

Reference of Scientific Advancement in Sanskrit Literature. CHEMISTRY-THE ANCIENT INDIAN SAGA.

Dr SHRIDHARA N BHATTA

ASSOCIATE PROFESSOR AND HEAD. DEPT OF SANSKRIT.

SRI DHARMASTHALA MANJUNATHESHWARA COLLEGE (AUTONOMOUS) UJIRE.

ORCID ID <https://orcid.org/0009-0003-0776-6922> Email: sbujire@sdmcujiire.com

9448335652

Abstract:

It is being increasingly recognized that ancient Sanskrit literature covers profound wisdom of Physical and Social sciences. The scientific knowledge root unveiled by our sages and perspective thinkers covers a wide range of subjects such as Physics, Chemistry, Mathematics, Astronomy, Metallurgy, Bio technology, Environment sciences etc . Knowledge of Sanskrit and perspective analysis of contents of our ancient Sanskrit literature would be great help in getting a good insight in to our rich scientific heritage. In this article I have concentrated on our advancement in the field of chemistry and Botany.

Keywords: - Sanskrit literature, Scientific vision, bio-diversity. Indian sciences

Introduction:

Ancient Indian view of life was a Holistic view (total view) and there for it included both knowledge and action as part of the same activity. This was based on the Cosmo centric view of life.

All our ancient achievements were recorded in Sanskrit language. Every facet of human intelligence has wonderfully been influenced by Sanskrit, the nerve of Indian culture. All the sensitive, subtle and vital areas of human knowledge find their first and the finest lessons in Sanskrit literature.

The scientific vision .fervour and methods of ancient seers are of splendid interest in modern context. India was the leader of several chemical and pharmaceutical industries including dyeing, tanning, soap making, glass and ceramics, cement and metallurgy. The earliest reference to the use of many materials by human beings are found in Vedic hymns, which are the oldest recorded literature in the world

अश्मा च मे मृत्तिका च मे गिरयश्च मे पर्वताश्च मे सिकताश्च मे वनस्पतयश्च मे हिरण्यं च मे यश्च मे सीसं च मे त्रपुश्च मे श्यामं च मे लोहं च मे----- (कृ. यजु ४-८-५)

“I want stone, Clay,Hills,Mountains,Sands,Trees,Gold,Silver,Copper,Lead,Tin,iron.”
(Yajurveda)

नमस्तक्षिभ्यो रथकारेभ्यश्च वो नमः । (कृ. यजु ४-५-१२)

नमः कुलालेभ्यः कमरिभ्यश्च वो नमः। (कृ. यजु ४-५-१३)

“Homage to you carpenters, makers of chariots, potters and smiths”
We shall now consider the preparation of a few chemicals standardized by the ancient

Indian chemists. It is found that these methods confirm surprisingly to the method developed on modern chemistry. Our ancient sages, monks, and scholars investigated the nature of queer metal mercury. they having thoroughly examined various properties , advanced these uses of mercury for the ultimate good of the human society. “Lohavedha” –transformation of base metals in to nobler one, Dehavedha-to conquer disease, old age, and death, and “Khechhari vidya”-to achieve ability to fly in space without wings,--these three processes together are called RASAVIDYA or alchemy. SUSHRUTHA SAMHITHA explains about the preparation of caustic alkali which was known to our ancient sages.

तं चिकीर्षुः शरदि गिरिसानुजं शुचिरुपोष्य प्रशस्तेऽहनि प्रशस्तदेशजातम् अनुपहतं मध्यमवयसं महान्तम् असितमुष्कमधिवास्य अपरेद्युः पाटयत्वि खण्डशः प्रकल्प्य अवपाट्य निर्वति देशे निचितिं कृत्वा सुधाशर्कराश्च प्रक्षिप्य तिलनालैः आदीपयेत् । अथ उपशान्ते अग्नौ तद्भस्म पृथग् गृहीयात् भस्मशर्कराश्च । ततः क्षारद्रोणम् उदकद्रोणैः परिस्राव्य, महति कटाहे श्शनैः दर्व्या अवघट्टयन् विपचेत् । तमादाय महति वस्त्रे परिस्राव्य इतरं विभज्य पुनः अग्नौ अधिश्रयेत् ।

some well grown trees in the forest are cut into logs & these are piled in free from strong wind. Lime stone should be placed on the piles and then set on fire by stalks of dry plants. When all the wood is burnt out, the fire is extinguished, the ashes of the logs and the burnt lime are collected and kept separate and dissolved in water. The extract of the ashes is then mixed with lime water to get the lye which is separated from the precipitate by filtration. The solution is concentrated to different extent by boiling and it is possible to get dilute, mild and caustic Alkali.

The chemistry involved in this process is very simple. The wood ashes contain potassium and sodium carbonates. Lime stones and seashells contain Calcium carbonate. On heating strongly the carbonate decomposes into Calcium Oxide. Quick lime and Carbon dioxide which escapes into the air. Calcium Oxide reacts with water vigorously and gives Calcium Hydroxide, which is lime water indeed. Calcium Hydroxide reacts with Potassium/Sodium carbonate and gives rise to Calcium Carbonate which comes down as precipitate. Alkali Hydroxide KOH remains in solution which may be concentrated by boiling to different extent. This was the most efficient and scientific method of preparing the caustic alkali until the end of 19th century when the electrochemical method became more popular.

The ancient books on chemistry elaborately explains about the laboratory setup, pieces of apparatus used for chemical and pharmaceutical investigations (YANTHRAS) Qualifications of the staff and assistants etc.

गुरुभक्ताः सदाचाराः सत्यवन्तो दृढव्रताः ।
निरालस्याः स्वधर्मज्ञा सदाज्ञा परिपालकाः ॥
दम्भमात्सर्यनिर्मुक्ताः कुलाचारेषु दीक्षिताः ।
अत्यन्तसाधकाः शान्ताः मन्त्राराधनतत्पराः ॥

इत्येवं लक्षणैर्युक्ताः शिष्याः स्युः कार्यसिद्धये ॥

(The pupil should be full of reverence for his teacher, well behaved, truthful, hardworking, obedient, free from pride and conceit and strong in faith.)

It was customary in ancient India to hold periodic conferences to discuss scientific and technical works. Charaka also prescribes the procedure for debate in greater detail.

Several preparations were made from materials of mineral, plant, animal origin which were extensively used in medicine and industry. The main goal of all these experiments described in Rasa shastra is two fold. One is to transform base metals to noble metals i.e. "LohaVedha", and the other is to strengthen the body and maintain in a fresh and healthy state, just like a youth.

In addition to these conventional chemical operations, many biochemical works were also in vogue from time immemorial. A major part of the Rigvedic text of the ninth Mandala deals with fermented SOMA Juice. Nine types of liquors referred in Arthashastra and Charaka Samhitha. Zinc minerals, Iron oxide and minerals, different types of anjanas, Arsenic sulphide, calcium carbonate, Mercury sulphide, Corrosion and loss on heating, Loss during heating, Flame test, Classification of Iron, Alpha and beta Tin, etc were found proper place in ancient texts. Indian chemists of vedic ages had made significant contribution to the field of cosmetics and perfumery. Gangadhara, the author of the treatise "Gandhasara" defines in a beautiful stanza the scope and purpose of the Indian science and art of cosmetics and perfumery. There are similar other works also in this field. Brihatsamhitha of Varahamihira, Manasollasa, Agnipurana, Gandhavada, Gandhayukthi etc.

Hundreds of chemistry books written by our ancient seers are available in Sanskrit language. Most famous among them a few are RASARNAVA RASENDRA CHOODAMANI, RASARATHNASAMUCHHAYA, RASARATHNAKARA, etc.

I am sure that the indepth study of books will not only explore a new source of ideas and knowledge but also fetch variety of materials hitherto unknown to even the modern science

ANCIENT INDIAN CONCEPT AND TECHNIQUES OF CONSERVATION OF BIO-DIVERSITY.

Ever since the dawn of civilization India has been known in the world for her nature consciousness. Indian life has never parted the lap of Nature. Indians are not just satisfied with this rich possession of plant life. They are also fully aware of what they do not possess and what its value is. It is rightly quoted that

The person who sees everything in oneself and sees him in all elements Bhuthas (means made up of five Bhuthas) is a good person and he lives happily. आत्मवत् सर्वभूतानि यः पश्यति स पश्यति ।

Bio-diversity, short hand for biological diversity, is a relatively new term coined by scientists, which encompasses the variety of all plants, animals and micro organisms in a particular habitat or geographic area.

The concept of bio-diversity is inherent in Indian thoughts. We can observe these thoughts are of our ancient Sanskrit texts. Bio-diversity is usually measured as the names of species or sub-species of plants, animals and micro organisms.

Creatures can be distinguished by knowing to what genus, species and Individuality they belong.

Kinds of plants are like this.

The plants are of four types namely herbs, trees, creepers and shrubs. In this back-ground, when ecological problems have attained tremendous proportions, the very existence of human race on this rare planet is threatened. The need of the hour is to take preventive measures to restore environmental balance and conserve bio-diversity.

The ancient Hindu literature is a rich source of information and inspiration in this connection. Ancient texts in Sanskrit depict a beautiful picture of the relationship of man with his kinsmen, society, and nature and with all that around him. Instructions laid down in these scriptures, if followed, can be of great help in solving the present day problems of environmental crisis and degradation of bio-diversity.

The Puranas constitute an important source for the study of bio-diversity- Flora and Fauna, which is an important element of ecology. The number of species of plants and animals referred to in the puranas are enormous. For example, 87 species of plants are enumerated in the Kurma Purana. The Narada Purana mentions 173 species of plants and 68 species of animals. The Vamana Purana refers to 117 species of plants and 137 species of animals. The Garuda Purana mentions about 300 names of different plants and animals. Amarasimha in his Amarakosha refers hundreds of plants and animals with their synonyms.

Modern ecologists recognize 3 types of bio-diversity.

1. Eco system diversity
2. Species diversity
3. Genetic diversity

Whereas ancient Indian scientists made 4 types of biodiversity: Plants, Insects, Birds and Animals.

The Bhagavtha Purana declares that rivers are the veins of the cosmic person and the trees are the hairs of his body. The air is his breath. The ocean is his waist, the hills and mountains are the stacks of his bones and the passing ages are his movements.

Our ancient people were fully aware of the importance of bio-diversity. That is why they said that trees are sentient beings. The trees always bear flowers and fruits because they have the eternal nature in them.

The vedanthic philosophy says that this world is incarnated by the God Brahman. All creatures which are made up of 5 elements namely the earth, water, heat, air, ether by their various combinations in different proportions are the part of Brahman only. All these creatures are equally important and all have the right to live in this hemisphere. It is rightly said that

Ancient texts always steer the mankind to achieve universal well being and fraternity through scientific development and spiritual perfection.

Conclution:

The Indian Science which arose, grew up and developed among the people born, lived and died in territories known as 'Bharatha Varsha' The Rigveda says:-“Give us sight for our eyes, Give us strength to our bodies, Let us see the world as one , Let us see the world clearly”. This mantra reveals the direction of the wishes and aspiration of the Indians of Vedic age. The speciality of ancient Indian sciences was to utilize nature for the good of mankind.

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