



THERAPEUTIC VALUE OF PLANT LATEX IN AYURVED

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INTRODUCTION

Plants, animal and minerals are most important resources to obtain food and medicine from ancient era and also in Ayurved. Ayurved is based on similarities and dissimilarities of properties between composition of substance and body that lead to elevate or decrease the specific physiological and anatomical factors in body. These resources are important for balancing and nourishment of essentially physiological factors. Configuration of everything in Ayurved is based on theory of five basic elements (Pancha-mahabhuta) which is established on their specific characteristic.

“*Ksheera*” is exudate obtain from two resources - plants (latex) and animals (milk). Ayurved has stated “*Ksheera*” indicating its secretory mode of manifestation, under which most commonly animal milk is considered^[1] and in some conditions, specific plants have also been mentioned. These two resources of *Ksheera* has differing properties due to change in its basic origin modality with different composition.

Animal resources are stated under *Ksheera Varga* mentioned separately in categories of fluid (*Drava Varga*). In animals, milk secreted through mammary Glands consists of often mild action (*Manda Guna*) and is cold (*Sheeta Guna*) in Nature. Various medicinal forms of milk (*Ksheera* obtained from animal) like medicated (*Siddha Ksheera*), medicated (*Siddha Ghruta*) and other liquid (*Peya*) forms are used in treatment. It is more applicable in conditions of *Vata-Pitta* dominated disorders like weakness, skin disorders and systemic disorders. Milk (animal resource *Ksheera*) is beneficial to all living beings as it nourishes, revitalize and rehydrates body cells and tissues.^[2] It is stated as “*Pranada*” means enriches vital energy of life {*Prana*}. It enhances *Rasa Dhatu* (nutritious body fluid) which is prime form of body fluid exhibited after digestion. Restoration of body fluids is most important mechanism role of *Rasa Dhatu*. Excellence of *Rasa Dhatu* is essential for further nourishment and restoration of other basic body elements as it is necessary for assimilation and transportation of corpus body elements. Milk is consistent with *Rasa Dhatu* as milk is yielded from it. Milk is useful as diet in various conditions especially^[3] related to *Pitta Dosh* and *Rakta Dushti* (disorders). Cow

milk is most preferred in all conditions. It is used in diet and medicinal purpose.

Whereas, various parts of plants (tender/full grown leaves, fruits, seeds, root, bark, stem, latex) are used enormously in different forms of medicine. Leaves, roots and fruits are most often used but, in some plants, use of specific parts has been emphasized to be considered. Plant resources whose milky secretion (Exude) are used is known as *Ksheere Vruksha*.^[4] *Ksheere Vruksha*^[5] comes under category of *Audabheeda Gand*^[6] (ca.su.1/74). Plant latex (*Vruksha Ksheera*) i.e. exude is located inside the bark^[7] but may demonstrate difference in action of stem and latex. Plant latex (*Vruksha Ksheera*) is included under extraction form (*Swarasa Kalpana*^[8]) of drug preparation. Stem prerequisites to be used in paste or Powder (*Kalka*) form. Often the taste of plant latex (*Vruksha Ksheera*) is astringent.^[9]

Plant Latex (*Vruksha Ksheera*) exudes from plant after having tissue injury. Plant exudates is secreted through specialized laticifer cells. Latex is produced in inside layer of distinct cells called laticifers. They may be in the form of single cells or chains of cells arranged as tubes, canals or networks, in various plant organs. This is quite different from the internal secretory tissues (pockets, cavities, or canals) which produces mostly resin. Various studies on the process of Latex secretion in plants have been carried out up till now.

Plant families that yield copious quantities of latex includes Euphorbia family (Euphorbiaceae), Milkweed family (Asclepiadaceae), Mulberry family (Moraceae), Dogbane family (Apocynaceae), Chicory tribe (Lactuceae) of the sunflower, Family (Asteraceae). The

genus *Euphorbia* (Euphorbiaceae) is varied plant of 2000 species having numerous established appearances including herbs, shrubs, trees, geophytes and multiple succulent forms. It is more tropical than temperate latex-bearing families.^[10] In spite of the morphological diversity, this genus is well-defined by one prime attribute which is the particular, extremely diminished flowerlike inflorescences. (Horn et al. 2012, Yang et al. 2012, Dorsey et al. 2013, Peirson et al. 2013, Riina et al. 2013).

^[11]All members of this genus are lactiferous that produces white latex comprising number of secondary metabolites (Jassbi 2006; Pintus et al 2010).^[12] It can cause dermatitis and severe irritation to eyes (Evans and Schmidt 1980, Lin. Marshall and Kinghorn 1983, Seigler 1994, Basak et al. 2009, Shlamovitz et al. 2009). *Euphorbia* latex has also been exhibited to possess moderate antimicrobial properties (Sumathi et al. 2011, van Deenen, Prufer, and Gronover 2011). Regarding other latex properties, it is thought to provide protection from herbivores (Bernays, Singer, and Rodrigues 2004). Composition and function of latex of *Euphorbia* laticifers (da Cunha et al. 2000) would consist of an unreceptive environment for microorganisms (Salomez et al. 2014).

Plant Latex i.e. *Vruksha ksheera*^[13] varies in color, consistency and its action. In Ayurved, plant latex is collected in season according to its hot or cold Nature.^[14] This secretion is an emulsion like sticky material that is thick, creamy white or milky. Although, sometimes it may be a thin aqueous suspension, clear or yellow or orange. Latex changes its color after exposure to air. It is steady diffusion of polymer micro-particles in an aqueous medium which coagulates on contact with air. It is not known to contribute to primary functions of the plant but play a defensive role. (Reviewed by Agrawal and Konno, 2009).

Diverse laticifers can be found along with difference in inter explicitly of latices e.g. in their color and chemical composition. Chemically complex mixture of latex consists of proteins, alkaloids, starch, sugars, oils, tannins, resins and gums.

Latex also contain various defense chemicals and proteins in highly concentrated manners. Likewise, it contains latex proteins like cysteine proteases, profilins and chitin-related protein that act as catalytic enzymes having enormous insecticidal activity against insects. It has no side effect on environment because it is biodegradable with better lethal potential than synthetic pesticides. Plant latex is considered analogous to animal venom - a treasury of useful defense proteins and chemicals. Plant latex is a rich source of pharmaceuticals, pesticides and immune allergens.^[15] Various pharmaceuticals studies on *Euphorbia nerifolia* latex are carried out like Anesthetic Activity, Radioprotective/Cytotoxic of Leaves, Wound Healing

action of Latex, Antifungal, Dermal Irritant/Anti-Inflammatory, Chemoprotective against Liver Carcinogenesis, Free Radical Scavenging / Antioxidant, Psychopharmacological Effects, Antithrombotic Potential, Hepatoprotective, Reno-protective, Diuretic action of Leaves, Antimicrobial action of Leaves, Sub acute Effects on Hematologic, Biochemical and Antioxidant Parameters, Pharmacological Screening of Leaves, New Flavonoid/Antioxidant in Leaves, Anti-Diabetic Potential of Leaves, Immuno-modulatory action of Leaves.

Other Studies conducted on latex are Rheological (flow) properties of latex,^[16] Lattices and their latex - coagulation mechanisms,^[17] Particle size distributions of the plant lattices and latex, Drying kinetics of the lattices were investigated. Latex has strong angio-genic potential. There are also other pharmacological studies on latex for e.g. Plasmin like activity, proteases exhibit a pro-coagulant action having irrespective of the plant species and family.

Applicability in Treatment of disease as per Ayurved

Ayurved has stated plant latex in many diseases. The *Ksheere Vruksha* have been separately stated which are *Nyagrodhra* (ficus benghalensis), *Udumbara* (ficus racemosa), *Ashwatha* (ficus religiosa), *Plaksha* (ficus virens), *Madhuka* (Madhuka indica), *Kapeetanaa* (albizzia lebbeck).^[18] Plants under the group of *Ksheera Vruksha* are utilized in Shalakyas related diseases like auricle and nasal diseases (Karnagata roga, Nasapaka) etc. Decoctions of such *Vruksha Ksheera* are used in disorders of Pitta (heat), Rakta (blood), Abhighata (Trauma), Visha (poisonous) origins. Decoctions (*Kashaya*) of *Ksheera Vruksha* are used especially for *Pitta Dosha* and blood disorders (Rakta Pradhana Dushti), renal calculi (Ashmari), psychosomatic disorders related to trunk part of body (Skandha-Apasmara), fever (Jwara), wounds (Vrana). *Ksheera Vriksha* are possessing more curative action and certainly no toxicity effect.

However, latex of some other plants like *Apamarga* (*Achyranthes aspera*), *Snuhi* (*Euphorbia nerifolia*) and *Arka* (*Calotropis gigantea*) are also used most frequently which are elaborated under category (*Varga*) of *Guduchyadi*, *Upavisha* and *Aushadhi* in Bhavaprakasha nighantu. Latex (*Vruksha Ksheera*) of these plant has strong action and often used in eliminating undesirable elements from body. These plants show a few toxicity effects in larger dose. These plant latexes are strong (*Tikshna Guna*) and hot (*Ushna Guna*) in Nature.

One of the most frequently used such plant is *Snuhi* (*E. Nerifolia*) which has strong purgative action.^[19] *Snuhi Ksheera* (latex of *E. Nerifolia*) is mentioned as a purgative i.e. *Virechana Dravya*.^[20] It is used as external application for hemorrhoids (*Arsha*) in paste form (*Lepana*), for skin disorders (*Kshudra Roga*), removing skin hair (*Romashatana*) and for wound healing activity

in decoction form (*Kwatha*) to wound wash (*Vrana-Prakshalan - Ropanartha*).

Internal application of *Snuhi Ksheera*^[21] has mainly used as strong purgative (*Tikshna Virechana*) for detoxification (*Shodhanartha*) in form of medicated ghee (*Siddha Ghruta*), for ticturation (*Bhavana Dravya*), in diet form as *Yavagu*, *Leha* and *Uttakarika*. It is advised in the conditions like abdominal distension in Ascites (*Aanaha in Udara*), obstructive pain (*Kaphaja Gulma*), Kshatasheena (degeneration due to excessive exertion), inflammation conditions (*Shotha-Sannipatika*), psychosomatic disorders like *Unmada*, *Apasamara* and in poisoning condition like *Rat-bite (Mushaka-visha)*, insect bite-poisoning (*Kitika Visha*).

Accordingly, therapeutic application of plant latex has elaborated in Ayurved with varied combination to disengage the amalgamation of toxins and eliminate it through the body. It is applied in chronic diseases having deep-rooted occurrence and difficult to eradicate from body. Due to piercing nature of such plant latex, mixtures with the other drug is an immense essential factor in prescribing it.

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