

## Does the plant Soma exist ?

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This paper has been written as a critique against the publications of Wasson (1968 and 1971) who wrote that soma, the divine plant of immortality, to be *Amanita muscaria* : a mushroom of hallucinogenic importance. Wasson (1971) has relied on the English translation of Rigveda by Geldner and Renou published around 1951. Most texts in mycology have cited this version (Svrcek, 1975; Hobbs, 1987). Justifications have been given categorically to disqualify Wasson's version that *Amanita muscaria* was Soma - a plant that yielded the drink of immortality as mentioned in Veda.

According to 'Shristito gatabda' (सृष्टितो गताब्दा) Hindu almanac the 1,95,58,85,104 years has passed since creation. The living beings are categorized into four types depending upon their nature of birth and development. They are Andaj (अण्डज : born from egg), Jarayuj (जरायुज : baby wrapped against the long fetus of mother in womb), Swedaj (स्वेदज : seeds germinating from heat and moisture of the earthen materials) and Udvij (उद्भिज : growing on soil or growing by breaking the layer of soil). Jarayuj include the mammals, swedaj include mushrooms and Udvij include the higher plants. Mushrooms are mostly included in Swedaj and as it is included in Saka burg (शाक वर्ग : vegetable category) it can also be taken as Udvij. (Adhikari, 1981- 82).

The first descriptions and nomenclatures of plant diversity in human use are in Sanskrit, which are based on their nature of origin, structure, taste of the material, physiological action and effects produced in and out side the human body (Adhikari, 2000). They are very likely, the oldest in the human history. Thus the products of diverse forms of life are used since the Vedic period. The ancient literatures like Veda (वेद), Upanishad (उपनिषद), Manusmriti (मनुस्मृति), Ramayan (रामायण), Mahabharat (महाभारत), Ayurveda (आयुर्वेद), Shamhita (संहिता) and Nighantus (निघन्टु), have quoted in hymns (ऋचा, श्लोक), several plant species, which are used in care and service of not only man kind but also the God and Goddess. These literatures have been written in different time period well before

naturalist of ancient Greece started gathering of plants and animals, and providing the systematic nomenclature / binomial nomenclature to life forms.

The Veda has been created by Lord Brahma (ब्रह्मा) and its significance has been disseminated by Indra (इन्द्र). It has been split up into four parts (Rigveda (ऋग्वेद), Yajurveda (यजुर्वेद), Samveda (सापवेद), Athrvaveda (अथर्ववेद) by Vyasa (व्यास), the sage. Rigveda is the main text among the Vedas. It deals with the divinely strength in sanctifying the inner ideas to enlighten the man and human duties, incorporates the natural mysteries and the health immortal. Atharvaveda deals with the medicines, medicinal herbs and other matters (Acharya, 1967 pg. 13).

The Manusmriti (मनुस्मृति) (written by Manu (मनु), the son of Brahma and the ancestor of mankind) have listed the different names of plants, animals, minerals, rocks and other materials in Sanskrit hymns.

The Ramayan (रामायण) deals with various plant species. Its one chapter is specially focused to cure the internal wound and wake up Laxaman from Coma, when severely wounded in the battle. There the herbs like Sanjivani (संजीवनी: herb used to bring a person to life from lifeless state), Sandhani (संधानी: herb used to join the broken parts), Sabarnakarni (सावर्णकरणी: herb used to bring out the object inserted deep into the body) and Bishalyakarani (विसल्यकरणी: herb used to operate without operation) were used.

There are sill some Ayurvedic medicines viz : Mritsanjiwani buti [मृतसंजीवनी बटी], Mritasanjivani sura [मृतसंजीवनी सुरा], Mritasanjivani rasa [मृतसंजीवनी रस.] and Mritunjaya rasa [मृत्युञ्जय रस.], the literal meaning of which are : Mrit [मृत] or Mrita [मृता] is dead, Jaya is victory, conquest, empower and Sanjivani means to get life back. These Ayurvedic herbs and medicines- Mritsanjiwani buti (मृतसंजीवनी बटी: is used to bring a person to life from lifeless state is similar to Sanjiwani), Mritasanjivani sura [मृतसंजीवनी सुरा : is a drink prepared by fermentation administered as an ideal tonic for strength, used in

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any type of disability after long type of illness, influenza, body ach and after delivery etc], Mritasanjivani rasa [मृतसंजीवनी रस : is used to treat communicable diseases like fever and influenza, body ach and in constipation.]; Mritunjaya rasa [मृत्युञ्जय रस : is used in almost all types of fevers cold, cough, pneumonia and rheumatism.]; and Amritarista [अमृतरिष्ट : is used to treat old fever and some liver diseases], are used since time immemorial. In Mritasanjivani sura (मृतसंजीवनि सुरा) there more than 27 plants and their products. Among these, the main ingredients are *Acacia nilotica*, *Zizyphus mauritiana*, *Areca catechu*, *Zingibar officinale*, *Cedrus deodara*, *Prunus cerasiodes*, *Pterocarpus santalinus*, *Hedichium spicatum*, *Nardostychnus grandiflora*, *Cyprus rotundus* and *Santalum album*. In Mritasanjivani rasa (मृतसंजीवनि रस) one of the main ingredients is *Aconitum ferox*. In Amrita (अमृता) there are *Terminalia chebula*, *Terminalia bellerica*, *Tinospora cordifolia* and *Aegel marmelos*. There is another Auyurvedic preparation known as Somakalpasab (सोमकल्पासब), which is prepared by fermentation of *Ephedra gerardiana*. Except this preparation, no other medicine named above contains *Ephedra gerardiana*.

Precisely Soma is related to immortality while Mritunjaya is related to empowering the death (death may happen, but may regain as well). All these herbs also await their phytochemical and bioactivity investigation and studies in modern concept in relational to find out the correlation with Soma. So, here, only about the Soma has been discussed.

The Mahabharat (महाभारत) also has quoted several important plants and animals used in medicines and other uses. Shreemadvagvatgeeta (श्रीमद्भगवद्गीता) (15:13) states that 'it is the Lord Krishana himself, who enters in side the earth, bears all the load of materials, turns himself into dew of immortality and nourishes all the plants.

“ गामाविश्य च भूतानि धारयाम्यहमोजसा ।  
पुष्पामि चौषधीः सर्वाः सोमो भूत्वा रसात्मकः ॥

The Ayurveda (the science of human health) is principally derived from Rigveda and Yajurveda. The Ayurveda based classics, Samhitas (संहिता) [Charak (चरक), Shushrut (सुश्रुत), Bagbat (वाग्बट), Kashyap (कश्यप)], Nighantus (निघंटु) (Bhavprakashg, Ratnakar, Madanpal, Bir, Chandra) and Drabyaguna vigyan (see Priyabrat Sharma's publications) though, narrate in different ways have the same view. Thus, according to Drabyaguna Vigyan (द्रव्यगुण विज्ञान) (in Sharma, 1993) the Rigveda deals with 67 plants, while

Yajurveda 82, Atharvaveda 288, Bhrahman grantha 129, Upanishad 31, Kalpa Sutra 519, Paniniya 152 and Patanjali 109 plants respectively. So, it can be stated that there were good plant explorers, who had discovered many mysteries about the phytochemical activities present in plants. But unfortunately they did not give the detailed description of each and every plant, which can be used for human welfare. Therefore the names of the plants were based on either the nature of their origin or gross morphological characters [i.e. Taxonomic, for example Jatamansi (having heavily adorn with hairs): *Nardostachys grandiflora*; Batsnav (rhizome of the plant looking like fetus of calf): *Aconitum ferox*] or phytochemical effects (ie. Chemotaxonomy, for example Kutaki (having bitter in taste): *Picrorhiza scrophulariflora*] on and in human body. The effects produced by the plants on and in the human body are given in the hymns rather than in chemical formulas. So, each and every hymns had been formulated by certain Rishi and Mahaarshi, the so-called researchers of those days.

Charak (also known as Agnivesha tantra, written around 5000 BC) is written by a sage while trekking in the Himalayas and testing the plant forms for its value in human health care and medicine. Shushrut (written by Dhawnantari, before 5000 BC) is the product of knowledge on human health and its care from different diseases. Madanpal Nighantu (written by King Madanpal - 1431 AD) also incorporates several biodiversity product used for the treatment of diseases.

The recent tracing out of the hymn depicted in the Rigveda do not reveal any such matter, which is relevant to *Amanita muscaria* as a source of Soma. Hence to clarify it, most matter has been extracted from Rigveda, Charak, Sushrut, [Pandey, 1988: Hindu Dharmakosha (हिन्दु धर्मकोश)] and some recent literatures. Tremendous amount of controversy has been noted, as there is no correlation between the ancient description of the Soma plant and the recent one. Following is comparative account to determine the concept.

## Soma in Veda

### 1. Meaning of Soma

Literally Soma [(सोम) is made of four words Sa स+ A अ+ Oo उ + Ma म], which means Moon. In

'Sanskrit Shabdarth Kaustuva', (the literal meaning of Sanskrit words) (Sharma and Jha, 1978). 'Soma' means name of a plant, Amrit, Moon, Rays, Camphor, Water, Air, the god of wealth (Kuber) and mind. In another word it signifies the matters related to eternal peace and super natural strength, while on other hand to the pleasant and cool atmosphere [Chhandogyan Upanishad, 5:104; Kaupinaki Brahman, 7:10]. Soma is not Sun and fire. As stated above, Lord Krishna has himself presented as the Soma, to keep all the plants of universe healthy. Soma has therefore, been regarded as Lord himself, moon and the plant. So, according to Hindu almanac the 2<sup>nd</sup> day of the week is known as Soma i.e. the day of moon.

Soma was regarded as a drink of immortality and that kept the body strong, safe and sound from any evil. In another way it means that it is the material, which keeps in touch the human soul with heavenly matters or keeps the relationship with heaven in peaceful way. Soma has no hallucinogenic properties.

If the word Rasa (रस) (water or liquid or extract or soup) is added, though, commonly it is known to be drink of immortality (Amrit: अमृत). In another sense it means drops of dew, which appear in full moon day. Sometimes in slang it denotes to an alcoholic drinks or drink of hallucinogenic importance. It is not related with urination of Soma by Lord Shiva



Amanita muscaria



Ephedra gerardiana



Rheum australe



Rheum webbianum



Juniperus recurva



Rheum nobile



Juniperus squamata



Cannabis sativa L.

Figure: Some species considered by Ayurveda as Soma

and Indra, which is contradictory to Wasson's statement.

## 2. Identification of plant

Pandey (1988), in Hindu Dharmakosha (pg. 86), a compiled literature all about the knowledge on Soma, states [Matsya Puran (मत्स्य पुराण) (5:21) (the text about 'Fish' the first incarnation of Lord Vishnu, to save the Universe and Earth from evil)] that the Rigveda contains the meaning and the mystery about soma in its sacred hymns. Soma is placed on the third category after the God of Fire and the God Indra. Soma is praised for its mysteries in 120 hymns of Rigveda. Shastri (1956, pg. 259 - 64) has compiled all about the plant Soma as depicted in Rigveda and other relevant literature

Shastri (1956) cites from Rigveda (10:34,1) as 'Somasyeva maujawatasya bhaksha (सोमस्येव मैजवतस्य भक्ष), 'Sahasrabalsam' (सहश्रबल्सं) \*(R.9:5,10), 'Diwispreshe' (दिविस्पृशे) (R. 9:11,14), 'Naicha shakha' (नैचा शाखा) (R. 3:53/14), 'Haritam bhajamanamhiranyam' (हरितं भ्राजमानं हिरण्यं) (R. 9:5,10), which means that it is a big plant with many drooping branches and though it is greenish, looks like golden yellow in color. (\* R= Rigveda, 9 = Chapter, 5 = Shukta, 10 = hymn). So, it is found that the plant Soma has its definite characters contradictory to Wasson's statement (1968, 1971) "if we discover that the poets never mention the roots or branches or blossoms or seed of Soma, if we find them placing the plant high in the mountains, if they use a succession of tropes each appropriate for the fly-agaric, indeed fitting it like a glove, if we discover no word in the Rigveda inconsistent with this plant, then indeed we have hit on its identity."

According to Gopāth Upanishad (1:17) Soma is "Soma aushadhinamdhirajh" (सोम औषधीनामधिराज), which means that Soma is the king of all the medicinal plants.

Charak (चरक चिकि : 1) states that सोमो नामौषधिराजः पन्चदशपर्वा सोम इव हीयते वर्धते च, Soma is the king of all the medicinal plants. It bears 15 leaves.

Sushrut (सुश्रुत : 29:21-22) also has the same opinion as above सर्वेषामेव सोमानां पत्राणि दश पन्च च । तानि शुक्ले च कृष्णे च जायन्ते निपतन्ति च ॥२०॥ एकैकं जायते पत्रं सोमास्याहरहस्ततः । शुल्कस्य पौर्णमास्यां तु भवेत् पन्चदशच्छदः ॥२१॥ शीय्यते पत्रमेकैकं दिवसे दिवसे पुनः । कृष्णपक्षक्षये चापि लता भवति केवला ॥२२॥ In addition, it states that the leaves gradually appear one by one starting from no moon day to full moon day and fall off gradually from full moon to no moon day. So, according to the concept of Charak and Sushrut, Soma has been categorized into two major objects 1. Soma lata (सोम लता), ["Soma lata bisheshah सोम लता विशेषः"] (lata = vine) (in Katyayan Stautsutra - see original literature in appendix 1), the divine plant and 2. the Moon. Somewhere *Tinspora cordifolia* and *Bacopa* (Sharma and Jha, 1978) are also taken into consideration. The major difference in the concept of Soma between Veda and Ayurveda are as follows.

## 3. Names of Soma

Soma, though, only one plant, has 24 varieties, which differs in their local names and structure depending on place of origin (Sushrut, 29:4). They are Anshuman (अशुमान), Munjawan (मुन्जवान), Chanadrama (चन्द्रमा), Rajatprabha (रजतप्रभ), Durba soma (दुर्वा सोम), Kaniyan (कनीयान), Swetaksha (श्वेताक्ष), Kanakaprabha (कनकप्रभ), Pratanwan (प्रतानवान), Talbrinta (तालवृन्त), Kashmira (कश्मीर), Anshwan (अशवान), Swyamprabha (स्वयंप्रभ), Mahasoma (महासोम), Garudarhita (गरुडाहृत), Gayatra (गायत्र), Traistubha (त्रैष्टुभ), Pank (पाक), Jagan (जागत), Shakar (शाकर), Agnisthoma (अग्निष्ठोम), Raiwat (रैवत), Tripada (त्रिपदा), Gayatri (गायत्री) and Uddupati (उड्डपति). (Sushrut, 29:5 – 8).

The names of Ayurvedic medicines prepared from the plant are : तत्राजगरी (Tatrajgari), श्वेत (Sweta),

	<i>Vedic concept</i>	<i>Ayurvedic (Sushrut, Charak, Tandy Brahman and Others) concept</i>
1	It is an evergreen tree with drooping branches and evergreen leaves.	It is a vine like herb.
2	There are numerous greenish leaves.	There are 15 leaves only leaves appearing one by one daily during lunar days from no moon day to full moon day. All the leaves fall off gradually from full moon day to no moon day (phases of moon). All the leaves fall off gradually from full moon day to no moon day.
3	Root is not a Tuber.	It has tuberous root system.
4	Only one kind of Soma.	There are 24 kinds of Soma.

कापोती (Kapoti), कृष्णकापोती (Krishanakapoti), गोनासी (Gonasi), वाराही (Barahi), कन्या (Kanaya), छत्रा (Chhatra), अतिच्छत्रा (Atichhatra), करेणु (Karenu), अजा (Aja), चकैका (Chakraka), आदित्य (Aditya), पर्णी (Parni), ब्रम्हासुवर्चला (Brahmasubrchala), श्रावणी (Shrawani), महाश्रावणी (Mahasrawani), गोलोमी (Golomi), अजलोमी (Ajalomi), महावेगवती (Mahabegawati) चेत्याष्टादश सोमसमवीर्या महौषधयो व्याख्याताः. These eighteen names of preparations are said to be equivalent to Soma [Sushrut, 37:5in Shastri, 1972)]. These need to be investigated.

#### 4. Mushroom

Wasson (1968 and 1971) mentions that the Soma of Rigveda, the Divine drink of immortality, is made from *Amanita muscaria*. Most texts in mycology (Svrcek, 1975; Hobbs, 1987) have also cited this version.

Mushrooms are pronounced as Samswedaj (संस्वेदज), Buomichhannam (भूमिच्छन्न), Bhuchhatram (भुच्छत्रम्), Chhatram (छत्रम्), Chhatrakam (छत्राकम्), Prithvikandam (पृथ्विकन्दम्), Kawakam (कवकम्), Balakam (बलकम्), Shilindhrikam (शिलिन्धिकम्) (Bhav Parakash 10; Amar kosha, 4:3250; Madanpa Nighantu, 7:874). Kshavak (क्षवक) (Shushrut, 46: 290) and Srpakshatra (सर्पक्षत्रा) (Charak, 1, 27:4121) (Adhikari, 1981-82).

The *Amanita muscaria* is a small mushroom, which has brilliant red to dark orange colored cap with white scales above, and white gills (spore producing region) beneath. It does not have branches, roots and leaves, which is in contrast to the description of Soma as provided in Rigveda.

*Amanita muscaria* is reported from Tamilnadu (Natajan, 1975: 35) and Jammu and Kashmir (Watling and Gregory (1980, 499) in India (in Manjula, 1985: 149). But here the publication of Wasson (1968 and 1971) indirectly supports the view that *Amanita muscaria* is found in India since very long period.

Singh (1966) and Singh and Nisha (1976) reported *Amanita muscaria* from Nepal. According to Dr. Zhu L. Yang (pers. comm. 2003) the reports of *Amanita muscaria* by Singh (1966) and Singh and Nisha (1976) from Nepal may be based on misidentifications. The fungi in Nepal and in China are very similar to each other. He did not find this *Amanita* in SW China. Whereas, *A. subfrostiana* Zhu L. Yang, is very common in the Himalayan regions, but was misidentified as *A. muscaria*.

Adhikari (2000) noted as "Natural forests have also been replaced by exotic trees e.g. conifer, *Eucalyptus* and *Casuarina* and these have brought with them their alien fungal flora e.g. *Amanita muscaria* (L.: Fr.) Pers.: Hook in the hills of the south, all adding to the gamonut of agaricoid species (Watling, 1978). But in Nepal *Amanita muscaria* (Singh and Nisha, 1976) has been reported from the natural forest of Phulchowki (Kathmandu valley). Thus the idea given by Watling on one hand, does not support the view on the basis if seeds of trees were introduced for propagation, but on the other hand, the case may be true if the seedlings are introduced from another country. Thus this may cause the biogeographic distribution of fungus flora a complicated relationship".

Adhikari (1978) has published a paper on mushroom as quoted by different Ayurvedic text (1981 - 82), which do not express the existence of such divine plant, the juice of which is used as drink.

Singh, Chunekar and Sharma (1972, pg 453) in "Glossary of vegetable drugs in Brhatrayi" noted, "A few words about the actual substitute drug plants and their names may not be out of place. The substitutes appear to have been drawn from a wide range of the plant kingdom especially fungi, ferns and Aroids and probably also the floating and terrestrial forms of the lowest organisms. What appears to be misleading is their tendency to invest them with the names, which are same or similar to those given to the original forms. This must have been done from the best of their motives to maintain, at least, a show of the sanctity and efficiency of the original drug before the eyes of others. But their real position is revealed, when their habit, habitat, geographical distribution and morphological characters are described, by them. They are all unlike that of *Soma*. The doctrine of signatures appears to have been followed in selective substitutes".

#### 5. Origin and distribution of Soma

There is a legend about the existence and extinct of Soma in the Vedic period itself. It is as follows. In early Vedic period Brahma created Soma (Sushrut, 29:3). Soma, (here it is treated as both the incarnation of moon and the plant itself) the son in law of Daksha, had 27 wives. Among them he loved Rohini much. Finding the husband much inclined to wards Rohini, all other wives complained it to Daksha, their

father. So, Daksha cursed Soma to vanish or became extinct. This case became unfair to god and goddess in the heaven. Then lord Vishnu ordered to churn the sea. After churning the sea, Soma appeared in a vessel. (Pandey, 1988).

Two places have been mention about the origin of Soma 1. Heaven and 2. Himalayana belt (Rigveda, 1, 93,6). Matariswa brought it to the earth from heaven (Rigveda, 9, 61, 10). So, the origin and growth of Soma on earth is said to be at Mujawant Parvat (Gandhar- Kamboj of India, now Kashmir) (Rigveda 10, 14, 1). In Chhandogya Upanishad (5:10,4 and 7,10) it has been stated that there is no difference between moon and the Soma plant. Whenever the Soma plant is picked up the moon enters into its body. That means Soma receives the biochemical energy from the moon or the moon nourishes the plant with its dew having tremendous amount of energy.

Shastri (1956) cites from Rigveda as 'Shringeshishano arpati' (9: 5,2) 'sahatsomo na parvatsya pristhe' 'शृंगेशिशानो अर्पति' 'रुहत्ससोमो न पर्वतस्यर्षष्ठे' (5:36, 2), which means that soma is found only on the high Himalayan belts. Soma is found on Himalayas, Arbuda, Satya, Mahendra, Malaya, Shree Parvat, Devagiri, Vindhya, Devasunda and Hrida (Sushruta, 29/9).

## Existence of the plant

### 1. Vedic concept

Since the creation, according to Vedic astrologic science and almanac the 'Shristito gatabda' (age of origin), 1,95,58,85,104 years has passed. The creation of life forms on the earth (since origin 1,95,58,85,104) has spent a huge amount of time period [Satya (सत्य) – 17,28,00,0; Treta (त्रेता) - 12,96,00,0; Dwaper (द्वापर) – 8,64,00,0 and Kali (कलि) the running epoch has 43,20,000 years of period (all these years in total = one Maha or Dibya yuga) (one year of human beings is equal to twenty-four hours of gods) and said to undergo 28 cycles]. These periods till now have undergone 28 cyclic movements. In this 28<sup>th</sup> period Kali is again spending its 5104 years and rest of the period is still waiting. (Goyandaka, 2017 B.S in Geeta 8:17; Manusmriti, 1: 6473) Though, some authors have assumed, the age of origin of Veda to be around some 3,89,3091 years back, is still doubtful. So, it is assumed that there must have been great change in nature during change of Yuga (age). Since

then, the actual Soma is not found. Other plants are used as substitute instead.

### 2. Ayurvedic concept

The plants mentioned above grow in different seasons in different areas of Indian subcontinent. In ponds and bank of Sindhu the herbs like Medhya, Brahmasubracha and Adityaparni grow in spring season. Ajagari grows in every season. Gonasi in rainy season, Karenu, Kanya, Chhatra, Atichhatra, Golomi, Ajalomi, Shrawani and Mahashrwani grow in Kshudrak pond of Kashmir Barahi and Gonasi appear in spring season, Soma is found at the peak of Arjun mountain. (Sushrut 37:30-40).

Now a days *Ephedra gerardiana* a herb, used to cure cough, is called Soma lata: (Shastri, 1956; *Bull. Dept. Med. Pl. no. 3*). It is a the high altitude plant, Ephedrin is the extract of *Ephedra*. Whether this is Soma needs verification.

### 3. Modern concept

Darwin according to the age of the earth to be of 57 million years based on the concept of separation of moon from the earth. Kolvin estimated to be around 20 to 40 million years based on the cooling of earth. Joly and Clark estimated as 100 million years based on the rate accumulation of Sodium in the seawater. Holmholtz estimated it to be 22 million years on the basis of calculation of heat of the sun. Recently on the basis of radioactive elements (like Thorium, Uranium and Carbon) and rocks of different geological periods, the age of the earth has been calculated to be around 2,000 million years back.

According to Wegener's (1912) '*Continental Drift Theory*', the earth has undergone numerous changes in its structure especially the drifting of land. The recent theories have been trying to find out the exact shape of previous landmass. So, the drifting of land mass has either carried away the vegetational composition along with the drifted land mass or buried under the land mass or even the huge sea. During this process most of the vegetation, which were found in ancient Jurassic period, have become extinct either by natural changes or calamities. The biodiversities of those periods can be known by the study of embedded fossil in the strata of different periods, which helps to calculate the origin of biodiversity on the earth. The pollen analysis found in younger Quaternary period (i.e. 130,000 years back) had the deposits of coniferous trees (in Mukerjee, 1969).

Geologically it is proved that the present great central Himalayan chain was buried under the Tethys Sea during the middle of the Tertiary period, which separated Laurasia from Gondwanaland. At the end of Eocene (40 million years back) this Himalayan chain was uplifted due to collides between Indian and Eurasian geological plates. The flora of those periods serves as connecting links between the countries or the regions of present age. The occurrence of *Tetracentron sinense*, *Gnetum montanum*, *Psilotum nudum* and *Cyathea spinulosa* in this Himalayan belt as living fossils are the examples of that Precretaceous period. (Adhikari,2000).

#### 4. Modern thinking about Soma

According to Satpath Brahman (4,5,10:1-6; in Shastri, 1856) the plant Soma is already extinct and other plant species such as Putika (पुतिका) and Arjuna (अर्जुन) have been used as substitute since time immemorial, which have more or less the same effects on the body (pg. 262). The phytochemicals needs to be investigated. According to Shastri (1956) Sushrut depicts of Ashwagandha (अश्वगन्धा: *Withania somnifera*) while Tandya Brahman (ताण्य ब्राह्मण) mentions of Arjuna (अर्जुन : *Terminalia arjuna*). Singh, Chuneekar and Sharma (1972) states that no serious attempts appears to have been made on the substance such as Rhubarb (*Rheum emodi*), Ephedra (*Ephedra gerardiana*), Sarcostenema, *Ceropegia Canabis sativa*, Hops, rapes, sugarcanes and millets to fill up the Soma vacuum in this field. Some literatures (Charak, Sushrut, Katyayan sutra) have cited Soma lata (सोम लता: *Ephedra gerardiana*) to be also a substitute to Soma. The juice is used to drink and has multifold actions. (Sushrut, 29). It is an evergreen herb without drooping branches.

There are six species of *Rheum* in Nepal. *R. australe* (= *R. emodi*), *R. delavayi*, *R. moorcroftianum*, *R. nobile*, *R. spiciforme* and *R. webbianum*. Though high altitude (alpine) plants, they are herb and not tree with drooping green branches. There are seven species of *Ceropegia*. It is either an herb or a twiner, with tropical to temperate distribution. Rest of the plants except *Terminalia arjuna* are herbaceous and do not possess drooping branches. *Terminalia arjuna* is a tropical evergreen tree.

Junipers, distributed between temperate and Alpine zones are evergreen trees with more or less drooping branches. The local people use to collect it in heaps for fuel wood, timber and making incense. In Nepal,

there are five species of *Juniperus*. Among them, *Juniperus recurva* (distributed from Kashimar, Bhutan to Burma), is an aromatic plant with typically prominent drooping branches. *Juniperus squamata* also shows its similarity with *Juniperus recurva* (Bista, Adhikari and Rajbhandari, 2001). The berries are used to relief the respiratory problems (Rajbhandari, 2001). This plant shows more or less affinity with the description cited as Vedic Soma, but yet they need screening of their phytochemicals and effects produced after drinking.

#### Extract of Soma

##### Making the extract of Soma

There are three processes of preparing the extract of Soma : 1. Perna (पेरना) 2. Chhanana (छानना) and 3. Milana (मिलाना= Mixing)

Shastri (1956) again cites from Rigveda (2:14/1; 9:97/19) as 'Adhwaryabo bharatendraya somamamatrebhi sichata madhumandha' (अध्वर्यवो भरतेन्द्राय सोममामवेभिः सिचता मध्यमन्धः), which mean that extract of soma is prepared by grinding the branches in a pestle and mortar made of stone and squeezing the paste wrapping in a lamb's woolen cloth (यत्र गावा पृथुबुध्न उध्वो भवति सोतवे । उलुखल सुतानामवेडिन्द् जल्लुः) (R. 1:28,1). In Sushrut it is stated that the juice is extracted by piercing the tuber with golden needle "सोमकन्द सुवर्णसूच्या विदायर्य पयो गृह्णीयात्" (Sushrut, ch. 29: 10). The extract used as a drink has more than hundred names. Few noted are: Soma, Rkshoha, Viswachashindi, Daksha, Ritu, Yoni, Brithastam, Devabi, Vrisha, Ayohrita, Madistha, Indu, Madhu, Shishu, Hari, Gosaabajasa, Nrisha, Aswasa, Saharubalsa, Harita, Bhrajman, Hiranyaya, Mhisrawa and Jyoti, (R. 9: 1-12; Sushrut, 37:5), which are sweet, aromatic and exciting (Shastri, 1956 cited from Rigved (9:1,1) (Atharvaveda [20:1,4-5, see appendix 1]. The drink is not hallucinogenic as stated in the Vedic literature.

##### Drinking the extract and its effect

Those who drink Soma are known as Somapaha (सोमपाः) (Geeta, 9:20) The extract is drunk either alone or by mixing with cow's milk, curd or *Hrodeum* powder (R. 9:103,3). It is some times mixed with honey. "सोमासो दध्याशिरः (R. 1:5,5) सोमगवाशिरः सोमाः यन्ते सोम गवाशिरो यवाशिरो भजावहे" (R. 1:185,9) (1:137,1; Sharma, 19903) (see also Sushrut, 29:10, 37:5).

The effects produced after drinking Soma has been discussed in different hymns of first chapter of

Rigveda. It is a loving drink, which enhances the strength, energy and multiplies the sperms. It is drunk for seven days, which produces different physiological effects in and on the body (R. 1:5,6-12; 1:9,1-5; 1:91,6-15; 9:4,1, 9:5,3, 9:8,1.). Excess of drinking Soma may cause vomiting (Maitrayani Sanhita, 2,1:13).

The extract of this plant provides energy and power to gods and human beings. Indra, the kind of God used to show his super natural power after drinking the Soma. The sage Kandwa described the effect of soma on human body, as it saves life from accidents, keeps away from diseases, provides peace and ease, increases the age of life and prosperity, saves from the anger and jealousy of enemies, creates happiness, enlightens and stimulates, creates high thinking and keep the body immortal (Rigveda, 848).

A person may become young, handsome, having great memory power and will live more than ten thousand years (Sushrut 76:6). The effects produced in and on the human body by Soma after drinking have also been cited in Atharvaveda (20:1, 4-5, see appendix - 1) Sushrut (29:12 - 13, 37:6).

Soma is drank utmost by Vayu (the Air) and Indra (the king of gods). No doubt, Soma is a drink of immortality.

## Chemical Compounds

### Phytochemical in mushroom

According to Svrcek (1975) "It resembles the deiatric potion known as Soma, mentioned in the ancient Hindu Rig Veda, which dates back more than 3, 000 years. It is also the same hallucinogenic drug which was used long ago in Siberia, Kamchatka and Chukotka by the indigenous population". (pg. 42). The extract from the fruit body of *Amanita muscaria* was mixed with sugar to kill the insect.

According to Hobbs (1987) "*Amanita muscaria* has been said by R. Gordon Wasson to be the famous Soma plant of the sacred Hindu text, the RigVeda. It is well known in Russia and other parts of the world as a hallucinogenic mushroom, bringing on various forms of vision, hilarity and at times, depression and a 'bad trip'. It is now thought that the mushroom contains ibotenic acid, which is converted to muscimol in the body, passing out in the urine" (pg. 13).

*Amanita muscaria* contains the toxin (Miller, 1984; Singer, 1986) like muscimole, muscarine, ibotenic acid and trichlomic acid, which act on central nervous system and are responsible for slowing down the activity of heart, dilation of blood vessels and constriction of eye pupil. This entire chemical produces physiological disorders involving hallucinogenic activity.

### Phytochemical in Soma

Soma is not an alcoholic drink (R. 9:1/10; Shastri, 1956). Without the process of fermentation alcohol cannot be produced. The juice of Soma is not fermented. It is prepared instantly and drunk. The physiological activity produced in the body by phytochemical of Soma as stated by Veda and Samhita cannot be correlated with effects produced by the chemicals of *Amanita muscaria*.

Ephedrin is the extract of Soma lata: *Ephedra gerardiana*, the high altitude plant, which is being used in cough, cold and Asthma. It is a well-known expectorant.

## Conclusion

Veda concludes that Soma is extinct. It is very difficult to trace its existence.

Charak and Sushrut also have the same opinion, but have provided the substitute for Soma. The cyclic changes of Yuga have also confirmed its extinction. The geological events are the evidence for drifting of continents there by changing the prevailing biodiversity of those periods.

According to Singh, Chuneekar and Sharma (1972) to solve the problem of Soma it is not possible without coordinated efforts of scholars and investigators (Anthropologists, Ethnobotanists, Botanists and Biochemists) in old and new system. It is not possible, at present, to clarify the problem with limited equipment and knowledge. Meanwhile, it can be likely stated that description of the plant and of its effects are not depicting at all a mushroom, as Wasson's hypothesis of considering *Amanita muscaria* as Soma should be avoided.

So, one has to carry out several investigation to identify the plant, must keenly observe on the structure, characters and changes brought by Soma after drinking as depicted in Veda.



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