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Review Article

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CRITICAL REVIEW ON NOTABLE RESINOUS SUBSTANCE (*NIRYASA*) USED AS BOTANICAL IN *AYURVEDA*

Karnam Chandrashekhar*

Professor, Department of Dravyaguna, V.Y.D.S. Ayurveda Mahavidyalaya, Khurja, Uttarpradesh.

***Corresponding Author: Karnam Chandrashekhar**

Professor, Department of Dravyaguna, V.Y.D.S. Ayurveda Mahavidyalaya, Khurja, Uttarpradesh.

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ABSTRACT

Treatment in *Ayurveda* is largely depends on the preparations containing botanicals. Many a times, it is observed that different parts of the same plant are used for treating different conditions. Each botanical of a plant produces a particular set of pharmacological actions. They are important not only because they represent their respective plants but also they contain optimum potency to generate a whole bunch of pharmacological activities in the human body. Among all the botanicals mentioned in *Ayurveda*, *niryasa* (resinous substance) secreted from a plant is unique in its own way. The reason behind it is the way how it is formed and secreted. The other parts of the plant such as root, leaf, fruit etc. are the anatomical parts of the plant. They are grown as part of the developmental process of the plant. But, the resinous substance is formed either as result of a stimulus or a degenerative process. In both the case, it protects the plant`s health and promotes its survival. The secreted resinous substance heals the wound caused by the injury, tries to kill the pathogens and covers the wounded surface. This fact is well taken by the age old medical science which considers the *niryasa* (resinous substance) as the useful part for therapeutics. This study reveals 34 plant species that secrete *niryasa* of special importance.

KEYWORDS: Botanical, *Niryasa*, Oleo-gum-resin, Dried latex, *Vranahara*,

INTRODUCTION

Botanical is the store house of various phytochemicals with different strength. It is the representative of the respective plant species. It is the basic ingredient of almost all herbal and herbo-mineral preparations. It is of no surprise that the different parts of the same plant act in pretty different ways. Therefore, the selection of a botanical is purely dependent on the desired pharmacological activity. This fact is given much importance in the oldest medical science-*Ayurveda* which recommends different botanicals of the same plant for different purposes. It praises the botanical as the useful part (*prayojyanga*). For the reason, it possesses the potency to the greater extent and is used in treating the conditions.[1]

Acharya Charaka hints at 18 types of botanicals in his work.[2] While, *Acharya Kaiyyadeva* –the author of *Kaiyyadeva nighantu* described 10 important parts (*dashanga*)[3] of the plant that can be used in the therapeutics. These include *pushpa* (Flower),*phala*(fruit), *twacha* (bark), *moola*(root), *patra*(leaf), *sara*(heart wood), *niryasa*(oleo-gum-resin), *shaka*(branch), *shunga*(bud) and *dugdha* (latex). Among them, the formation of *dugdha* (latex) and *niryasa* (oleo-gum-resin) in a plant has altogether different reasons. They are formed and secreted in response to a stimulus that threatens the survival of the plant such as injury and infection. Both are produced as a part of defense mechanism and are species specific. It is a common observation that secretion of the latex is an immediate response of the plant to the stimulus. But, the secretion of oleo –resin is a slow process. It is interesting to note that the latex secreted by some species turns out to be an oleo-gum or gum or oleo-gum -resin after some time. Interestingly, some species exudates are seen externally on the surface of the plants which, on coming in contact with air, become hard and called as gums. True gums are formed from the disintegration of internal plant tissues, mostly from the decomposition of cellulose in a process called gummosis.[4]

It is difficult to differentiate oleo-gum/ gum / oleo-gum –resin easily. It frequently oozes out through the bark and hardens on exposure to air. Resinous substances may occur alone or in combination with essential oil (oleo-resin) or gum (oleo-gum) or with both (oleo-gum-resin).

Niryasa is collective term used in *Ayurveda* to denote all semi solid or solid exudates such as gums, oleo –gums, oleo-resin, oleo-gum-resin and sometimes the dried latex also. The great sages of *Ayurveda* must have acknowledged their protective role in maintaining the health of the plants during the stressful situations like

injury, infection and other conditions affecting the growth. Hence, they included *niryasa* as one among the botanicals in therapeutics. Considering the importance of *niryasa*, an earnest attempt is made in this review to reveal the properties and actions of *niryasa* procured from different plant species mentioned in *Ayurveda* along with the present understanding on them.

MATERIALS AND METHODS

Materials

The following books were considered for the present review

- *Nighantu Adarsha* vol-1 and vol-2 available in print version, being written by Vaidya Bapalal ji, published by Chaukhambha bharati academy, Varanasi, Reprint edition 2007.
- *Dravyaguna vijnana* vol-2 and vol-3 available in print version, being written by Acharya Priyavrat Sharma published by Chaukhambha bharati academy, Varanasi, Reprint edition 2011.
- *Dravya guna vijnana* vol-2 available in print version, being written by J.L.N shastry ,published by Chaukhambha orientalia ,Varanasi, third edition 2008.

Methods

Screening of the data

- All the plants that secrete resinous substance were sorted out.
- The resinous substances which are mentioned as useful part were compiled.
- The resinous substances whose actions are specified in *Ayurveda* were also compiled.
- The true botanical source of the same were collected from the plant list
- Important constituents, the *rasa panchaka* and exuding part of the plant were tabulated.

Table 1: Habit of botanical source and exuding part.

S. No.	Niryasa	Plant`s name	Habit	Exuding part
01	*Vanvrintaka niryasa*	*Giriparpati*	Herb	Root, Rhizome
02	*Afeem/afuk*	*Ahiphena*	Herb	Fruit
03	*Kattira niryasa*	*Kattira*	Tree	Stem bark
04	*Dhava*	*Dhava*	Tree	Stem
05	*Kankustha*	*Kankustha*	Tree	Stem bark, Leaf, Flower, Fruit
06	*Raala*	*Shaala*	Tree	Stem bark
07	*Sarjarasa/Chandrasa*	*Sarja*	Tree	Stem bark
08	*Garjana tel*	*Ashwakarna*	Tree	Stem bark
09	*Bhimaseni karpoora*	*Bhimaseni karpoora*	Tree	Stem bark, Branches
10	*Mocha rasa*	*Shalmali*	Tree	Stem bark
11	*Guggulu*	*Guggulu*	Tree	Stem
12	*Bola*	*Bola*	Tree	Stem
13	*Kunduru*	*Shallaki*	Tree	Stem
14	*Laksha*	*Koshamra*	Tree	Stem, Branch
15	*Rumaja*	*Rumaja*	Tree	Stem, Branch
16	*Jhingan gum*	*Gudamanjari*	Tree	Stem, Branch
17	*Butea gum*	*Palasha*	Tree	Stem
18	*Indian kino gum*	*Beejaka*	Tree	Stem
19	*Anjana*	*Anjana*	Tree	Stem
20	*Babbula niryasa*	*Babbula*	Tree	Stem
21	*Silhaka/Shilarasa*	*Silhaka*	Tree	Stem bark
22	*Blue gum*	*Taila parni*	Tree	Stem
23	*Red gum*	*Tailaparni*	Tree	Stem
24	*Citron gum*	*Taila parni*	Tree	Stem
25	*Hingu*	*Hingu*	Herb	Root, Stem just above the root
26	*Gaushira*	*Gaushira*	Herb	Root, Stem just above the root
27	*Ushaka*	*Ushaka*	Herb	Stem
28	*Nadihingu*	*Nadihingu*	Tree	Stem
29	*Lohbana*	*Lohbana*	Tree	Stem
30	*Sakmuniya*	*Sakmuniya*	Herb	Root
31	*Karpoora*	*Karpoora*	Tree	Stem
32	*Ganja*	*Bhanga*	Herb	Leaf
33	*Shri veshtaka*	*Sarala*	Tree	Stem
34	*Rakta niryasa*	*Raktaniryasa*	Tree	Fruit

Table-2: Botanical source and family of the plant species yielding resinous substance.

S. No	Niryasa	Botanical source[5]	Family[6]
01	*Vanvrintaka niryasa*	*Sinopodophyllum hexandrum(*Royle)T.S.Ying	Berberidaceae
02	*Afeem/afuk*	*Papaver somniferum* L	Papaveraceae
03	*Kattira niryasa*	*Cochlospermum religiosum*(L.)Alston	Bixaceae
04	*Dhava*	Anogeissus latifolia (Roxb.ex DC.)Wall.ex Guillem. & Perr	Combretaceae
05	*Kankustha*	*Garcenia morella*(Gaertn.)Desr.	Clusiaceae
06	*Raala*	*Shorea robusta* Gaertn	Dipterocarpaceae
07	*Sarjarasa/Chandrasa*	*Veteria indica* L.	Dipterocarpaceae
08	*Garjana tel*	*Dipterocarpus turbinatus* C.F.Gaertn	Dipterocarpaceae
09	*Bhimaseni karpoora*	*Dryobalanop sumatrensis* (J.F.Gmel.) Kosterm..	Dipterocarpaceae
10	*Mocha rasa*	*Bombax ceiba* L.	Malvaceae
11	*Guggulu*	*Commiphora mukul* (Hook.ex Stocks)	Burseraceae
12	*Bola*	*Commiphora myrrha*(Nees)Engl	Burseraceae
13	*Kunduru*	*Boswellia serrata* Roxb.ex Colebr.	Burseraceae
14	*Laksha*	*Schleichera oleosa* (Lour.)Merr.	Sapindaceae
15	*Rumaja*	*Pistacia lentiscus* L.	Anacardiaceae
16	*Jinghan gum*	*Lannea coromandelica* (Houtt.) Merr..	Ancardiaceae
17	*Butea gum*	*Butea monosperma* (Lam.)Taub	Leguminosae
18	*Indian kino gum*	*Pterocarpus marsupium* Roxb	Leguminosae
19	*Anjana*	*Kingiodendron pinnatum*(DC.)Harms.	Leguminosae
20	*Babbula*	*Acacia nilotica*(L.)Delile	Leguminosae
21	*Silhaka/Shilarasa*	*Altingia excesla* Noronha	Altingiaceae
22	*Blue gum*	*Eucalyptus globules* Labill	Myrtaceae
23	*Red gum*	*Eucalyptus rostrata* Sm..	Myrtaceae
24	*Citron gum*	*Corymbia maculata* (Hook.)K.D.Hill &L.A.S. Johnson	Myrtaceae
25	*Hingu*	*Ferula narthex* Boiss	Apiaceae
26	*Gaushira*	*Ferula galbaniflua* Bioss.&Buhse.	Apiaceae
27	*Ushaka*	*Dorema ammoniacum* D.Don	Apiaceae
28	*Nadihingu*	*Gardenia gummifera* L.f	Rubiaceae
29	*Lohbana*	*Styrax benzoin* Dryand.	Styraceae
30	*Sakmuniya*	*Convolvulus pseudoscammonia* C.Koch	Convolvulaceae
31	*Karpoora*	*Cinnamomum camphora* (L.)J.Presl	Lauraceae
32	*Ganja*	*Cannabis sativa* L	Cannabinaceae
33	*Shri veshtaka*	*Pinus roxburghii* Sarg..	Pinaceae
34	*Rakta niryasa*	*Daemonorops draco*(Willd.)Blume.	Aracaceae

Table-3: Vernacular name of *niryasa* and important constituents.

S. No	*Niryasa*	Important constituent
01	*Vanvrintaka niryasa*	Astragalin, Podophyllotoxin
02	*Afeem/afuk*	Phenanthrene and Isoquinilones
03	*Kattira niryasa*	Polysaccharides, Galalucturonic acid
04	*Dhava*	Tannin
05	*Kankustha*	Garcinolic acid,Morellin
06	*Raala*	Epi-ψ-taraxastanonol,β sitosterol, dipterocarpol,
07	*Sarjarasa/Chandrasa*	Essential Oil,Camphene, α &β pinene
08	*Garjana tel*	Damerenediol 2,Betulonic acid
09	*Bhimaseni karpoora*	α caryophylline,β caryophylline ,α pinene
10	*Mocha rasa*	Gallic acid, Tannic acid,D-galactopyranose
11	*Guggulu*	Z-guggulsterone, E-guggulsterone, Guggullignans 1&2
12	*Bola*	Volatile oil containing terpenes, sequiterpenes, esters,cuminic aldehyde and eugenol
13	*Kunduru*	Boswellia oil, resin, gum
14	*Laksha*	Lac acid,laccin, resin
15	*Rumaja*	Masticoracin,Masticonic acid
16	*Jinghan gum*	D-galactose,L-arabinose
17	*Butea gum*	Leucocynadins,Procyanidin
18	*Indian kino gum*	Kinotannic acid, Pyrocatechin,Pectin

19	*Anjana*	Terpenes,Flavonoids, Tannins
20	*Babbula*	Galactoaraban
21	*Silhaka/shilarasa*	Benzoic acid,Cinnemic acid
22	*Blue gum*	Tannin, cineol
23	*Red gum*	Tannin, cineol
24	*Citron gum*	Tannin, cineol
25	*Hingu*	Volatile oil containing sulphur, a- pinine
26	*Gaushira*	Terpenes, Sulphur,umbellifeone
27	*Ushaka*	Volatile oil, Salicylic acid,Beleric acid
28	*Nadihingu*	Olcanonic acid,β sitosterol,Gardenin
29	*Lohbana*	Benzoic acid,Cinnemic acid,vanilline
30	*Sakmuniya*	Scamonin
31	*Karpoora*	Campherol, Cineol,Pinene,camphene
32	*Ganja*	Resin,Cannabinol,Tetrahydrocannabinol
33	*Shri veshtaka*	Pinene,Carene,Longifolene,Tarpine
34	*Rakta niryasa*	Pterocarpol,Dipterocarpol

Table 4: *Rasa, Vipaka* and *Guna* of *Ushna veerya yukta niryasa.*

S. No	Niryasa	Rasa	Vipaka	Guna
01	*Vanvrintaka niryasa*	*Tikta,Katu*	*Katu*	*Laghu, Teekshna*
02	*Afeem/afuk*	*Tikta Kashay*	*Katu*	*Laghu, ruksha, Suksma Vyayayi ,Vikasi*
03	*Kankustha*	*Katu, Tikta*	*Katu*	*Laghu, Ruksha*
04	*Guggulu*	*Tikta Katu*	*Katu*	*Laghu Ruksha Teekshna Vishada Sukshma, Sara Sugandhi*
05	*Bola*	*Tikta Katu Kashaya*	*Katu*	*Laghu, Ruksha*
06	*Kunduru*	*Katu Tikta Madhura*	*Katu*	*Laghu,Teekshna,Ruksha*
07	Jinghan gum	*Madhura Kashaya*	*Katu*	-
08	*Rumaja*	*Madhura, Kashaya*	*Madhura*	*Laghu, Ruksha*
09	*Silhaka/shilarasa*	*Tikta, Katu Madhura*	*Katu*	*Snigdha Laghu*
10	*Hingu*	*Katu*	*Katu*	*Laghu snigdhaTeekshna*
11	*Ushaka*	*Tikta, Katu*	*Katu*	*Laghu, Ruksha*
12	*Nadihingu*	*Katu, Tikta*	*Katu*	*Laghu, Ruksha, Teekshna*
13	*Lohbana*	*Madhura,Tikta*	*Madhura*	*Laghu,Ruksha, Teekshna*
14	*Ganja*	*Tikta*	*Katu*	*Laghu, Teekshna*
15	*Shri veshtaka*	*Katu, Tikta, Madhura*	*Katu*	*Laghu, Teekshna, Snigdha*

Table-5: *Rasa, Vipaka* and *Guna* of *Sheeta veerya yukta niryasa.*

S. NO	*Niryasa*	*Rasa*	*Vipaka*	*Guna*
01	*Kattira niryasa*	*Kashaya,Madhura,Katu*	*Madhura*	--
02	*Dhava*	*Kashaya*	*Katu*	*Laghu,Ruksha*
03	*Raala*	*Kashya Madhura*	*Katu*	*Ruksha*
04	*Sarjarasa/Chandrasa*	*Kashya Tikta*	*Katu*	*Ruksha*
05	*Garjana tel*	*Kashya Madhura*	*Katu*	*Ruksha*
06	*Bhimaseni karpoora*	*Tikta.katu, Madhura*	*Katu*	*Laghu, Teekshna*
07	*Mocha rasa*	*Kashaya*	*Katu*	*Laghu Snigdha, Picchila*
08	Butea gum	*Madhura,Kashaya*	*Madhura*	*Laghu,Snigdha*
09	Indian kino gum	*Kashaya*	*Katu*	*Laghu,Ruksha*
10	*Babbula*	*Madhura, Kashaya*	*Madhura*	*Snigdha*
11	Blue gum	*Kashaya*	*Katu*	*Laghu, Snigdha*
12	Red gum	*Kashaya*	*Katu*	*Laghu, Snigdha*
13	Citron gum	*Kashaya*	*Katu*	*Laghu, Snigdha*
14	*Karpoora*	*Tikta.Katu, Madhura*	*Katu*	*Laghu, Teekshna*
15	*Rakta niryasa*	*Kashaya*	*Katu*	*Laghu, Ruksha*
16	*Laksha*	*Kashaya*	*Katu*	*Laghu,Snigdha*

Table 6: Actions of *ushna veerya yukta niryasa.*

S. No.	*Niryasa*	Actions
01	*Vanvrintaka niryasa*	*Rechana*
02	*Afeem/afuk*	*Shoshana, Grahi,Kaphahara, Vata kara ,Pittala*
03	*Kankustha*	*Rechana,Krimighna*
04	*Guggulu*	*Lekhana,Sandhaniya, Swarya, Rasayana, Balya,*
05	*Bola*	*Stambhana*
06	*Kunduru*	*Twachya, Purisha sangrahaniya,Stambhana*
07	*Rumaja*	*Mutrala, Vrishya, Deepana, Sangrahi*
08	Jinghan gum	*Vrana hara, Vata hara, Rujapaha*
09	*Silhaka/Shilarasa*	*Kustaghna, Jwaraghna, Kapha vatahara,*
10	*Hingu*	*Deepana, Sanjnasthapana, Chedana*
11	*Ushaka*	*Deepana, Jantughna,Medhohara, Chedana*
12	*Nadihingu*	*Vibandhahara, Vatanulomana*
13	*Lohbana*	*Chedana,Kasahara,*
14	*Ganja*	*Madaka, Deepana,*
15	*Shri veshtaka*	*Shleshmaputihara*

Table 7: Actions of *Sheeta veerya yukta niryasa.*

S. No	*Niryasa*	Actions
01	*Kattira niryasa*	*Balya,Vrishya,Grahi,Shoolahara,Stambhana*
02	*Dhava*	*Mutrasangarahaniya, Vedanasthapana*
03	*Raala*	*Vrana ropana, Stambhana,Sandhaniya*
04	*Sarjarasa/chandrasa*	*Stambhana, Kustaghna,Visphota hara, Vatajit*
05	*Garjana tel*	*Kusthaghna,Kothaprashamana*
06	*Bhimaseni karpoora*	*Kustahara,Lekhana, Kandughna, Kshayahara*
07	*Mocha rasa*	*Kapha pittahara,Stambhana,Vranahara*
08	Butea gum	*Vrishya, Balya*
09	Indian kino gum	*Danta shulahara*
10	*Babbula*	*Vrishya, Shothahara, Balya*
11	Blue gum	*Grahi*
12	Red gum	*Grahi*
13	Citron gum	*Grahi*
14	*Karpoora*	*Kustahara,Lekhana, Kandughna, Kshayahara*
15	*Rakta niryasa*	*Stambhana*
16	*Laksha*	*Stambhana, Kustaghna, Stambhana*

DISCUSSION

Niryasa (resinous substance) is defined as that which is secreted in the form of a liquid from the plant as a result of increased plant`s temperature.[7] This definition indirectly hints at the defensive mechanism taking place in the plant during the secretion of *niryasa*. Increased temperature is always indicates a part of defense mechanism even in human beings. *Kalidasa*- the author of *Raghuvamsha* considered *niryasa* as the fragrant secretion of the plant.[8] Anyway, the term *niryasa* is used in a much broader sense in *Ayurveda*. It encompasses all the secretions of the plant that become sticky over time. It refers to true gums, oleo- resins, oleo-gum-resins and even the latex that turns in to a gelatinous substance. It is comprehensible that many plant species secrete *niryasa* (resinous substance). But, as a notable botanical, 34 plant species, among which, 27 trees and 07 herbs distributed among 21 different families have gained much importance in *Ayurvedic* therapeutics.

On the potency of Niryasa

Among the 34 plant species that secrete the *niryasa* (resinous substance) of great importance in *Ayurveda*, *niryasa* of 15 plant species is *ushna*. While, the rest possess *sheeta veerya* except *Gaushira*, *Sakmuniya* and *Anjana* whose *rasa panchaka* is not mentioned clearly.

Niryasa secreted by 15 plant species possess *ushna veerya*, among them, *Hingu*, *Guggulu*, *Ahiphena*, *Karpoora* and *Kankustha* need to undergo purification process before being used as a medicine. This explains the fact that these resinous substances carry such compounds that are quite harmful to the human beings if used in raw form. It is a common observation that the resinous substances that possess *ushna veerya* act primarily as stimulants affecting different system of the body. They mainly contain volatile oil and/or alkaloids and/or glycosides and gum. In fact, their appearance on the surface of the plant is to kill the pathogen or to seal the injured part of the plant. The same compounds target the human cells in the same way as they do on the micro

organisms. Hence, there will be some sort of harmful effects produced in humans. The dosage of such resinous substance is therefore, very much small.

Niryasa secreted by 16 plant species possesses *sheeta veerya*. Interestingly, they act in two different ways based on the *rasa* present in them. i.e 1) dominant in *madhura rasa* and 2)dominant in *kashaya rasa*. *Sheeta veerya yukta niryasa* with dominant *madhura rasa* act as *balya, vrishya* and *brimhana*. While, the latter, acts as *grahi, mutra sangrahaniya, shonita sthapana, vrana ropana* and even *vedana sthapana* by the virtue of *prabhava.*

On the chemical nature

Based on the present understanding, all these notable resinous substances can be classified as:

- **Oleo-gum-resin**: *Guggulu, Kunduru, Hingu, Ushaka, Lohbana, Sarja rasa,*
- **Oleo-resin**:*Anjana, Raala, Garjana tel, Rumaja, Silhaka, Karpoora, Bhimaseni karpoora, shri veshtaka, Sakmuniya*
- **True gum**: Butea gum, Indian kino gum, *Babbula*, Blue gum, Red gum, Citron gum, *Kattira, Dhava, Mocha rasa, Nadihingu*, Jinghan gum
- **Dried latex**: *Afeem/Afuk*
- **Resin**: *Ganja*
- **Resin-gum**-*Laksha, Kankustha, Vana vrintaka niryasa, Bola, Rakta niryasa, Gaushira*

On Process of collection

Almost all the resinous substances are collected by incising or cutting the secreting part. In fact, time of collecton of the *niryasa* in *Ayurveda* classics is not very much clear. But, few experts consider *sara* as *niryas*a and collect it in either *Hemanta ritu* (Dec-Jan) or *Vasanta ritu*(April-May) as per the time of collection for *sara* mentioned by *acharya Charaka*[9] *and acharya Sushruta*[10] respectively.

On Lesser known facts related to different resinous substances

- *Vana vrintaka* possesses a neuro toxin containing resin; hence it is used in small quantity along with *parasika yavani* to relieve the abdominal cramp which occurs as its side effect.
- *Kattira niryasa* contains polysaccharides and hence it acts as *pusthidayaka.*
- *Kankustha* is a source of Morellin- an effective wound healer
- Ginghan gum – the resin secreted from the plant *Guda manja*ri is advocated in form of nasal administration in *skandha bahu ruja*(pain in the cervical and shoulder region which appears, on the conceptual back ground ,as cervical spondylitis).
- Literature of *Ayurveda* recommends *Raala* for *Vipadika* and *Agnidagdha* in addition to other indications.
- *Guggulu* is advised in *Amlapitta* which is not usually thought of.
- *Bola* acts as a deodorant.
- *Kunduru* is advised in *mutrashmari* and for *shiro virechana* purpose.
- *Rumaja* is a remedy for tooth ache
- Recommendation of *Anjana* in Diabetes mellitus
- Recommendation of *Hingu* as collyrium in *Kamala*
- Best lac is obtained from the host plant- *Koshamra* botanically known as *Schleichera oleosa* (Lour.) Merr belongs to Sapindaceae. Interestingly, lac is the secretion of lac bug- *Kerria lacca* rather than the plant.
- *Gaushira* acts as *Vatahara, Kaphahara, Shothaghna* and *Akshepahara.*

CONCLUSION

On the contrary to the popular belief that the resinous substances can only make better excipients, the age old medical science-*Ayurveda*, has recognized 34 remarkable plant species that secrete medically useful resinous substances. Their inclusion in various formulations is the hall mark of their medicinal value. This review will help the researches to look up to new pharmacological activity in the different resinous substances to prove them as botanicals of great interest.

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CONFLICT OF INTEREST

None.

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