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Review On Botanical Extract and Their Extraction Methods Used Infor Skin Lightening Purpose

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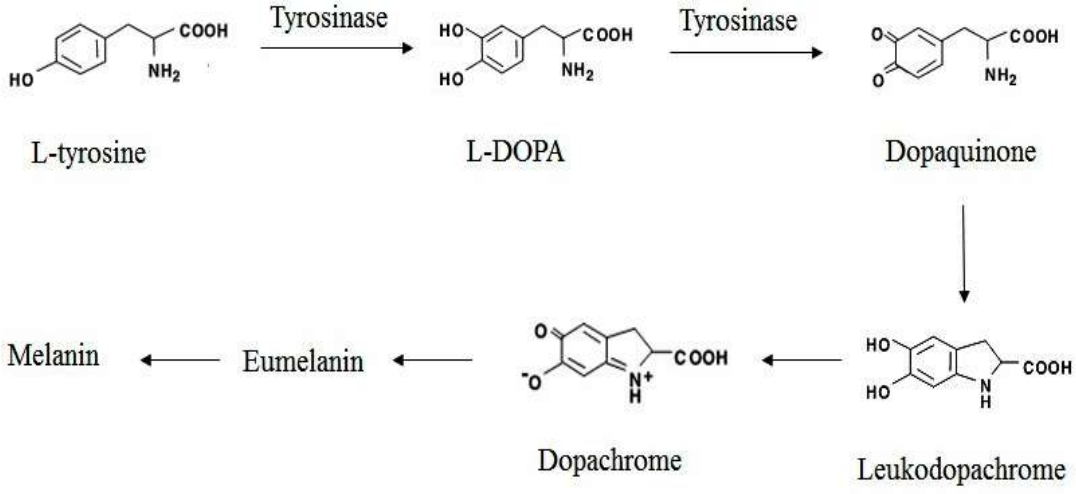
ABSTRACT
Major Problem Related To Skin in Human Being is the Hyperpigmentation &Skin Darkening Which may be Prevented by the used of Chemical formulation . Used Of this Chemical Product For The long term May lead to the side effect.Due to this major attention is given to use of botanical extract to light the complexation.Natural&Botonical Extract of herbal plant provides opportunities to developed the formulation or new product to solve the skin problem. Botanical Extract include the active constituent from the plant such as liquor ice, arbutin , aloesin,gentinsicacid,flavonids, niacinamide ,polyphenols etc,that inhibit the synthesis of melanin by different mechanism such as tyrosinase inhibition which lead to the skin whitening this there is Overview of herbal extract used for skin lighting purpose, their sources, mechanism of action & the method of isolation.

Keyword- Skin lighting,botanicalExtract, flavonids, polyphenols,tyrosinaseinhibitor,antixidant

INTRODUCTION

Skin regulates body temperature, maintain the fluid balance and protect the skin from environment. Strateumcorenum the External layer of skin balnce the skin function.Variation in skin colour is due to melanin pigment which is synthesis by the melanosomes. Increase the production of melanin result in skin disorder like darkness uneven skin tone and hyperpigmentation .melanin is generally present in outer epidermis of skin(1).skin darkening or taning is majorly due to the sun damage (overexposure to UVA, UVB rays),drug reaction,Genetic factors, pollution, birth control pills as they secret the excess of melanin that result in hyperpigmentation(2) .Skin lightening, Depigmentation Agent mainly target the tyrosine inhibition which is theblock the overproduction of melanin , which is the first step for skin lighteing activity(1).Hyperpigmentation is most common dermatological problem Due to Adverse effect associated with Chemical agentNatural extract are used for Depigmentation activity(Sivamani& Clark, 2016)

- **Melanin synthesis**(5)



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- **Melanogenesis (5,6,7)**

Melanocytes cells are located in the epidermis, where it produces the melanin. Upon exposure to the sun light, UV radiation melanogenesis is produced by the key enzyme tyrosine. Tyrosine is the glycoprotein present in melanosomal domain has the catalytic side has the 90% of protein followed by the transmembrane and cytoplasmic domain 30% portion. Histidine is present in the catalytic portion of tyrosine it binds to the copper ion that is required for tyosinase activity. And melanogensis take place. Two types of melanin synthesis within melanosomes.

Melanin- dark brown black insoluble polymer

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Pheomelanin- light red yellow sulphur containing soluble

Tyrosinase, (polyphenol oxidase,) can catalyze two distinct reactions

First reaction-the oxidation of L-tyrosine to L-dihydroxyphenylalanine (L-DOPA)

Second reaction- the oxidation of L-DOPA to dopaquinone

Third reaction-dopaquinone, is transfer through a non-enzyme-catalyzed process, into leukodopachrome

Fourth reaction-. This compound is oxidized to dopachrome this is an extremely fast and non-enzyme-catalyzed process. Then, dopachrome is converted to melanin through a series of enzyme-catalyzed reactions. This d process shows that dopachrome synthesis can be suppressed when any of the above steps are inhibited. However, not all substances t can inhibit the formation of dopachrome are tyrosinase. Over-activity of tyrosinase leads to over-production of melanin. Melisma, freckles and senile lentigo are due to abnormal accumulation and biosynthesis of melanin pigments different approaches are used to find chemicals that inhibit the catalytic activity of tyrosinase, and disrupt the synthesis or release of melanin pigments. Many of these compounds have a tyrosinaseinhibitingactivity, leading to the decrease of melanin total production. And result in the skin lightening.

- **MECHANISM OF TYROSINASE INHIBITION BY VARIOUS NATURAL SOURCES(4,5,6,7)**

	Mechanism of action	**Molecule**
Before melanin synthesis	Inhibition of tyrosinase transcription	Tretinoin, glucosamine, retinol, retinaldehyde, N –acetylglucosamine
During melanin synthesis	Tyrosine Inhibition	Hydroquinone, mequinol, arbutin, azelaic acid, kojic acid, ellagic acid, resveratrol, oxyresvaretral
	Reactive Oxygen species scavengers	Ascorbic acid, ascorbic acid palmitate, thioticacid,hydrocumarins
After melanin synthesis	Tyrosinase degradation	Linoleic acid, α-linoleic acid
	Inhibition of melanosome transfer	Niacinamide, serine protease inhibitors, retinoids, lecithins, neoglycoproteins, soybean trypsin inhibitor
	Skin turnover acceleration	Lactic acid, glycolic acid, linoleic acid, retinoic acid
	Interaction with copper Inhibition	Kojic acid, ascorbic acid

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1ARBUTIN

Arbutin is most widely used as skin lighting agent .D-Glucopyranoside derivative of hydroquine is natural form of arbutin.Arbutin is found is extract of dried leaves of plant such as pear, blueberry,cranaberry, bearberry B belonging to familyEricaceae. Among the alpha and beta arbutin alpha arbutin shows more potent skin lighting effect the beta form.(6)

- **Mechanism of Action of Arbutin**

Arbutin inhibit the tyrosinase activity competitively by binding on theL- tyrosinase binding .site and suppress the melanin synthesisand also result in dipigmentation(3,7).

Sources(6)

Source	Concentration	Part
Bearberry	4-8gm/1	Leaf
Blueberry	48gm	Fruit
Pear	100mg/kg	Leaf

- **Method Of Extraction of Arbutin**

1) PEAR

Pear fruit is collected and separated into peel and flesh.Peel thickness is achieved upto 1mm by peeling.Both peel and flesh is grounded for 30 sec.0.05g sample were added to water and methanol solution v/v(100:0,90:10,80:20,70:30)The flask were homogenized at room temperature foer 30 min at 20KHZand 400W. The solution is concentrated at 4000RPMfor 10 min .Then solution is filtered . Arbutin is quantified by Hplc(8)

2)Bearberry

Bearberry leaves were dried and grounded into fine powdered.50 mg of powderd sample were taken and sonicatedwih 5ml of solvent for 10min at 25ºC. the supernatant is collected and Analysed by hplc for dertermination of arbutin content .the extraction is repeated for 4 times with different solvent. Solvent used are water, water:methanol(95:5)(9)

2**.ALOESIN**

Aloesin is found in aloe plant generally Aloe ferox contained the maximum amount of aloesin from the among species.Aloesin is Hydroxymethylchromone derivative of aloevera.Aloesin shows the dose dependent melanin suppression activity(4)

- **Mechanism of Action:**

Aloesin inhibit the tyrosine hydroxylase inNonCompetative way. and DOPA quinone by competitive inhibition at DOPA oxidation state.In compare to the other skin lighting agent aloesin show no cytotoxicity. Aloesin is the hydrophilic in nature And due to high molecular weight it shows the poor penetration to the human skin.Dueto the poor penetration aloesin with arbutin shows the synergistic effect(3,4)Aloesin Decreases the uv induced melanin..Alosin and arbutin show synergistic melanin inhibition,(6)

- **Extraction**

Leaf gel from alovera plant were dried for 48 hrs at 80ºc in oven. Then the 20mg of gel powdered were soaked in 200ml of solvent namely methanol and ethanol..the solution were filtered through the whatsmamn filter paper. Filtered solution is evaporated for 1 hrs to dryness. The sample is dissolve in water for further identification(10)

3)POLYPHENOL

Polyphenols are classified by the presence of phenolic ring . they are generally the condensed tannin. They are widely found in fruits , vegetables, cereals, spices, polyphenols shows the antioxidant activity.antiinflamatory, protect the skin from uvdamge.

- **Flavonoids**

Flavonoids Bioflavonoidare grouped flavones, flavonols, isoflavones, and flavanones. Flavonoids are also called as vitamin P. Flavonoids are the subclass of polyphenols .Flavonoids are widely found in many v plants such as fruits , steam ,leaves. Among the available class of flavonoids Anthocynidin,Flavonols,Flavonones show the decrease melanin synthesis activity Among this Flavones,flavonols shows the tyrosinase reduction activity(11)

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- **Classification of flavonoids**(11)

Chemical class	Example	Dietary source
Flavonols	Querecetin Rutin Myricetin kaempferol	Tea,red wine, apple, tomato, cherry
Flavones	Apigenin Luteolin Chrysin	Thyme & parsley, Red wine
Isoflavones	Genistein Glycetein Daidzein	Soya beans & legumes
Flavanol	Catechin Gallocatechin	Tea & apple
Anthocyanidin	Cyanidin	Most berries & stone fruits
Flavanones	Hesperidin Narigenin	Lemon & sour oranges,Citrus fruits, Grape fruits

➢ **Qurecetin**

Qurecetin is majorly present in the Tea,Apple, Onion,Neem,Sunflower Evening primrose Cranberry. Qurecetin show sun protection activity by absorption of both UVA,UVBrays.its shows the antioxidant and antiinflamatory effect as scavengering the free radicals.as well as inhibiting the tyrosinaseactivity.Among the sourecesQurecetin is majorly present in onion.Onion has the high level of antioxidant(12)

- **Extraction of QurecetinfromOnion**

Red onion(Alliunsativum)is used for extraction. Plant material Dried at room temperature. Then Grinded to form the fine powdered. Dried material is extracted with the methanol with shakerat 150rpm for 48 hrs. the extracted solution is filterd to obtained the crude extract.(13)

➢ **Luteolin**

Luteolin is found in carrot , pepper, celery, olive oil, , peppermint , thyme, roseberry . itposses the both antioxidant, and anti-inflammatory activity.luteolin decreases the tyrosine catalysed melanin synthesis.Luteolin shows the dose dependent tyrosine inhibition in B_{16}melonoma cells.

- **Extraction of Luteolin from pepper**(14)

Luteolin is majorly extracted from the aromatic plants.Fresh pepper sample were homogenized in 25ml of 60% methanol. The sample were filterd and washed with 50 % methanol. extract werehydrolysed with 2N Hcl in 50% methanol at 90^{o} C for 2 hrs. Flavonoids is detected at 370nm

➢ **Hesperidin**

Hesperidin is exist mainly in peel of citrus fruits. Hespradin found in large amount in rinds of orange lemons. Aglycone part of hesperidin is hespeitin which show the anti-inflammatory, antityrosinase activity and skin lighteingbenifits(3,4)hespeidin decreases the melanin without cytotoxicity. Protect the skin against uv induced damage. Of collagen and improved the overall skin tone(6)

- **Extraction of Hesperidin from Sweet orange**(15)

Dried sweet orange peel were grinded intopowderd and 250mg of powder extracted in soxhletextracter with 800ml of petroleum ether and refluxed for 4 hrs. after complete extraction petroleum ether layer is discarded. And filter is acidified with acetic acid 6% ph(3-4) Keep this residue in refrigerator for overnight Crystalline sample is appeared.

4)FLAVONOIDS

- **Stillbenes**(16)

Stillbenes are exist as monomer, oligomer.they are generally C_6 aromatic compound. Stillbenes show s the tyrosinase inhibitory effect that is generally more in tera oxygenated stillbenes class.

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Tyrosinase inhibitor	Botonical origin
Pinosylin	Unspecified source
Reservetrol	Morus alba Veratrum album A. gomezianum
Picids	Polygonumcupidatum
Chlororophin	Artocarpusincisus
Oxyresveratrol	A.lokoocha M.alba

Among this Oxyresveratrol shows the maximum tyrosinase inhibition potential.which is 32 folds greater than that of koljic acid.

- **Reservetrol.**(16)

Reservetrol found in grapes, berries , pears Reservetrol shows the antioxidant, anticancer, antiinflammation activity, antiaging. Depigmentation activity ofreservetrol is demonstrated in human melanocytes by inhibition of MRNA expression of tyrosinase,

- **Extraction of reservetrol from Vitisvinifera**(17)

200gm of dried finely grounded plant material is extracted with 95% v/v of aq ethanol at room temperature. The solution is evaporated at reduced pressure to produce the 4.8% extract. 8 gm were suspended in water, liquid liquids partioning successively with methanol, ethyl chloride , N butanol fraction yield after evaporation.are

Methanol extract - 23%
Ethyl chloride-12%
N butanol-9%
Aq H_2O-56%

Among this ethyl extract shows the maximum tyrosinase activity.

- **Ellagic Acid**(3,4,6)

Pomengrantesextract orally can be used effective skin whitener.Ellagic Acid is found in chestnuts, Walnuts, Ras berries , Grapes , Pomengrantes. It is also fund in Oak plant species. Among this the rinds from the pomengrantesfruits contains about 90% of total ellagic acid content. Ellagic acid can be used as potent skin whitener because it has found the high affinity for the cupper ion at its active site . and thus inhibit the tyrosinase activity. It alsodercrease the proliferation of melanocytes and decrease the melanin synthesis.

- **Extraction of Ellagic Acid from the Pomengrates**(18)

Pomengrates fruits rinds were extracted 3 times with50% of aq ethanol solution at 60-70^{o}C for 2 hrs. then remove the ethyl alchol with vaccum . the solution is acidified with the hydrochloric acid and then refluxed at 70^{o}C for 6 hrs. upon dilution ellagic were precipitate. Precipitate were collected by fitration and dried invaccum tray . the extract contained the 90.16% of ellagic acid on dry basis (confirmed by the Hplc).

5)MULBERRY(4,7)

mulberry is known as morus alba .Muroxide F shows the potential tyrosine inhibition activity(19)It also contains Rutin, Isoqurecetin, and astragalin. Root, bark shows skin whiteingproperty.stem twig, fruit show the dipigmentionactivity.Depigmentation activity is due to tyrosinase inhibition of DOPA oxidase and superradical scavengering(4)

- **Extraction of mulberry**(20)

Mulberry leaves(Morus alba) where collected , dried and grounded into the fine powder. 0.5 gm of powder were weighed and shaken with the 10 ml of acetone solution for 60 min at the room temperature. The sample is centrifuged at 4000Rpm for 10 min. after that the supernatant is collected , and transfer to the volumetric flask containg 25ml of methanol for futheruse.Methanol extract. Acetone extactchloform extract of mulberry show the potent skin whiteing property.

6)CURCUMINOIDS

Curcuminoid is the polyphenol obtained from the rhizome of turmeric plant. Turmeric has the various properties such as wound healing, anti inflammation, skin lighteing, soothing . curcumin

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is the main constituent of curcuminoid which shows skin lighteing properties. Which inhibit the melanin synthesis

- **Extraction of curcumin**(21)

Turmeric rhizome dried , powdered and sive through the mesh 60 to form the fine powdered. Powder is extracted with acetone for 90 min .the extract is filter , concentrated under the vaccum. At the temperature less then 50^{o}C to form the oleoresin. In 100ml beaker 20 gm of oleoresin 20 ml of solvent is added mixed and kept aside for 48 hrs at room temperature for precipitation. The precipitate were purified wash. The curcumin is quantified by the Hplc instrument.[18]

7)LIQUORICE EXTRACT

Liquorice has the depigmentation, antimicrobial, antiaging, sun protection activity. Glyrrhzetic acid control the melanin synthesis it decreases the melanin and improved the skin complextion(4)Liquoriceextract containsglabridin, isoliquirtitigenin, licuroside, licochalcone which inhibIt the tyrosinase activity, among this glabridin is the potent inhibitor of tyrosine(7)Liquorice extract shows the skin lighteing activity by decreasing the epidermal melanin, biosynthesis of melanin.

- **Extraction of glabridin from the liquorice**(22)

Liquorice rhizome where dried finely grounded to form the fine powder. 1gm of liquorice powder where taken in the ethanol to water 70;30 v/v system. The utrasonic extraction is done for 60 min at 50^{o}C the amount of glabridin quantified by hplc instrument.

8)P-COUMARIC ACID(6)

P coumaric acid from the fresh leaves of the panax ginseng shows the decrease oxidation of l tyrosineP coumaric acid is the secondary metabolites from ginseng . P coumaric acid has the similar structure to that of tyrosinase it compete with tyrosinase and reduces the melanin synthesis (23)Pcoumaric acid were isolated from Ginseng it shows the antioxidant, immunomodulatory, Neuroprotective And in vivo- in vitro tyrosine inhibition It directly decrease the melanogenesis process(4)

9)**CAROTENOIDS**

Carotenoids are the colorful pigments, carotenoidsinclude the lycopene, Bcarotene carotenoidsdecreases uv induced photodamage they are rich source of antioxidant. Among the carotenoid's lycopene is most potent one.lycopene found in color vegetables fruits. higher lycopene content were found in tomato, watermelon, pink guava,papaya, It shows the free radical scanvering activity and gives sun protection by blocking uv rays(24)

- **Lycopene extraction from watermelon**(25)

Watermelon fruits were washed and cut into the pieces; innerred fleshy part is used for the extraction. 100gm of watermelon paste is prepared. Paste we warmed with the 30 ml benzene mixture.mixturewas stirred well and the benzene layer is decanted.this step is repeated 5 times and benzene is distilled off and lycopene residue is collected.

10)AZELAIC ACID(4)

Azelaic acid is found in rye, wheat, barley plant ovule azelaic acid decrease the tyrosinase activity.itdecreases the DNA synthesis of hyperactive melanocytes,itsbright skin tone,improve the skin texture.

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