EXTRACTION, FORMULATION AND EVALUATION OF ANTIAGING CURCUMIN FACIAL CREAM

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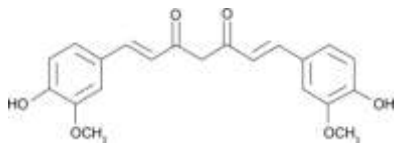
ABSTRACT: ***Curcumin (diferuloyl methane), the natural yellow pigment in turmeric, is isolated from the rhizomes of the plant Curcuma longa. It constitutes about 3-4% of the composition of turmeric. Curcumin (diferuloyl methane), the natural yellow pigment in turmeric, is isolated from the rhizomes of the plant Curcuma longa. It constitutes about 3-4% of the composition of turmeric. Its role in the treatment of skin diseases and its ability to soften rough skin resulted in the prolific use of turmeric in topical creams and bath soaps in India. Turmeric is also used in home remedies in the treatment of cuts, wounds, bruises, and sprains. Its use as an anti inflammatory and antimicrobial agent has been recognized for more than a century. The importance of turmeric in medicine took a new twist when it was discovered that the dried rhizome of Curcuma longa is very rich in phenolics, whose structures have been identified as curcuminoids Phenolics are known to possess antioxidant properties. Free radical mediated damage to biological systems is recognized as the initiating agent for many diseases, such as cardiovascular diseases, cancer, and arthritis. Turmeric and its constituents show beneficial effects on these diseases and on other illnesses. Our research work is to isolate curcumin from turmeric and formulate in cream . Its anti oxidant properties help the cream to act as antiaging cream. Its evaluation test done. Curcumin is also a powerful inhibitor of the proliferation of several tumor cells, as well as an anti-inflammatory agent. It exhibits anti-carcinogenic, anti-fungal and anti-viral properties. Results: The pH of the cream base was found to be in range of 6.2-6.9 which is good for skin pH. The viscosity of was cream was in the range of 27021-27053 cps which indicates spreadibilty of cream. Acid value 5.7, saponification value 25.7. Dye test, Homogeneity, Appearance, After feel Emolliency, skin irritant test was determined and found to be satisfactory.***

Keywords : curcumin, phenolics, curcuminoids, spreadibility, skinirritant test

MANUSCRIPT

INTRODUCTION

Curcumin (diferuloyl methane), the natural yellow pigment in turmeric, is isolated from the rhizomes of the plant Curcuma longa. It constitutes about 3-4% of the composition of turmeric [1] . The turmeric spice has been used for many centuries mainly as a food additive, primarily because of its golden yellow color. The medicinal properties of this spice were recognized in Indian folklore medicine and in Ayurveda, which is an ancient Indian traditional system of medicine. It was used as a tonic for improving health and in various combinations for the treatment of diseases such as common cold. The major break through in realizing the medicinal value of turmeric came with the isolation of phenolics called "curcuminoids" , of which curcumin is the major constituent. Turmeric is used in ancient Hindu medicine as a treatment for sprains and swelling. While the therapeutic use of this treasured spice has been commonplace throughout history, emerging medical research has begun to elucidate curcumin's beneficial effects for a range of diseases and conditions. Much of the recent science has focused on its effects against cancer, both therapeutically and prophylactically. Curcumin's potential apparently stems from its ability to suppress the proliferation of a wide variety of tumor cells and to inhibit harmful molecules and enzymes, as well as its antioxidant and antiinflammatory properties. Some studies have even suggested that curcumin can inhibit cancer metastasis. In research studies, curcumin has shown potential activity against cataract formation, liver injury and the resultant damage from heart attack and stroke. More important, curcumin's antiinflammatory effects and apparent effectiveness in keeping Alzheimer's disease at bay are attracting the notice of more and more medical researchers. [2]



Structure of curcumin

Antiaging cream and its effect :

Many anti-aging creams, function in four ways to help the slow skin aging process. It is a very potent antioxidant and it helps maintain the health of the mitochondria, which is the powerhouse of the cell. When this cell is compromised, it cannot perform youthful repair functions. Also, it helps turn off an inflammatory messenger known as nuclear factor kappa B that can do much damage to the skin. Alpha-lipoic acid activates a collagen-regulating factor known as AP-1 that turns on enzymes that digest damaged collagen. Aged skin occurs when the slowdown in production of youthful new cells fail to replace the accumulation of damaged aged cells. Vitamin A stimulates skin cell renewal by increasing the rate of mitotic cell division. Anti-aging creams, make sure it has four important ingredients, such as alpha-lipoic acid, glycolic acid, retinoic acid and Vitamin A. Whether these products work or not, it wouldn't hurt to try. [3]

Since ageing cannot be avoided, one can always opt for healthy ageing. Turmeric is a spice used in Asian cooking that is famous in Ayurveda and Chinese medicine as an anti-ageing and healing herb.Turmeric possesses various biological properties that can aid in dealing with signs of ageing. The herb belongs to the ginger family and has a vibrant yellow color with a slightly hot bitter taste. Curcuminoids are a class of compounds that are isolated from turmeric powder. They serve as coloring agents and as strong antioxidants. Curcumin belongs to this group and it is one of the most potent therapeutic agents belonging to turmeric. The volatile oil fraction of turmeric also possesses healing properties and contributes to the aroma of the spice. Turmeric's anti-inflammatory, antioxidant, anti-microbial, anti-cancer and other pharmacological properties makes it all rounder when it comes to therapeutic foods. Wrinkles, sagging skin, age spots and hyper pigmentation is seen. Wrinkles and sagging of skin occur generally due to loss of collagen (a structural protein that maintains a firm tissue), loss of fat tissue and gravitational force acting on the skin.

Appearance of signs of ageing on skin is due to a number of factors: extrinsic and intrinsic. Extrinsic factors include smoking, air pollution, sun exposure, alcohol consumption and poor nutrition. Intrinsic factors are genetic background, declining hormonal activity and modification in growth factors. The most common solution recommended by all dermatologists is eating a diet rich in antioxidants. Curcuminoids present in turmeric are strong antioxidants. Curcumin has antioxidant activity comparable to that of Vitamin C and E.

It is known to treat conditions of oxidative stress (imbalance between prooxidants and antioxidants). It raises the level of antioxidant enzymes, scavenges free radicals that cause oxidative stress and inhibit lipid peroxidation (oxidation of fats present in cell membrane leading to cell death). So including turmeric in your diet can prove to be helpful in terms of supplementing your antioxidant intake.

Curcumin has been successful in stimulating antioxidant defences in human dermal fibroblasts. Low doses of curcumin increase the production of antioxidant enzymes. However when senescent cells were treated with curcumin, curcumin's ability to stimulate increase in antioxidant enzyme levels was impaired.

These cellular responses indicate that curcumin at low levels only can support antioxidant defences which can be useful in developing an anti-ageing intervention.

A study conducted in India demonstrates the inhibitory effect of curcumin on UV induced skin damage. The study was a comparison between encapsulated curcumin at different doses, a famous marketed formulation and free curcumin dispersed in ointment base.

Mice were exposed to UV radiation for 5 seconds 5 times a week for 6 weeks and after every exposure they were treated with different curcumin formulations. 5 and 10 micromole dose of encapsulated curcumin and the marketed formulation showed sufficient strength in controlling lesion formation and restoring redox balance whereas free curcumin did not bring about these effects. Results proved that topically delivered curcumin can control photoaging. [4]

The discovery of the antioxidant properties of curcumin explains many of its wide ranging pharmacological activities. Curcumin is an effective antioxidant and scavenges superoxide radicals, hydrogen peroxide, and nitric oxide from activated macrophages. It inhibits the inducible nitric oxide synthase activity in macrophages. Human keratinocytes are protected from Xanthinexanthine oxidase injury by virtue of the antioxidant property of curcumin. Oral administration of 30mg/kg body weight of curcumin in rats for 10 days reduces the ironinduced hepatic damage by lowering lipid peroxidation. Protection from radiation by dietary curcumin administered to mice is also attributed to the antioxidant property of curcumin. Curcumin protects renal cells and neural glial cells from oxidative stress. [5,6,7,8,9]

EXTRACTION OF CURCUMIN :

Turmeric rhizomes were powdered and sieved through 30 mesh size sieve to obtain sample of uniform particle size. The resulting powder was extracted with acetone using cold percolation process in which the solvent uniformly seeps through the particle bed (sample powder), allowing the efficient diffusion of the soluble from the powder into the solvent after the contact time of 90 min. the solvent ratio was 5 volumes calculated on the dry weight of powdered turmeric rhizome. The extraction procedure was repeated for 7 times and the individual extracts combined before concentrating. The extracts were filtered and concentrated by distillation under vacuum at temperature less than50°C to produce turmeric oleioresin. A detailed study was carried out for isolation of curcuminoids from turmeric oleioresin extracted as above. In 100ml beaker 20 g turmeric oleioresin and 20g solvent were added, mixed well and kept aside for 48 hrs at room temperature for curcumioids precipitation. The precipitated curcuminoid crystals were purified by washing several times with the solvent.

Drug Formulation

The emulsifier (stearic acid) and other oil soluble components (Cetyl alcohol, almond oil) were dissolvedin the oil phase (Part A) and heated to 75° C. The preservatives and other water soluble components (Methyl paraban, Propylene glycol,curcumin) were dissolved in the aqueous phase (Part B) and heated to 75° After heating, the aqueous phase was added in portions to the oil phase with continuous stirring until cooling of emulsifier took place.

ingredients	**formulations % w/w**
Stearic acid	13
Cetyl alcohol	2
Almond oil	4
Glycerol	3
Methyl paraben	0.02
Curcumin	1
Water	qs

Evaluation of Cream[10]

pH of the Cream

The pH meter was calibrated using standard buffersolution. About 0.5g of the cream was weighed and dissolved in 50.0 ml of distilled water and its pH was measured.

Viscosity
Viscosity of the formulation was determined by Brookfield Viscometer at 100 rpm, using spindle no 7.
Dye test
The scarlet red dye is mixed with the cream. Place a drop of the cream on a microscopic slide covers it with a cover slip and examines it under a microscope. If the disperse globules appear red the ground colourless. The cream is o/w type. The reverse condition occurs in w/o type cream i.e. the disperse globules appear colourless in the red ground.
Homogeneity
The formulations were tested for the homogeneity by visual appearance and by touch.
Appearance
The appearance of the cream was judged by its color, pearlscence and roughness and graded.
After feel
Emolliency, slipperiness and amount of residue left afterthe application of fixed amount of cream was checked.
Type of smear
After application of cream, the type of film or smear formed on the skin were checked.
Removal
The ease of removal of the cream applied was examined by washing the applied part with tap water.
Acid value
Take 10 gm of substance dissolved in accurately weighed, in 50 ml mixture of equal volume of alcohol and solvent ether, the flask was connected to reflux condenser and slowly heated, until sample was dissolved completely, to this 1 ml of phenolphthalein added and titrated with 0.1N NaOH, until faintly pink color appears after shaking for 30 seconds.
Acid value = n*5.61/w
n - number of ml of NaOH required, w - weigh of substance.
Saponification value
Introduce about 2 gm of substance refluxed with 25 ml of 0.5 N alcoholic KOH for 30 minutes, to this 1 ml of phenolphthalein added and titrated immediately, with 0.5 N HCL.
Saponification value = (b-a)*28.05/w
a - volume in ml of titrant, b - volume in ml of titrant, w -weigh of substance in gm.
Skin irritation test:
The skin irritation test was carried out by using Human as animal model. The study protocol was approved from Institutional Animal Ethical Committee of Jeypore College of Pharmacy. The prepared curcumin Antiaging facial cream was applied over skin. In interval of 10 min, any reactions likeitching, inflammation, redness etc. were not observed.

RESULT

The pH of the cream base was found to be in range of B6.2-6.9 which is good for skin pH. The viscosity of was cream was in the range of 27021-27053 cps which indicates spreadibilty of cream. Acid value 5.9, saponification value 25.7. Irritancy test was conducted in this project work. Dye test This dye confirms that formulation is o/w type emulsion cream. Homogeneity: formulation of base produce uniform distribution in cream. This was confirmed by visual appearance and by touch. Appearance When formulation kept for long time, it found that no change in colour of cream base After feel Emolliency, slipperiness and amount of residue left after the application of fixed amount of cream base was found Type of smear After application of cream base, the type of smear formed on the skin were non greasy Removal The cream applied on skin was easily removed by washing with TAP WATER and result found to be satisfactory.The skin irritation study exhibited that no such sign of irritation, itching, redness and inflammation was found over lip over extended period of time, which revealed that the curcumin antiaging facial cream formulation was safe and compatible to skin.

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[10] EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH PREPARATION AND EVALUATION OF CAFFEINATED FAIRNESS CREAM
Simanchal Panda* and Dr. Sruti Ranjan Mishra1*,1Department of Pharmaceutical Technology, Jeypore College of Pharmacy, Jeypore (K), Odisha. 03/2018