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Review Article

REVIEW ON SOME MEDICINAL FLOWERS USEFUL IN SKIN DISORDERS W.S.R. TO ANTI-BACTERIAL ACTIVITY

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ABSTRACT

Skin diseases are numerous and a frequently occurring health problem affecting all ages from the neonates to the elderly and cause harm in number of ways. It is not a life threatening disorder, but the sign and symptoms like itching, burning, oozing make the patients irritating and worried. Infection of the skin due to Staphylococcus aureus is a challenge for the physicians. S. aureus is spherical gram-positive bacteria, which is immobile and forms grape-like clusters. It is a normal inhabitant of the skin and mucous membranes in the nose of a healthy human. The speciality of *S. aureus* is that it is infectious to both animals and humans and survives only on dry skin. It can be spread through contaminated surfaces, through the air and through people. Modern medicine has limitations for the treatment of such skin disease. But in Ayurveda, many references can be found in classical texts, about successful treatment of various skin diseases like *Kandu, Pama* etc. In this article we have reviewed, the most useful five herbs from the *Pushpa varga* of *Bhavprakasha Nighantu*. Many scholars have experimentally studied the antibacterial activity of these flowers in details. We have tried to explain the anti bacterial activity of flowers from these herbs in accordance with Ayurvedic concept.

KEYWORDS: Staphylococcus aureus, Skin disease, Antibacterial activity, Flowers.

INTRODUCTION

Diseases of skin are becoming increasingly important. [1] The pattern of skin diseases in India is influenced by the developing economy, level of literacy, social backwardness, varied climate, and industrialization, access to primary health care, and different religious ritual and cultural factors. Skin changes are affected with aging due to passage of time, photo-aging due to exposure to the sun.[1] The cutaneous signs of skin are xerosis, fine wrinkling, thinning of skin, loss of elasticity, seborrheic keratosis, coarse deep wrinkling, skin tag, etc.[2] The prevalence of skin diseases in the general population has varied from 7.86% to 11.16% in various studies.[3, 4]

Skin diseases also pose huge financial, psychological burden for the patients and their families. However, there are very minimal data available on the prevalence of the skin disease in this population, especially in central rural India. Improvement in the standard of living, education of the general public, improvement in the environmental sanitation, and good nutritious food may help us to bring down the skin diseases in this area. Therefore, prevention by identifying the risk factor is the most effective approach especially in resource restrained settings of Central India.

Ayurveda is a prehistoric health science. Skin is an important organ of communication with the external world. It is one of the five *Gyanendriyas* which responsible for *Sparsha gyan* or touch sensation. Majority of the dermatological disorders have been described under the umbrella of *Kushtha, Kandu, Pama*.[5] Patients of skin disorder always experience physical, emotional & socio-economic embarrassment in the society, which further leads to aggravation of symptoms of existing disease[6]. Staphylococci are abundant bacteria of the human skin micro biome. It is resident in skin flora owing to their ubiquitous colonization of human skin and the wide spectrum of diseases they cause.[7] Staphylococci aureus formed infection in skin and soft tissue. Polymorph nuclear leukocytes (neutrophils) are the primary cellular host defense against S. aureus infections and a major component of S. aureus abscesses. These host cells contain and produce many antimicrobial agents that are effective at killing bacteria, but can also cause non-specific damage to host tissues and contribute to the formation of abscesses. By comparison, S. aureus produces several molecules that also contribute to the formation of abscesses.[8] *Pushpa varga* of *Bhavprakasha* is a combination of total 5 medicinal herbs, having used for the control of Skin disorder. 5 medicinal herbs are *Jasminum sambac* Ait, *Ocimum sanctum* Linn, *Origanum majorana* Linn, *Mimusops elengi* Linn, *Pterospermum acerifolium.* All the important attributes of *Pushpa varga* are described in the table No.1.In Ayurveda the main etiological factor for skin diseases is Excess intake of Guru (heavy in digestion), liquid, *Snigdha Ahara, Mithya Ahara, Viruddha Ahara* etc. Taking excessive Guru and *Snigdha Ahara* produces Dushti in *Rasavaha Srotas*[9]. The *Viruddha Ahara* leads to impairment in Agni. The vitiated Agni does not digest even the *Laghu Ahara* (food substance easy to digest), resulting in state of indigestion. The indigested food materials turns sour and acts like a poison, which is termed as *Amavisha.*[10]

This etiological factor responsible for increasing the *Rakta dosha* in the body. It is hot, light, dry, hard, unstable, rough, flowing, clear, and sharp in qualities. These qualities are very similar to *Pitta dosha* which is made up of *Agni* and *Jala mahabhuta*. *Aacharya Vagbhata* has mentioned that increase in the attributes of one *Dosha*, causes a decline in the qualities of another *Dosha*. Vitiation of *Vata dosha* pacifies *Rakta dhatu. Laghu*, Sheet *Guna* of *Vata* can reduce the red blood cell count and fire carrying capacity (*Rakta dhatwagni*) of *Rakta dhatu.*

AIM

1. Literary study of medicinal plants from *Bhawprakashokt pushpavarg.*
2. To study antibacterial activity of flower.

Objective

To study the chemical composition of medicinal herbs from *Pushpavarga of Bhavprakasha.* To study the Antibacterial activity of *Pushpavaerga* of *Bhavprakasha.*

Material and Method

Through review of *Pushpavarga* of *Bhavprakasha*. Study of herbs done from Bhavprakasha Nighantu as well as related work done by research scholars was referred**.**

1. *Bela*

Flowers: contains 3-hexenol, 2- vinylpyridine (XVII), indole (XVIII), myrcene (XIX), linalool (XX), geranyl linalool (XXI), alpha terpenol (XXII), beta terpenol, linalyl acetate (XXIII), nerolidol (XXIV), phytol (XXV), isophytol (XXVI), farnesol (XXVII), eugenol (XXVIII), benzyl alcohol (XXIX), methyl benzoate (XXIX), benzyl cyanide (XXX), benzyl acetate (XXXI), methyl dihydrojasmonate, methyl anilate, cis- jasmone, methyl N-methylanthranilate, vanillin (XXXII), cis-3-hexenylbenzoate,[11] Study shows that flowers and leaves Ethanolic extracts of *Jasminum sambac* exhibited almost good activity (10-15mm inhibition zone) against Gram +ve bacteria including the Methicillin resistant Staphylococcus aureus.[12]

2. *Muchkunda*

Pterospermum acerifolium belongs to the family Sterculiaceae. It is widely distributed in Indian sub-Himalayan tract, outer Himalayan valley, Pakistan and North America (Dixit et al., 2011).[13]

The phytoconstituents reported from flower were 24 *β* -ethylcholest-5-en-3-beta-0- alpha-cellobiside,3,7-diethyl-7-methyl-1:5-pentacosanolide,n-hexacosane-1,26-dioldilignocerate, friedelan-3*α*-ol, and its *β* -isomer,*β* -amyrin, *β* -sitosterol, n-triacontanol, n-hexaco- sane-1,26-diol, myristic, palmitic, stearic, arachidic, behenic, lignoceric, oleic, linoleic, linolenic acids, kaempferol, 4 methoxy-kaempferol, and kaempferide-7-O- *β* -D-glucopyra- noside.[14]

Ghias Uddin and other (2014) has studied that the crude alcoholic extract of *Pterospermum acerifolium* show antibacterial activity against the Staphylococcus aureus at 100ppm concentration.[15]

3. *Maruaa*

Common Names: sweet marjoram, knotted marjoram, wurstkraut Family: Lamiaceae (mint Family) Sweet marjoram is a bushy half-hardy perennial sub-shrub that is often grown as an annual. *Origanum majorana* is 1-2 ft (0.3-0.6 m) tall with descending, multi-branched stems that spill over to create a mound. Since the stems take root where they touch the soil, the mound gradually increases in diameter. If grown in a hanging basket, the stems form a cascade of attractive gray-green foliage. Sweet marjoram's oval leaves are soft and fuzzy, but you need a hand lens to see the short fine hairs. They are opposite each other on a square stem which is typical of plants in the mint family. The leaves get up to an 1 in (2.5 cm) long and have a wonderful, very distinctive, perfumy fragrance when bruised. The flowers are tiny, less than 1/8 in (0.3 cm) long and arranged in burrlike heads 1/2 in (1.3 cm) long. Wild marjoram is another name for oregano (*O. vulgare*). Pot marjoram (*O. onites*) has larger flowers and a less pleasing (to me) fragrance. Hardy marjoram, a.k.a. Italian oregano, (*Origanum* X *majoricum*) is a hybrid resulting from crossing oregano and sweet marjoram. It combines the pungency of Greek oregano with the sweetness of marjoram.

L. Leeja and other (2005) conclude that the Methanol extract of *Origanum majorana* can be used as effective herbal against Staphylococcus aureus.[16]

4. *Tulsi*

It has an annual shrub that has a height of 2 to 4 feet. The whole plant is of purple colour. Leaves are 1to 2 ½ inch long, oval in shape and are dentate. It has a bud at the apex of the petiole. Flowers are small and are of purple color. These are present in the presentation that is 6 to 8 inch in length. Seeds are oval and are flattened and shiny having brown color and bears black spots on them. Flowers and fruits bloom in winters. [17]

The leaves of *Ocimum sanctum* contain 0.7% volatile oil comprising about 71% eugenol and 20% methyl eugenol. The oil also contains carvacrol and sesquiterpine hydrocarbon caryophyllene. Fresh leaves and stem of *Ocimum sanctum* extract yielded some phenolic compounds (antioxidants)such as cirsilineol, circimaritin, isothymusin, apigenin androsameric acid, and appreciable quantities of eugenol Two flavonoids, viz., orientin and vicenin from aqueous leaf extract of Ocimum sanctum have been isolated.[18,19,20] Ursolic acid,apigenin, luteolin, apigenin-7-O-glucuronide, luteolin-7-Oglucuronide, orientin and molludistin have also beenisolated from the leaf extract.[21] *Ocimum sanctum* also contains a number of sesquiterpenes and monoterpenes viz., bornyl acetate,- elemene, neral, and -pinenes, camphene, campesterol, cholesterol, stigmasterol and – sitosterol.[22] The fixed oils of *Ocimum sanctum* revealed the presence of five fatty acids – stearic, palmitic, oleic, linoleic, linolenic acids. It is a good source of beta carotene, vitamin C and calcium. It also contains volatile oil (1% including eugenol, linalool, estragol, methyl chaviol, methyl cinnamate, cileole and other terpenes), tannins, camphor, flavanoid (like luteolin, orientin, vicenin), triterpene; urolic acid, Zinc, manganese and sodium are also found using high resolution gamma ray spectrometry [23]. Essential oils of Tulsi have antibacterial, antifungal and antiviral properties. [24-26] Poonam Mishra (2011) has studied that $CHCL_3$ extract was found comparatively more effective against staphylococcus aureus.[27]

5. *Bakula*

Mimusops elengi Linn tree is the native of western peninsula. The tree is found in South India in dry evergreen forests from the Krishna southwards and in ravines in the hills up to 20 meter along western coast and lower ghats in moist evergreen forests. It is distributed in Andaman, Martaban, Tenasserim, Burma and the Western Ghats; in the Eastern Ghats it is found in dry areas, often on laterite and in comparatively small in size. It is mostly found in Northwestern Himalayas, Eastern Ghats, Western Ghats, Central Deccan Plateau, East Coast, West Coast, Indo-Gangetic Plain, and Outlying Islands.[28,29]

Macroscopic characters

Leaves[30] The leaves are glossy and are dark green when old with 6.3 - 10 cm in long and 3.2 - 5 cm in wide. The new leaves mostly appear in February when the trees often appear bright vivid green. Leaves are variable, elliptic, oblong or oblanceolae, short or long acuminate, margin undulate, closely but faintly veined. Petioles 1.2 - 2.5 cm.

Microscopical characters

Stem bark[31] Transverse section of bark shows 5-6 layers of cork cells, 2-3 layers of phellogen, 2-3 layers of phelloderm followed by cortex. The cork originates in the sub epidermis or second layer of cortex. Pericycle is represented by a discontinuous ring consisting of thick walled fibers and parenchyma. The secondary phloem is a wide zone of tissue composed of sieve tubes, companion cells, phloem parenchyma, alternating with strands of phloem fibers transverse by phloem rays which are filled with latex. Secretary cells are present, they are elliptical in shape and lined by epithelial cells.

Leaf [32]

Transverse section of leaf shows a dorsiventral structure, heavily thickened and strongly striated with ridged cuticle on both surfaces. The stomata, present on the lower surface, are ranunculaceous or rubiaceous and striations emanate from the sides of stomata. The glands are present only on upper surface. Trichomes are always two armed, each arm being pointed. Mesophylls consist of 2-3 layers of palisade tissues and 5-6 layers of spongy parenchyma. The hypodermal cells are thick walled. Vascular bundle is capped by sclerenchymatous fibers. Laticiferous cells containing latex, solitary crystals of calcium oxalate, tannin and brownish contents are present. Stomatal index- 10.36, palisade ratio- 5, vein islet number-11, vein termination number-12.

Stem bark

Taraxerone, taraxerol, betulinic acid and spinasterol, sodium salt of betulinic acid and ursolic acid, Fatty acid esters of alpha-spinasterol was isolated from the bark.[33] A new farnane-type pentacyclic triterpene, farnan-2-one-3 beta-ol (mimusopfarnanol), was isolated along with the known triterpenoids, farnan-3-one, and olean-18-en- 2-one-3-ol and lup-20 (29)-en-3 beta-ol.[34] A new triterpene 3β- hydroxy-lup-20(29)-ene-23, 28-dioic acid, beta amyrin, lupeol[35] also obtained from bark. Steam distillation of bark sample yielded 0.18% of volatile organic matter. The major constituents were alpha cadinol, tau muurolol, hexadecanoic acid, diisobutyl phthalate, octadecadienoic acid.[36] New gallic acid esters, characterized as phenyl propanoxyl gallate. [37]

Fruit and seed of *Bakula* showed presence of Quercitol, ursolic acid, dihydroquercetin, quercetin, β - d glycosides of β sitosterol, alpha-spinasterol after Saponification[38]. Two new Pentacyclic triterpene acids were isolated as mimusops acid and mimusops acid, possessing the novel migrated oleanane skeleton, mimusopane[39] along with mimusopgenone and mimugenone[40]. Pentacyclic triterpenes 3beta, 6beta, 19alpha, 23-tetrahydroxy-urs- 12-ene and 1beta-hydroxy-3beta-hexanoyllup-20 (29)-ene-23, 28- dioic acid have been isolated [41]. Two novel triterpenoid saponins, mimusops and mimusops were isolated from the seeds of Mimusops elengi [42] and minor triterpenoid saponin mimusin was isolated along with two known triterpenoid saponins, Mi-saponin A and 16 alpha-hydroxy Mi-saponin A[43]. In addition taxifolin, alpha- spinasterol glucoside, Mi-glycoside 1, two new triterpenoid saponins mimusopside A and B were also isolated [44]. Six New saponins were isolated from the seed kernel [45]. Bakul fruit are reported to contain moisture (79.27 %), protein (1.29%), fat (2.76 K Cal), reducing sugar (8.9%), Non reducing sugar (6.3%), Total sugar (15.2%), Fiber (1.13%), Vitamin C (3.27 mg / 100 gm), Mineral content (0.32%), Iron (0.59 mg / 100 gm), Sodium (5.16 mg / 100 gm), Potassium (98.54 mg / 100 gm). [60]

Leaves, heartwood and roots Hentriacontane, carotene and lupeol from the leaves, heartwood and roots were isolated. A new steroidal saponins, 5 alpha- stigmast-9(11) en-3-o-beta-D-glucopyranosyl (1-5)-o-beta-D-xylofuranoside was isolated from the roots of Mimusops elengi[46,47,48]. The part of this plant made very important contribution to the field of science from ancient times as also to modern research due to large number of Chemical constituent isolated from different part of the plant.[49]

Hazrakm and other (2007) reported that The ethanolic, Petroleum ether extracts of seed of Mimusops elengi were tested for antibacterial efficacy against Staphylococcus aureus.[50]

Drug name	***Rasa***	***Prithvi***	***Jala***	***Vayu***	***Aakash***	***Agni***		
Bela	*Tikta*	*Katu*		-	-	2	1	1
Bakul	*Tikta*	*Katu*		-	-	2	1	1
Muchkunda	*Tikta*	*Katu*	*Kashya*	1	-	3	1	1
Tulsi	*Tikta*	*Katu*		-	-	2	1	1
Mruaa	*Tikta*	*Katu*		-	-	2	1	1
Total	05	05	01	01	00	11	05	05

Drug name	Latin name	*Rasa*	*Veera*	*Vipaka*	*Guna*
Bela	*Jasminum sambac* Ait.	*Tikta, Katu*	*Ushna*	*Katu*	*Laghu, Ruksh*
Bakul	*Mimusops elengi* Linn	*Tikta, Katu*	*Ushna*	*Katu*	*Guru*
Muchkunda	*Pterospermum acerifolium*	*Tikta, Katu, Kashaya*	*Ushna*	*Katu*	*Pichhila*
Tulsi	*Ocimum sanctum* Linn	*Tikta, Katu*	*Ushna*	*Katu*	*Laghu, Ruksh*
Mruaa	*Origanum majorana* Linn	*Tikta, Katu*	*Ushna*	*Katu*	*Laghu, Ruksh*

DISCUSSION

As we described above the 5 drugs from *Pushpa varga* of Bhavpraksh Nighantu has been reported to show antibacterial activity against staphylococcus aureus pathogen, this bacteria are causative factor for almost all skin diseases.

Jasminum sambac Ait, *Ocimum sanctum* Linn, *Origanum majorana* Linn, *Mimusops elengi* Linn, *Pterospermum acerifolium.* Possesses *Tikta* rasa. As we know according to the basic principles of Dravya guna, properties are actually located in *Dravya* but are projected to rasa because of their concomitance, these properties actually relate to *Mahabhutas* which the *Rasas* are composed of. The composition of *Rasas* has been defined by inference on the basis of their effect on the body for instance, *Tikta* rasa pacifies *Pitta dosha* but it is devoid of *Teja Mahabhuta. Tikta rasa* is composed of *Aakash Mahabhuta* & *Vayu Mahabhuta*, acharya Sushrut has mentioned that *Raktha dhatu* get affected by vitiated *Pitta dosha*, and *Bhrajak pitta* which is a type of *Pitta dosha* is responsible for skin diseases (*Twakastham bhrajakam, Bhrajnat twakah*) *Tikta rasa* is very much effective to pacify *Pitta dosha.* Due to this action both *Bhrajak pitta* and *Rakta dhatu* get balanced due to predominance of *Pitta dosha*. Due to Further it increases *Vata* and decreases *Kapha* which indicates predominance of *Vayu* in its composition. Also Aacharya Sharangdhara has mentioned *Tikta* and *Katu* are the *Rasas* of healthy (*Prakruta*) *Pitta Dosha*.[12] As well as their is *Ashraya-ashrayi sambhanda* (relationship) in between *Pitta dosha* and *Rakta dhatu* has already been mentioned by Aacharya Vagbhata in *Sutrasthana*.[13] So if there is disturbance in normal *Pitta dosha* causes improper formation of *Rakta dhatu* which intern results in development of various skin diseases.

Also in the patho-physiology (*Samprampti*) of *Kustha roga* (Skin diseases) Aacharya charaka has mentioned that because of etiological factor such as excess intake of *Guru* (heavy in digestion), liquid*, Snigdha Ahara, Mithya Ahara*, *Viruddha Ahara* etc. Taking excessive *Guru* and *Snigdha Ahara* produces *Dushti* in *Rasavaha Srotas* [5]. The *Viruddha Ahara* leads to impairment in *Agni*. The vitiated Agni does not digest even the *Laghu Ahara* (food substance easy to digest), resulting in state of indigestion. The indigested food materials turns sour[6] as well as create improper formation of *Pachak pitta dosha* (*Vidagdha avastha*), this *Vidagdha pitta* vitiated *Rakta dhatu* and responsible for the formation of various skin disease.

Bhrajaka pitta is one of the type of *Pitta dosha* and which is located in the skin.[14] Vitiation in *Bhrajaka pitta* leads skin problems like ulceration, redness, burning etc. which intern results in various acute and chronic skin diseases. All the five herbs mentioned above composed of *Tikta rasa* which pacifies vitiated *Pitta*. This *Pitta dosha* in healthy state maintain purity of blood (*Rakta dhatu*) and helps to nourishes skin properly which intern helps to cure various skin diseases

CONCLUSION

From above discussion we have concluded that flowers are not only beatify the nature but also helps to increases the beauty of skin. Most of the flowers included in *Pushpa vagra* of Bhavprakash Nighantu are composed of *Tikta rasa.* Skin disorders are caused due to vitiated *Pitta* and *Rakta. Tikta rasa* having the property to pacifies *Pitta dosha*, as we seen *Pitta* and *Rakta* having *Ashraya-ashrayi* relationship which intern pacifies vitiated *Rakta dhatu* helps to keep the skin healthy, nourish and cure skin diseases.

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