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A COMPARATIVE STUDY ON PHYTOCHEMISTRY OF ORANGE PEEL

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Abstract

Orange is richest source of vitamins c but the peel of orange is more beneficial then fruits. Orange peel is wasted part in food industry but it has various pharmacological activity like a anti-oxidant, anti-microbial, anti-inflammatory and anti-cancer activity. Orange peel is by product in the production of orange juice in food industry. Orange peel play vital role in cosmetic industry because of their anti-oxidant property. the glycosides naringin and hesperidinare responsible for the antioxidant activity of orange peel. orange peel contain various phenolic compound and flavonoid. Orange peel is utilize in the formulation of skin care product for the soft smooth and natural glowing skin. According toayurveda orange peel is beneficial for the oily skin because it can balance kapha and pittadosha. Orange peel can balance the production of oil in skin. Orange peel work as a exfoliating agent which removes unclogging the skin pores and blackheads dead cell of skin. Orange peel can reduce the highperpigmentation of skin and acne scars and dark spot of skin. Orange peel contain citric acid will take care of the skin. The calcium present in orange peel that regenerate and renew the skin. orange peel protect our skin from ultravoiletlight come from exposure of sun light. in this review my present study to summarizes the beneficial effect, pharmacological activity and pharmacognostic study of orange peel. The antifungal antibacterial and anti-inflammatory property of orange peel it can treat the acne and pimple of face. The present study in this review orange peel considered a beneficial for the skincare products.

Key words: Anti-oxidant , skin care , anti inflammatory, Flavonoid, Hyperpigmentation, Ayurveda

Introduction

Orange is a citrus fruits it is a good resource of vitamin C. the peel of orange are riched in bioactive components fibers citric acid and folic acid .orange peel has anti-oxidant, anti-iflammatory, anti-diabetic,anti-hypertensive ,antimicrobial, antifungal,antibacterial, and anti cancer properties. Orange peel contain volatile oil component such as oxygenated compound and terpenes .[1] orange peel oil are used in cosmetic and perfumery industry. Orange peel has various benefits when the peel is applied on the skin it give natural bleach, close pores, prevents acne pimple and blemishes, instant glow ,amazing skin toner, prevent wrinkles.[2] It is also good for hair care product in the treatment of dandruff and scalp. It is good for oily skin .orange is plant of rutaceae family which is grown in Uttrarakhand, Nagaland, Mizoram, Tamilnadu, Maharashtra, West Bengal. Orange is consumed fresh or in the form of jam, squash, syrup, and juice. Orange also conatin vitamin A,B and phosphorus and calcium.it is the main source of peel use in the cometic industry, pharmaceutical industry, food industry.[3] The genus citrus belongs to the rutaceae and 1,300 species. Citrus sinensis(lemon), citrus reticulate (tangerine), orange, citrus medica (citron), and the genus citrus are all of the citrus fruits and their by-products have a high economic and medicinal value due to their diverse uses, such as in the food industry, cosmetics, and folk medicine.[4]The fruit is made up of two distinct parts, the pericarp, also known as the peel, skin, or rind, and

the endocarp, or pulp with juice sac glands, anatomically speaking. The skin consists of an epidermis of epicuticular wax with many small aromatic oil glands that give the skin its distinctive smell.[5] The pericarp consists of the outer flavedo or epicarp, which is mainly made up of parenchymatous cells and the cuticle. The albedo or mesocarp beneath the flavedo consists of tubular-like cells joined together to form the tissue mass compressed into the intercellular space. The fruit has a sweet pulp as well as several to many seeds inside. The plants that produce citrus fruits are rich in a variety of volatile oils. The volatile oil obtained is intended for various pharmacological uses.[6] Essential oils from leaves, fruits, and bark have been described several times in different amounts by different extraction techniques. The volatile oils were analyzed for their pharmacological properties.[7] These essential oils are being used to make a variety of medicinal products based on their reported pharmacological properties. Since several studies have been published about the properties of volatile oils from such plants for different purposes, such studies are extremely important to be made available to all concerned researchers.[8] The present study is therefore based on a review of literature on such experiments on volatile oil extraction techniques, reported chemical constituents, and pharmacological properties.[9]

Figure 1 : Orange fruit

Figure 2 : Orange peel power

Figure 3: Orange peel

- **Pharmacognostic classification of orange.**
- Botanical name :Citrus Sinensis
- Phylum :Magnoliophyta
- Class : Mangoliopsida
- Order : Sapindales
- Family : Rutaceae
- Genus : Citrus
- Species : Citrus Sinensis

Benefits of Orange peel on skin

- These face packs, face masks and cream have a soothing and relaxing effect on the skin.
- Orange peel help to reclaim the lost shine of skin in a short period of time.
- Natural face packs, and creams when used regularly, give skin a glow, improve skin texture, and reduce stress.
- With the help of face packs, the harmful effects of pollution and harsh environments can be effectively mitigated.
- They help to prevent premature aging of the skin.
- By using natural face packs, wrinkles, fine lines, and aging of skin can be effectively controlled.
- Natural face packs made the skin look young and healthy.
- Brighting and glowing the skin.
- Cells build up around the pores, enhancers the shadows and make the pores appear larger.
- Hydrates the dehydrated skin.
- Promotes a youthful appearance to the skin.
- it protects the skin from free oxidative stress, skin hydration, and radical damage. Its instant glow feature also helps to prevent acne, scars, wrinkles, and ageing.
- Orange face packs nourish the skin.
- Depending on the herbal ingredients, it helps to reduce acne, pimples, scars, and marks.
- Face packs made of sandalwood and turmeric are used to treat acne and pimples.
- Face packs and creams are also recommended for acne, pimples, and black heads. they usually prevent the overextraction of sebum from the sebaceous glands and kill the harmful bacteria that reside inside the acnes lesion.
- By combining fine powder of sandal and orange lentils with an acne face pack, the scars and marks on the skin can be reduced.
- face packs are used to remove dead skin cells from the body.

Geographical distribution

Orange is plant of rutaceae family. it is cultivated in tropical and subtropical America, Australia, china, south Africa, India northern and eastern Mediterranean countries.it was considered a dessert fruit. largest producer of orange in world is brazil .[10]

In india the orange are cultivated in Uttarakhand ,Haryana , Rajasthan, Madhya Pradesh, Nagaland, Maharasthra, West Bengal, Mizoram and Tamilnadu.

Nagpur is called as orange city because it produce the large variety of orange.

Plant Description

Citrus sinensis is a species of rutaceae family. Rutaceae are herbaceous plants, shrubs, and trees with glandular punctate, often strongly smelling flowers, with 150 genera and 1,500 species. These are further characterized by the common appearance of winged petioles and spines. Sweet orange is a small evergreen tree7.5 meters tall (to distinguish it from closely related species such as sour orange, 3c. aurantium, c. reticulata, and mandarin orange), and it measures up to 15 meters.[11]

Leaves

Orange (citrus sinensis) produces leathery and evergreen leaves of various sizes, ranging from elliptical to oblongto oval, 6.5-15 cm long, 2.5-9.5 cm wide, with often narrow wings on the petioles. Flower fragrant white

flowers either in clusters of 6 or 20 with 5 petals and 20-25 yellow stamens. they are small and greenish-white. The flowers are waxy.[12]

Seeds

The seeds are greenish to pale whitish colored. They are flattened and angular. The seeds are generally poly embryonic, and the embryos are either zygotic or nuclear. The embryonic egg is derived entirely from the mother plant and has most of the same characteristics as the parent plant, as a result of pollination.[13]

Fruit

The fruit can be globose to oval in shape. Fruit is 6.5-9.5 cm wide and ripens to orange yellow. The fruit is divided into two distinct subtypes, the pericarp and the endocarp, according to anatomically speaking. The pericarp is also known as the peel and the endocarp is also known as pulp or juice sacs. On the face an epidermis of epicuticular wax with many small aromatic oil glands is present. this oil gland gives the distinctive smell. the consistency of wax varies according to the species, climatic conditions, and growth rate.[14]

Phytochemical constituents in orange

The peel of orange conatin flavones glycosides, triterpene, flavonoids, and bioactive compound saponin limonene, zexanthin, cryptoxanthin.

Flavones glycosides:-

Hesperidine, Narirutin, Neohesperidin, Naringin.

Triterpene:-

Limoeme, citrol.

Pigment:-

Anthocyacin, Zeaxanthin and RutinBeta-cryptoxanthin, Polymethoxylted

Cryptoxanthin, ,Eriocitrin, Homocysteine,TangeritinandNobiletin

Flavonoids;

Citacridone,CitabrsineandNoradrenaline

Phytoconstituent present in leaves

Terpanoids, Linalool,βelemene

Phytoconstituents present in flower

Triterpenes,Limonene

Phytoconstituents present in fruit

Vitamins;

B1,B2,B3,B5,B6,andVitaminC

Minerals;

Calcium, Iron,Magnesium,Zinc,Phosphorus,Potassium

Pharmacological activity of orange peel

Anti-Cancer activity

It has a anti-carcinogenic effect. Limonene, which is found in orange, reduces the risk of breast, colon, lung, and mouth cancer.[15]

Anti-Oxidant property

it also provides protection against cardiovascular diseases. In the orange fruit, cardioprotective substances such as vitaminc, calcium, flavonoids, and carotenoids are present. Oranges have a good anti-oxidant ability.[16]

Urinary disease

Oranges are full of phenolic compounds, pectin, vitamin c, and flavonoids. Women who consumed 1/2 liter of orange juice daily reduced their urinary ph value and citric acid excretion by lowering the risk of forming calcium oxalate stones significantly. for urinary problems decoction of wroth orange seeds is used in china.[17]

Anti-Typhoid property

According to a study published in the british journal of nutrition. Typhoid is a significant public health problem in developing countries, particularly because of flavonoids such as citacridone, citbrasine, and saponins in orange fruit. It has anti-typhoid properties.[18]

Wound healing property

Citrus sinensis' healing properties are based on a wide variety of phytonutrients, including citrus flavons, hydroxycinnamicacids,anthocyacin, and a variety of polyphenols.[19]

Anti-Hypertensive property

Hesperidine is the most common flavone in the orange, which has been shown to reduce blood pressure as well as cholesterol in animal studies. The bulk of these phytonutrients are found in the peel and inner white pulp rather than in its liquid orange center. This beneficial compound is often removed from orange juice production.[20]

Anti-Arthritis property

Due to the presence of carotenoids, zeaxanthin and beta-cryptoxanthinphytonutrients reduce the chance of rheumatoid arthritis by 52%. It has a healing and anti-arthritis function.[21]

Anti-Ulcer property

It has anti-ulcer properties. Aromatherapists use citrus sinensis oil as an atranquilizer. Sweet orange oil, Orange juice has reduced the incidence of helicobacterpylori infection (h. pylori) infections on a daily basis, preventing ulceration. It has anti-ulcer properties.[22]

Anti-Bacterial property

Because of the presence of saponins, it has anti-bacterial and larvicidal property.

Anti-Diabetic property

Citrus fruit peels contain bio flavonoids such as hesperidin and narangin, which have anti-diabetic properties. [23]

Anti-Fungal property

Citrus sinensis'contain major antifungal agents include limnene (84.2%), linalool (4.4%), and myrcene (4.1%). Orange essential oil is a potent biodegrading and storage agent for fungus. It also has a anti-fungal activity.[24]

Anti-Inflammatory property

Citrus sinensis has anti-inflammatory properties due to the presence of polymethoxyflavones.

Antispasmodic activity

Aromatherapists use citrus sinensis oil as an atranquilizer. Sweet orange oil, the roasted pulpis used as a poultice for skin ailments. for acne treatment, the fresh peel is applied to the skin. As an antispasmodic ingredient.[25]

Other use

Orange peel is good for skin care product.it can treat acne, wrinkles, blackheads. It make instant glow, soomth, soft and glowing skin.[26]

It can treat scalps and dadruff.

Conclusion

This review represents the natural product with medicinal value play a integral role in the formulation of new pharmaceutical product with the less side effect. The bioactive compound present is orange and orange peel that show various important activity and efficacy in development of new compound. in my present study the orange peel is used in the formulation of different- different pharmaceutical and cosmetic product because of their versatile pharmacological activity and application.

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