	तैलकन्द	2.9.107
275.	त्रपु	1.4.180
276.	त्रिकटु	1.4.19
277.	त्रिकर्णिका	2.8.143
278.	त्रिक्षारं	1.7.40
279.	त्रिजातक	1.17.74
280.	त्रिदण्डिका	2.9.105
281.	त्रिफला	1.4.14
282.	त्रिवृता	1.15.142
283.	त्रिशूली	2.9.104
284.	त्वक्	1.15.112
285.	त्वक्सार	1.18.66
286.	दध्योर्णा	1.4.186
287.	दण्डधारी	1.4.369
288.	दण्डफल	1.17.39
289.	दन्ती	1.12.152

290.	दमनी	1.2.180
291.	दरद	1.23.346
292.	दर्दुर	1.14.13
293.	दाडिम	2.1.31
294.	दारुहरिद्रा	1.7.6
295.	दारूणी	1.18.35
296.	दार्वी	1.18.96
297.	दीनारी	1.24.127
298.	दुग्धपाषाण	1.23.23
299.	दुरालभा	1.4.20
300.	दूर्वा	1.3.15
301.	देवदारुकाष्ठ	1.4.438
302.	देवदारु	1.4.40
303.	देवदाली	1.4.39
304.	देवकुष्मं	1.16.26
305.	द्राक्षा	1.15.409
306.	द्रोणपुष्पी	2.10.211
307.	धत्तूर	1.13.17
308.	धन्वयास	1.18.63
309.	धव	1.18.63

310.	धातकी	1.4.190
311.	धात्रीफल	1.15.5
312.	धान्यक	1.4.12
313.	धृतगन्धा	2.9.107
314.	नख	1.16.45
315.	नरकपाल	1.4.198
316.	नररतं	1.4.515
317.	नरसार	1.23.270
318.	नलिका	1.23.49
319.	नवनीतगन्धिनी	2.9.103
320.	नवमालिका	1.19.79
321.	नवसार	1.4.20
322.	नाकुली	1.18.65
323.	नागकन्यका	1.4.445
324.	नागदन्ती	2.10.208
325.	नागपुष्प	1.16.75
326.	नागबला	1.4.20
327.	नागवल्ली	1.4.111
328.	नागिनी	2.9.101

329.	नागं	1.4.178
330.	नारङ्ग	1.1.43
331.	नारिकेल	1.17.35
332.	नारीपुष्प	1.23.87
333.	नालपुष्प	1.17.44
334.	निचुल	1.4.336
335.	निम्बपत्र	1.4.432
336.	निम्ब	1.16.14
337.	निम्बवल्ली	2.9.107
338.	निम्बृक	1.18.35
339.	निर्गुण्डी	1.4.39
340.	निष्पाव	1.6.104
341.	नीलिका	1.16.16
342.	नीलाञ्जन	2.1.285
343.	नीली	1.4.31
344.	नीलोत्फलं	1.19.143
345.	नीलं	2.1.281
346.	नेपालिका	1.18.173
347.	न्यग्रोध	1.18.34
348.	पञ्चगव्य	1.7.101

349.	पञ्चमुष्टिका	1.4.61
350.	पटोल	1.19.167
351.	पत्रक	1.18.97
352.	पत्रवल्लरी	2.9.102
353.	पञ्चक	1.16.46
354.	पञ्चराग	1.18.178
355.	पनस	1.2.27
356.	पर्पटि	1.4.256
357.	पलाण्डु	1.19.85
358.	पलाश	1.22.13
359.	पवि	2.8.42
360.	पाटली	1.17.13
361.	पाठा	1.4.38
362.	पातालगरुडी	2.10.11
363.	पारद	1.2.198
364.	पारिभद्र	1.23.25
365.	पालकी	1.17.41
366.	पाषाणभेद	1.4.191
367.	पिञ्जली	1.1.45

368.	पिच्छिल	1.15.513
369.	पिञ्जर	1.25.24
370.	पित्तल	2.7.1
371.	पिप्पलीमूल	1.15.438
372.	पिप्पली	1.15.182
373.	पीतपुष्प	1.15.104
374.	पीतवल्ली	2.9.103
375.	पीलु	2.1.312
376.	पुण्डरीक	1.1.43
377.	पुत्रदात्री	2.10.52
378.	पुनर्नवा	1.7.169
379.	पुन्नाग	1.18.172
380.	पुष्पकासीस	1.10.7
381.	पुष्पाञ्जन	2.1.295
382.	पुष्यराग	2.8.41
383.	पूग	1.4.143
384.	पूगीफल	1.16.47
385.	पेरोजा	2.8.218
386.	पोद्दारशृङ्गी	2.1.6
387.	प्रपौण्डरीक	1.16.46

388.	प्रियङ्गु	1.16.79
389.	प्रियाल	1.15.439
390.	प्लक्ष	1.18.34
391.	फलपूरक	1.17.40
392.	फेनिल	1.18.65
393.	बदरी	2.8.67
394.	बब्बूल	1.22.53
395.	बहिंचूड़ा	2.10.181
396.	बला	1.4.31
397.	बाकुची	1.7.171
398.	बालक	1.18.174
399.	बाह्लीक	1.24.179
400.	बिडलवण	2.1.342
401.	बिभीतकी	1.15.163
402.	बिम्बी	2.7.50
403.	बिल्व	1.18.64
404.	बिल्विनी	2.9.76
405.	बीजपूरक	2.4.40
406.	बृहती	1.17.49

407.	बोधिवल्ली	2.9.108
408.	ब्रह्मदण्डी	1.16.57
409.	ब्राह्मणी	2.9.107
410.	ब्राह्मी	1.4.38
411.	भङ्गी	1.15.337
412.	भञ्जनी	1.25.72
413.	भल्लातकी	1.7.99
414.	भार्ङ्गी	1.16.26
415.	भूकदम्ब	1.15.205
416.	भूतकेशी	2.9.100
417.	भूधात्री	2.1.363
418.	भूपाटली	1.4.39
419.	भूमितुम्बिनी	2.9.104
420.	भूम्यामलकी	2.10.180
421.	भूर्ज	1.4.233
422.	भूलता	1.4.191
423.	भृङ्गराज	1.4.13
424.	भृङ्गवल्ली	2.9.105
425.	भृङ्गी	1.13.17
426.	भ्रमरश्रृङ्गी	1.4.205

427.	मञ्जिष्ठा	1.4.437
428.	मण्डूकपर्णी	1.15.409
429.	मण्डूकवल्लरी	2.9.108
430.	मण्डूर	2.7.101
431.	मत्स्याण्डी	1.17.39
432.	मदन	1.18.173
433.	मदनफल	1.16.27
434.	मधूक	1.18.36
435.	मधूच्छिष्ट	1.23.343
436.	मध्यगन्धा	2.9.108
437.	मनःशिला	1.10.7
438.	मरकत	1.15.512
439.	मरिच	1.4.61
440.	मरुवक	1.18.174
441.	मल्लिका	1.18.64
442.	मल्ली	1.19.107
443.	महानागा	2.9.108
444.	महानीली	1.15.249
445.	महापत्र	1.20.59

446.	महामेदा	2.10.133
447.	महावट	1.18.66
448.	महिषवल्ली	2.9.26
449.	महेन्द्रवारुणी	2.10.31
450.	महौषधी	2.9.103
451.	मातुलुङ्ग	1.18.104
452.	माधवी	1.19.79
453.	मालती	1.19.107
454.	मालिनी	1.1.44
455.	माष	1.4.11
456.	मीनाक्षी	1.4.13
457.	मुक्ता	1.18.178
458.	मुचुकुन्द	1.22.44
459.	मुण्डलोह	1.7.140
460.	मुण्डी	1.4.14
461.	मुद्ग	1.4.11
462.	मुनि	1.7.170
463.	मुनिवल्ली	2.9.86
464.	मुसली	1.15.452
465.	मुस्तक	1.14.15

466.	मूर्वा	2.10.67
467.	मूलक	1.23.40
468.	मूलकन्दा	2.9.107
469.	मूली	1.16.37
470.	मृषा	1.26.148
471.	मृगाण्डजा	1.19.107
472.	मेघनाद	1.4.20
473.	मेदा	1.18.142
474.	मेषशृङ्गी	1.4.20
475.	मोक्षक	1.4.336
476.	मोचा	1.17.39
477.	यवक्षार	2.1.342
478.	यवचिञ्चा	2.1.362
479.	यव	1.4.11
480.	यवानी	1.15.426
481.	यष्टीमधु	1.21.15
482.	यूथिकात्रय	1.18.172
483.	रक्तकञ्चुक	1.1.44
484.	रक्तचन्दन	1.4.437

485.	रक्तपादी	2.10.38
486.	रक्तपुनर्नवा	1.4.13
487.	रक्तपुष्पी	1.15.104
488.	रक्तबिन्दुक	1.1.43
489.	रक्तवल्लरी	2.9.102
490.	रक्तशृङ्गिक	1.14.14
491.	रजत	1.4.160
492.	रजतमाक्षिक	1.4.215
493.	रसकं	1.23.393
494.	रसाञ्जन	1.16.69
495.	राजवृक्ष	1.4.25
496.	राजावर्त	2.8.195
497.	राजिका	1.4.17
498.	राम्छं	1.7.40
499.	रास्ना	1.6.11
500.	रुदन्ती	1.15.102
501.	रुद्रजटा	2.10.151
502.	रेणुका	1.16.26
503.	रोमकलवण	1.7.87
504.	रोहिणी	1.15.142

505.	लकुच	1.18.270
506.	लक्ष्मणा	1.4.515
507.	लक्ष्मी	1.17.38
508.	लघुच्छदा	1.17.37
509.	लज्जालु	2.10.40
510.	लताकरञ्ज	1.23.235
511.	लवङ्ग	1.15.448
512.	लवणक्षार	2.1.331
513.	लशुन	1.26.71
514.	लशुनवल्लरी	2.9.100
515.	लाक्षा	1.9.14
516.	लाङ्गली	1.4.155
517.	लिङ्गिनी	2.10.8
518.	लोध्र	1.19.17
519.	वकुल	1.18.173
520.	वज्र	1.4.200
521.	वचा	1.4.31
522.	वज्रवल्ली	2.9.106
523.	वटजट	1.7.170

524.	वत्सनाभ	1.4.123
525.	वन्दाक	1.22.1
526.	वन्ध्याककोॕटकी	1.4.17
527.	वराटिका	2.1.304
528.	वर्तलोह	2.7.18
529.	वसा	1.4.336
530.	वसुकन्यालिका	1.17.40
531.	वारवल्ली	2.9.106
532.	वाराही	2.10.21
533.	वार्त्ताकी	1.17.38
534.	वालुक	1.14.15
535.	वास्ती	1.18.34
536.	वास्तुक	1.6.87
537.	विजया	1.4.62
538.	विडङ्ग	1.15.173
539.	विदारी	1.4.125
540.	विद्रुम	1.18.178
541.	विमल	1.4.257
542.	विशाला	2.9.108
543.	विषमुष्टि	1.24.131

544.	विष्णुकन्द	2.10.26
545.	विष्णुक्रान्ता	2.8.109
546.	वृद्धदारुक	2.10.108
547.	वृद्धि	2.10.139
548.	वृश्चिकाली	1.23.322
549.	वृषभ	1.18.36
550.	वैक्रान्त	1.10.8
551.	वैदूर्य	1.18.180
552.	वंश	1.22.39
553.	व्याघ्रपादी	1.4.155
554.	व्याघ्री	1.7.17
555.	व्योष	1.17.74
556.	शङ्खपुष्पी	1.4.39
557.	शङ्ख	1.23.41
558.	शठी	2.5.77
559.	शणपुष्प	1.18.66
560.	शतपत्रिका	1.18.173
561.	शतपुष्पा	1.16.60
562.	शतावरी	1.4.13

563.	शताह्वा	1.18.144
564.	शमी	1.7.15
565.	शरपुङ्खा	2.10.54
566.	शर्करा	1.16.27
567.	शल्लकी	1.15.588
568.	शशदन्ता	1.4.220
569.	शशास्थि	1.7.99
570.	शाकवृक्ष	1.4.153
571.	शारिवा	1.18.143
572.	शालूक	1.17.44
573.	शाल्मली	1.18.64
574.	शिग्रु	1.7.170
575.	शिरीष	1.19.101
576.	शिलाजतु	1.4.220
577.	शिलावाप्यं	1.4.325
578.	शुक्ति	2.8.16
579.	शुण्ठी	1.24.202
580.	शुनकशाल्मली	1.15.131
581.	शृङ्गी	1.4.515
582.	शेलु	1.18.64

583.	शैलेयक	1.16.46
584.	श्यामा	1.4.11
585.	श्रीखण्ड	1.19.106
586.	श्रृङ्गिवेर	1.4.347
587.	श्लेष्मातक	1.24.199
588.	श्वेत-आखुकर्णी	2.10.16
589.	श्वेतचन्दन	1.16.26
590.	श्वेतपुनर्नवा	1.4.13
591.	श्वेतपुष्प	2.9.93
592.	श्वेतमुसली	1.4.111
593.	श्वेतशृङ्गी	1.14.15
594.	श्वेतार्क	1.15.92
595.	षण्डजारी	1.4.156
596.	सतुक	1.14.15
597.	सदाफल	1.17.39
598.	सक्षकञ्चुक	1.1.45
599.	सक्षत्री	2.9.101
600.	सक्षर्ण	1.16.47
601.	समुद्रशेषी	2.10.124

602.	सरल	1.4.48
603.	सरसी	1.17.41
604.	सर्जक्षार	1.23.39
605.	सर्ज	1.18.35
606.	सर्पाक्षी	1.4.14
607.	सर्पिणी	2.9.101
608.	सर्वकन्द	1.17.50
609.	सर्षप	1.14.15
610.	सस्यक	2.8.218
611.	सहकार	1.17.35
612.	सहदेवी	2.5.35
613.	साबुणि	2.1.310
614.	सामुद्रलवण	2.1.334
615.	साल	1.2.27
616.	सिद्धार्थक	1.17.50
617.	सिन्दुवार	1.9.47
618.	सिन्दूर	2.5.74
619.	सुगन्धागा	1.19.160
620.	सुनिषण्णक	1.17.36
621.	सूची	1.15.203

622.	सूएर्पर्णी	1.18.142
623.	सूरणकन्द	1.4.30
624.	सूर्यकान्त	2.8.166
625.	सेव्यत्वक्	1.18.96
626.	सैन्धवलवणं	1.4.139
627.	सोमराजी	1.15.597
628.	सोमवल्ली	2.9.22
629.	सोमवृक्ष	2.9.25
630.	सौगन्धिक	1.18.174
631.	सौराष्ट्री	1.4.123
632.	सौवर्चललवण	1.19.155
633.	सौवीर	2.4.11
634.	सौवीराञ्ज	2.1.283
635.	स्थलकुम्भी	1.7.40
636.	स्थलपद्मिनी	1.23.347
637.	स्थाणुलोचन	1.16.45
638.	स्थौणेयक	1.16.45
639.	स्नुहीक्षीर	1.4.144
640.	स्पृक्का	1.16.44

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641.	स्फटिक	1.2.46
642.	स्फटिका	1.24.12
643.	स्यहजीर	1.16.26
644.	स्रोतोञ्जन	1.23.581
645.	स्वर्ण	1.4.198
646.	स्वर्णपुष्पी	1.4.61
647.	स्वर्णमाक्षिक	1.4.178
648.	हयमारक	1.18.35
649.	हरिचन्दन	1.19.142
650.	हरिताल	1.4.181
651.	हरिद्राश्मा	2.1.4
652.	हरिद्रा	2.5.56
653.	हरीतकी	1.15.148
654.	हस्तिकन्द	2.10.122
655.	हस्तिकर्णी	1.15.98
656.	हस्तिशुण्डी	2.10.190
657.	हालाहल	1.14.13
658.	हिङ्गुल	2.1.183
659.	हिन्ताल	1.18.66
660.	हिमजा	2.10.1

661.	हेम्माक्षिक	1.4.123
662.	हंस्पादी	1.4.13
663.	हीवेर	1.19.107

APPENDIX-2

SCREEN SHOTS

Screen shot of Home page

Screen shot of 'Browse Test' module (introduction to Ānandakanda)

Screen shot of 'Browse Text' module (full text)

Ānandakanda Knowledge Base
(Towards developing an Ontology)

Department Of Sanskrit Studies
University Of Hyderabad

Home | Browse Text | Topic Index | Ulta sa Search | Word Search | Rasasāstra Ontology | Rasapariṇaka | Text List

Topic Index

In Ānandakanda, a number of topics were mentioned as Rasavrats, Gandhaka śuddhi etc. Additionally, tantras, Aṣṭha, Nidas were also mentioned. Total topics are 567 in number, which are made available through a list box. A searching option can be used for a quick reference. Each topic can be selected and read in units.

Select topic: [अञ्जनविधि:] [▾] [SEARCH]

अञ्जनविधि:

तलोऽङ्कापालुखादौ पश्चच्च दशिषाम्।

वामाक्षे वन्दूलेन दक्षस्तेन दक्षिणम् ॥1.18.82॥

मुद्राकार्यं लोचनाञ्जनं तिस्रो हिम्।

तेनैतिणे निर्तिते च लक्ष्मणों तथोक्तले ॥1.18.83॥

स्यातां ज्ञातरलिखपाञ्जनं सूक्ष्मदर्शि।

नेत्रोश्लेष्मानो भीतेर्विशेषतत्त्वरूपं हिम् ॥1.18.84॥

सादर श्लेष्मभूस्राशिलाकं चञ्चू निरि।

अञ्जनेत्वरं वीतश्लेष्मा नानानकांगती म्येत् ॥1.18.85॥

तस्य निह्नमार्थाय नावनं किञ्चार्स्येद् ।

Screen shot of 'Topic Index' module

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Ānandakanda Ullāsa Search

The classification of 36 ullāsas from the basic classification of two Viśrāntis (Amṛtīkaraṇaviśrānti, Kriyākaraṇaviśrānti) of Ānandakanda is considered. All 36 Ullāsas are termed as AK-1.1 through AK.2.10. The numbering system followed is in two levels. The first level refers to the viśranti. And the second level refers to the Ullāsa. So, AK.1.1 means first Ullāsa in first viśranti in Ānandakanda. All the 36 Ullasas are searchable through a list box with respective headings.

Select Ullasa First: [AK.1.1]

नीलाद्रिकरवीरं चलाकर्षसाधनम् ।
प्रसातं एकाशनं जडजनकारकम् ॥ १.१.१ ॥
प्रभया कथया नस्या वैर्यं रतुलिगवर्तनं ।
शेशेर नहरेर जन्मरितुलगनम् ॥ १.१.२ ॥
न्यारे कलमन्ती प्रक्ष न्योशेक ।
रेयागन्तलयनि कुलशिलशिनि च ॥ १.१.३ ॥
जले ज्रा नहरेर भगमश्रुकेह ।
शेत्रुं लाणि शक्ति तव निश्ववलाहन ॥ १.१.४ ॥
कान्तगातरं च शेक्त्या रेशिलि ।
मदेन्तगुरुक्षनं बक्षवारिशयं ॥ १.१.५ ॥

[ढूंढ जड]

यादु यायु गड्की सावर कीलकरिणि ।
तज्ञी ज्ञर्रो चाज्वदुष्करभाज्वर्त्रं ॥ १.१.६ ॥

Screen shot of 'Ullāsa Search' module

Ānandakanda Knowledge Base
(Towards developing an Ontology)

Department Of Sanskrit Studies
University Of Hyderabad

Home   Browse Text   Topic Index   Ullasa Search   Word Search   Rasachintra-Ontology   Rasapaddati   Text list

Ānandakanda Word Search

This module contains collection of technical terminology related to plants (944), animal products (21) and minerals (90) totalling to 1055 from Ānandakanda. Entire terminology has been classified into the above mentioned three categories. Use the list box to get required classification from all the three categories. Two notations are used here - 'wx' and 'unicode - devanagari'. The word list is alphabetically sorted arranged. The interface offers suggestions by while querying to the words.

Each term has been tagged with 7 elements such as: शब्द (term), लिङ्ग (gender), अन्त्य (end letter), निष्पत्ति (grammatical derivation), व्युत्पत्ति (word reference), श्लोकसं (etymology), and पर्याय (synonym). The system generates the output in a table format.

Category Plant ▾   Encoding wxAlphabetic ▾   haritA   SEARCH

शब्दः	हरिद्रा
लिङ्ग्	स्त्री
अन्त्यः	आ
निष्पत्तिः	हरि-तु(र्त्ती)-ड-टाप् ।
व्युत्पत्तिः	हरेः पीतत्वं द्रवति । रमनमङ्गल्ये आर्त्तिभेदे (वाच०) । हरेः पीतत्वं द्राति गच्छति इति (शब्दर०) ।
श्लोकसं	2.3.55
पर्यायः	हरिद्रणी, स्वर्णवर्णा, सुवर्णा, रैमा, वरिणी, क्षेपनका, हरेडी, पीता, वराङ्गी, गौरी, कनिका, क्तन, वर्वंटी, पत्रिका, हरिता, रजनी, विकर्णं, वरवर्णिनी, क्रिमन, मङ्गल्या, मङ्गला, लक्ष्मी, भद्रा, निषा, योक, शोभना, शुभ्रा, रत्ना, कर्पूरिका (रा.नि०) ।

Screen shot of 'Word Search' module

Screen shot of 'Rasaśāstra-Ontology' module

Screen shot of 'Rasapañcaka Search' module

Screen shot of 'Text list' module

APPENDIX-3

HIERARCHY OF DRAVYA
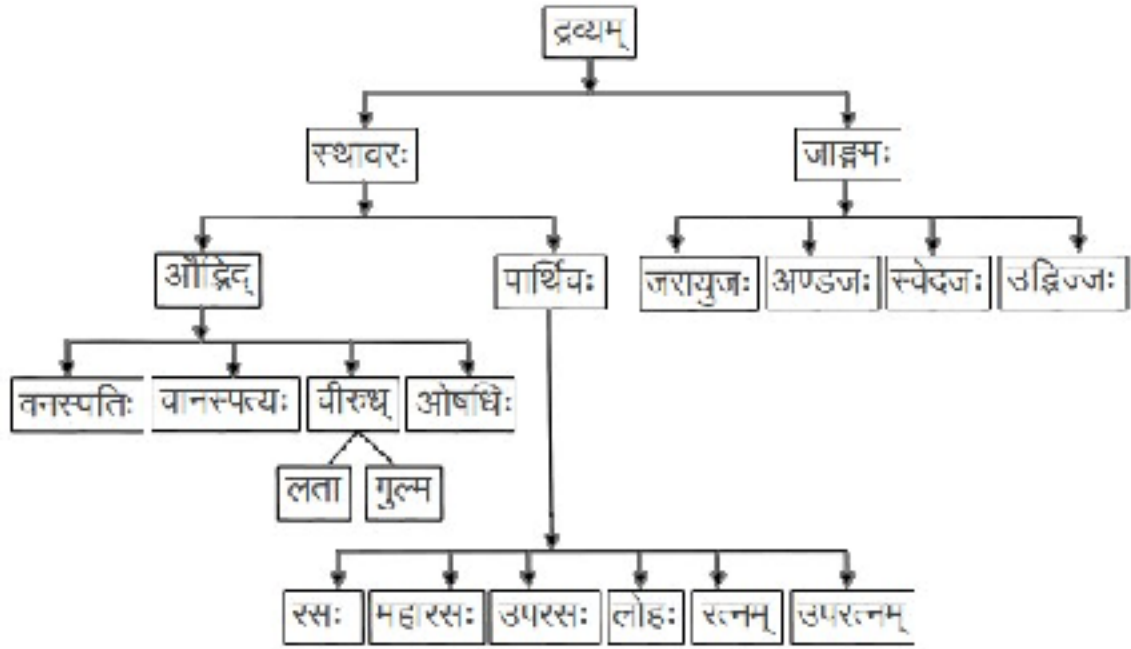
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