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## Khulanjaan (*Alpinia galanga*): A novel herb for Melasma management

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### ABSTRACT

*Melasma* is a common skin ailment that affects young women especially during pregnancy and at menopause. It is more common in Asian and Hispanic women. Studies have found that it affects about 0.25-4% of the population in South East Asia. It is characterized by symmetrical gray to brown hyperpigmented lesions over sun exposed areas of the skin and is associated with substantial psychological impacts. The management of *melasma* is challenging and requires a long term treatment. Although various treatment modalities including topical and systemic are available viz, Azeilic acid, Kojic acid, Glycolic acid, HQ, Retinoids, Topical steroids, Mequinol, Arbutin and Glutathione, but, prolonged treatment may lead to various noxious effects. So, there has always been search for safer alternatives. Herbs are a better option. Plant products have been used for medicinal purpose long before people could write. Various herbal preparations have been tried for treatment of *melasma*. These have been found to be safe and effective. The present review aims at the management of *melasma* with a well known herb of Unani system of medicine i.e., Khulanjaan (*Alpinia galanga*) and summarizes the current pharmacological activities, major bio actives, reported mechanisms of action and its possible *anti melasma* activity. It is considered a safe herbal medicine with fewer side effects.

**Keywords:** *Alpinia galanga*, *Melasma*, Unani system, Khulanjaan.

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## INTRODUCTION

*Melasma* is a common, acquired, symmetrical, circumscribed hypermelanosis of sun-exposed skin. It is more common over face and neck but occasionally involves forearms<sup>1,2,3</sup>. *Melasma* is derived from a Greek word, ‘*melas*’ meaning black. The term, “*chloasma*” is also derived from Greek word; ‘*chloazein*’ meaning ‘to be green’ is often used to describe *melasma* that appear during pregnancy<sup>1</sup>. It develops slowly without any signs of inflammation and may be faint or dark<sup>2</sup>.

The accurate prevalence of *melasma* is unknown in most of the countries. In South East Asia it accounts for about 0.25 to 4% and is found to be most common among Indians. This disorder can affect any of the races but is more common among Hispanics and Asians. It commonly involves darker skin types with Fitzpatrick skin types IV to VI as compared to lighter skin types although women are predominantly affected, men account for 10% of the cases. It is rarely reported before puberty<sup>1,3</sup>. It is estimated that 5-6 million women in the United States alone are affected by the condition<sup>4</sup>. Sharique K E, in his study in Iraq observed that 26.6% of females are affected by *melasma*<sup>5</sup>. A recent study conducted on Latino men with *melasma*, prevalence rates reported from three studies that included poultry workers, cross-sectional farm workers and longitudinal farm workers study, were 36.0%, 7.4% and 14.0% respectively<sup>6</sup>. In a study conducted in 2003 in New Delhi, India, on 120 patients of *melasma*, 31 (25.83%) of them were men<sup>7</sup>. *Melasma*, though benign, is extremely psychologically distressing and has been shown to have a significant impact on quality of life, social, and emotional wellbeing<sup>4</sup>.

There are three clinical patterns of *melasma* viz, centrofacial, malar and mandibular. On the basis of wood’s light examination, *melasma* has been classified into 4 types as; epidermal type, dermal type, mixed type and indeterminate type<sup>1,2,3</sup>. On the basis of natural history of the lesions, *melasma* may be classified into two types viz, Transient type that disappears within one year of discontinuance of hormonal stimulation like OCP’s and pregnancy; Persistent type that persists more than one year following cessation of hormonal stimuli<sup>1</sup>.

The exact cause of *melasma* remains ambiguous but multiple risk factors have been put forth to explain its pathogenesis<sup>1,3</sup>. Ortonne et.al in the study on 324 women with *melasma* observed pregnancy, hormonal birth control, family history and sun exposure as triggers for the onset of *melasma*<sup>8</sup>. Exacerbation of *melasma* is almost inevitably seen after uncontrolled sun exposure and conversely *melasma* gradually fades during a period of sun avoidance. Genetic factors are also involved, as studies have suggested 33- 56% patients having positive family history of

*melasma* and the higher prevalence of the disease among Hispanics and Asians. Other factors incriminated in the pathogenesis of *melasma* include thyroid and ovarian dysfunction, certain cosmetics, and phototoxic and anti-seizure drugs<sup>1,2,3,4,9</sup>. Irrespective of the cause, there is increased melanin in the epidermis, particularly in the basal layers. One study showed that melanocytes were increased in most cases, but that some cases showed a normal or even a decreased number. Another study found normal melanocyte numbers in all cases. Melanosomes are increased in basal and suprabasal keratinocytes. Melanocytes have increased numbers of dendrites. Mild pigment incontinence is sometimes present. Solar elastosis is prominent. Mast cells and organelles related to synthesis (Golgi apparatuses, rough endoplasmic reticulum, and mitochondria) are also increased in number<sup>1,4,9</sup>. The clinical and histological features of *melasma* in men are the same as those of *melasma* in women<sup>1</sup>.

#### **Mechanism of *melasma* treatment:**

*Melasma* can get treated by topical therapies by following possible mechanisms<sup>10</sup>:

1. Competitive or non competitive tyrosinase inhibition.
2. Reduction in transfer of melanosomes from melanocytes to keratinocytes.
3. Reduction in tyrosinase oxidation.
4. Copper chelation, antioxidant and inhibition in melanocyte proliferation.
5. Removal of keratinocytes or shortening of cell cycle or rapid pigment loss.
6. Interference with pigment transfer and penetration of other agents.

#### **Khulanjaan (*Alpinia galanga*):**

Medicinal plants have been widely used for treating variety of ailments since antiquity. India is the country with very rich flora due to its wide range of climatic conditions<sup>11</sup>. India covers more than 45,000 species of flora and more than 3000 officially documented medicinal plants. India comprises of seven percent of world's flora<sup>12</sup>.

According to WHO, in some Asian and African countries, 80% of the population relies on traditional medicine for primary health care<sup>13</sup>. Traditional system of medicine is predominantly based on medicinal herbs. Khulanjaan (*Alpinia galangal*) is one among the herbs that has been widely used traditional system of medicine especially Unani (Greco Arabic) system for various ailments viz, Gout, cold, cough, *melasma* and halitosis<sup>14</sup>.

#### **History:**

*Alpinia galangal* has been known in Europe for seven centuries longer than its botanical origin. The Latin generic name “*Alpinia*” was given to commemorate Prospero Alpini (1553-1617), an Italian botanist who catalogued and described exotic plants. The common name “Galangal” is

derived from the Arabic name Khalanjan, perhaps a perversion or an adaptation of the Chinese Liangtiang (meaning 'mild ginger'). Although this herb has been in use since centuries but was recognized in 1870, when specimens were examined that had been found near Tung-sai, in the extreme south of China, and later, on the island of Hainan<sup>15</sup>.

**Synonyms**<sup>16,17</sup>:

Alpinia Galanga Sw.

Amomum galangal(Linn.).

Languas galangal (L.) Stuntz.

Maranta galanga.

**Common names**<sup>16,18</sup>:

Arab Khulanjan e kabir.

Persian Khusravedurue kalan.

Hindi Kulanjan.

Sanskrit Mahabaracach, Sugandhavacha, Rastma.

English Greater galangal, Java galangal, galangal cardamoms.

Unani Khulanjaan

**Parts used:**

Rhizome<sup>14,19</sup>.

**Habit and habitat:**

It is a tuberous aromatic root stock. It is native to Indonesia. It grows throughout plains of India and is also cultivated for its rhizome<sup>16</sup>.

**Botanical description:**

It is a perennial herb found in India, Malaysia, China, Indonesia and Thailand. Roots are adventitious, fibrous, and persistent in dried rhizome, 0.5 – 2cm long and yellowish brown in colour. Rhizomes are cylindrical, branched, longitudinally ridged with rounded warts and marked with fine annulations; scaly leaves arranged circularly, externally reddish brown, internally orange yellow; pleasant and aromatic odour; spicy and sweet in taste<sup>20</sup>.

**Chemical constituents:**

It contains small quantity of volatile oil that imparts its odour. Other constituents include resin, extractive gum, starch, fixed oil and a crystalline substance known as Kampferid.<sup>19</sup> Rhizome also contains flavinoids, galangin, phenolic compounds (p- hydroxycinnamaldehyde and di- (p-hydroxy cis styryl) methane), 0.04% essential oil<sup>16</sup> and gallic acid glycoside<sup>21</sup>.

**Traditional uses:**

In Unani System of medicine, rhizomes have been used as stomachic, aphrodisiac, tonic, diuretic, expectorant, carminative useful in headache, rheumatic pains, sore throat, sour eructation, stuttering, pain in chest, diabetes, ailments of liver, tubercular glands and diseases of the of kidney<sup>20</sup>.

It is a remedy for bronchial cough in old aged people<sup>18</sup>.

It is used as a good remedy for impotence and nervous debility<sup>18</sup>.

It is used in dyspepsia, fevers, incontinence of urine, removal of body odours and bad breath, and to improve the voice in throat affections<sup>18</sup>.

In Meitei community of Manipur, it has been used as abortifacient, during parturition and also for enhancing male fertility<sup>22</sup>.

### **Clinical trials:**

Researches conducted on *Alpinia galanga* have proved that this herb exhibits antimicrobial<sup>23,24,25,26,27</sup>, anti allergic<sup>28</sup>, anti inflammatory<sup>21</sup>, analgesic<sup>29</sup>, anti obesity<sup>30</sup>, anti estrogenic<sup>22</sup>, anti HIV<sup>31</sup>, anti diabetic, antioxidant<sup>32</sup>, immunomodulator<sup>33</sup>, anti amnesic activity<sup>34</sup> and anti *Helicobacter pylori* activity<sup>35</sup>.

### ***Alpinia galanga* in melasma**

Various studies on the rhizome of *Alpinia galanga* have found it a potent tyrosinase inhibitor and antioxidant. By the virtue of these properties it is considered as topical skin whitening agent. Tyrosinase is a key enzyme in the melanin biosynthesis and controls the process of melanogenesis. Variety of antioxidants has been intensely used in cosmetic products to prevent free radical generation, thus protection of skin from damage and reduction of hyperpigmentation<sup>36</sup>. Panich et al, observed that a recovery of antioxidant defences including increased CAT and GPx activity and GSH content by *Alpinia galanga* (AG) was able to counteract UVA mediated increased melanogenesis through down regulation of tyrosinase in human G361 melanoma cells and it was believed due to presence of eugenol and curcuminoids<sup>37</sup>. E.W.C. Chan et al observed higher total phenolic content (TPC) and ascorbic acid equivalent antioxidant capacity (AEAC) in the rhizome of this herb along with its higher FIC ability<sup>38</sup>. Nopparat Mahae observed that major antioxidants in the ethanolic extract were 1'-acetoxycavichol acetate, catechin, and three unknown substances. The highest concentrations of total phenolic compounds and Flavonoids especially catechin were found in ethanolic extract. The phenolic compounds possess antioxidant activity owing to their redox properties. In addition to the phenolic compounds, 1'-acetoxycavichol acetate (ACA) is believed to play an important role in the antioxidant activity of galangal<sup>39</sup>.

## CONCLUSION:

*Melasma* is a common hypermelanosis of skin that is associated with various psychological impacts. Although various treatment modalities are available for the treatment of *melasma* but the results are unsatisfactory. The management of *melasma* is difficult and requires longer duration. Longer duration treatment may lead to some harmful effects, so there has been always pursuit of safe and effective herbs for its treatment. *Alpinia galanga* has been in use since centuries in alternative system of medicine and could be a better option for the future use in cosmetics.

## REFERNCES

1. Debabrata B. Topical treatment of melasma. *Indian J Dermatol* 2009;54(4):303–309.
2. Thomas P., Habif M. Disorders of pigmentation. *Clinical Dermatology: A Color Guide to Diagnosis and Therapy*. 4th ed. USA: Mosby; 2003: 692-93.
3. Achar A, Rathi S. Melasma: A clinico-epidemiological study of 312 cases. *Indian J Dermatol* 2011; 56(4): 380–382.
4. Jennifer M., An Wen Chan. Hyperpigmentation in pregnancy. *UTMJ* 2012; 89(3):143-5.
5. Al Hamid K, Hasony HJ, Jareh HL. Melasma in Basrah: A clinical and epidemiological study. *MJBU* 2008;26(1): 1-5.
6. Sarkar R, Puri P, Jain R, et al. Melasma in men: a clinical, aetiological and histological study. *JEADV* 2010; 24: 68–772.
7. Pichardo R, Vallejos Q, Feldman SR, Schulz, et al. The Prevalence of Melasma and Its Association with Quality of Life among Adult Male Migrant Latino Workers. *Int J Dermatol* 2009; 48(1): 22-26.
8. Ortonne JP, Arellano I, Berneburg M, Cestari T. A global survey of the role of ultraviolet radiation and hormonal influences in the development of melasma. *J Eur Acad Dermatol Venereol* 2009; 23(11): 1254-62.
9. Weedon D. Disorders of pigmentation. *Weedon's Skin Pathology*. 3<sup>rd</sup> ed. China: Churchill Livingstone Elsevier; 2010; 293.
10. Sarkar R, Chugh S, Garg VK. Newer and upcoming therapies for melasma. *Indian Journal of Dermatology and Leprology* 2012; 78(4): 417-428.
11. Flora - The Plant Kingdom of India. [Internet] 2013 [Cited on 2013 Jan 18]. Available from <http://www.indiaonline.in/about/Profile/Geography/FloraandFauna/Flora.html>
12. *Flora in India*. [Internet] 2013 [Cited on 2013 Jan 18]. Available from

<http://www.ecoindia.com/flora/>

13. Guidelines on the Conservation of Medicinal Plants. The World Health Organization (WHO) Switzerland; 1993.
14. Ghani Najmul. Khazainul Advia. New Delhi: Idara Kitabul Shifa; 2101; 1063-4.
15. Alpinia galanga: Greater Galanga: Kulanjan. [internet] 2013 [Cited on 2013 Jan 20]. Available from <http://www.hillgreen.com/pdf/ALPINIA%20GALANGA.pdf>
16. Gupta AK, Tandon N. Reviews on Indian Medicinal plants. Volume 2. New Delhi: ICMR; 2004;118-128.
17. Duke JA. Handbook of Medicinal Herbs. 2nd ed. U.S: CRC Press; 2002; 350- 351.
18. Nadkarni KM. Indian Materia Medica. Volume 1. Bombay: Popular prakashan pvt Ltd; 2010; 77-79.
19. Robert Bently. Medicinal plants. Vol 4. New Delhi: Asiatic Publishing House; 2002; 271.
20. Chudiwala AK, Jain DP, Somani RS. Alpinia galanga Willd.- An overview on phyto-pharmacological properties. Indian Journal of Natural products and Resources 2010; 1(2): 143-149.
21. Jaju S, Indurwade N, Sakarkar, Fuloria, Ali M. Isolation of galangogalliside from rhizomes of Alpinia galanga. International Journal of Green Pharmacy 2009; 144-147.
22. Singh YR, Kalita JC. Effects of methanolic extract of Alpinia Galanga from Manipur (India) on uterus of ovariectomised C3H albino mice. IRJP 2012; 3(5):423-427.
23. Taechowisan T, Lumyong S. Activity of endophytic actinomycetes from roots of Zingiber officinale and Alpinia galanga against phyto-genic fungi. Annals of Microbiology 2003; 53(3):291-298.
24. Latha C, Shriram VD, Jahagirdar SS, et al. Antiplasmid activity of 1'- acetoxychavicol acetate from Alpinia galanga against multi- drug resistant bacteria. J Ethnopharmacol 2009; 123(3): 522-525.
25. P. Yamsakul, S. Kongkhaew, T. Yano, et al. The antibacterial and bactericidal activity of Alpinia galanga extracts to referent strain of pathogenic bacteria of pig in vivo. In proceedings of the 47th Kasetsart University Annual Conference: 2009 March 17-20; Kasetsart. Subject: Veterinary Medicine 2009; 208-215.
26. Sunilson JAJ, Suraj R, Rejitha G, et al. In vitro antimicrobial evaluation of Zingiber officinale, Curcuma longa and Alpinia galanga extracts as natural food preservatives. American Journal of Food Technology 2009; 4(5): 192-200.
27. Oonmetta-aree J, Suzuki T, Gasaluck P, et al. Antimicrobial properties and action of

- galangal (*Alpinia galanga* Linn.) on *Staphylococcus aureus*. LWT 2006; 39: 1214-1220.
28. Matsuda H, Morikawa T, Managi H, et al. Antiallergic principles from *Alpinia galanga*: Structural requirements of Phenylpropanoids for inhibition of degranulation and release of TNF- $\alpha$  and IL-4 in RBL-2H3 cells. *Bioorg. Med. Chem. Lett.* 2003; 13 (19): 3197-3202.
29. Achary SD, Ullal SD, Padiyar S, et al. Analgesic effect of extracts of *Alpinia galanga* rhizome in mice. *Journal of Chinese Integrative Medicine* 2011; 9(1):100-104.
30. Shiv Kumar and Alagawadi KR. Influence of *Alpinia galanga* rhizomes on cafeteria diet induced obesity in rats. *Pharmacologyonline* 2010;3: 84-91.
31. Ye Y, Li B. 1'S-1's-Acetoxychavicol acetate isolated from *Alpinia galanga* inhibits human immunodeficiency virus type 1 replication by blocking Rev transport. *Journal of General Virology* 2006; 87(7): 2047-2053.
32. Srividya A.R, Dhanabal SP, Satish Kumar MN, et al. Antioxidant and Antidiabetic activity of *Alpinia Galanga*. *International Journal of Pharmacognosy and Phytochemical Research* 2010; 3(1): 6-12.
33. Bendjeddou D, Lalaoui K, Satta D. Immunostimulating activity of the hot water- soluble polysaccharide extracts from *Anacyclus pyrethrum*, *Alpinia galanga* and *Citrullus colocynthis*. *Journal of Ethnopharmacology* 2003; 88: 155-160.
34. Hanish Singh JC, Alagarsamy V, Diwan PV, et al. Neuroprotective effect of *Alpinia galanga* (L.) fractions on A $\beta$ (25-35) induced amnesia in mice. *Ethnopharmacol* 2011; 138(1): 85-91.
35. Chaichanawongsaroj N, Amonyngcharoen S, Pattiyathanee P, et al. Anti-*Helicobacter pylori* and anti-intestinalization activities of Thai folk remedies used to treat gastric ailments. *Journal of Medicinal Plants Research* 2012; 6(8): 1389-1393.
36. Weerapreeyakul N, Seebundit K, Pra yong P. Antioxidative and Tyrosinase inhibitory activities of indigenous plants. *KKU Sci. J* 2012; 40(2): 572-583.
37. Panich U, Kongtaphan K, Onkoksoong T, et al. Modulation of antioxidant defence by *Alpinia galanga* and *Curcuma aromatica* extracts correlates with their inhibition of UVA-induced melanogenesis. *Cell Biol Toxicol* 2010; 26(2): 103- 16.
38. Chan EWC, Lim YY, Wong LF, et al. Antioxidant and tyrosinase inhibition properties of leaves and rhizomes of ginger species. *Food Chemistry* 2008; 109: 477-483.
39. Mahae N, Chaiseri S. Antioxidant Activities and Antioxidative components in extracts of *Alpinia galanga* (L.) Sw, *Kasetsart J. (Nat. Sci.)* 2009; 43: 358-369.