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PREPARATION AND EVALUATION OF BCD COMPLEXED 1, 3, 7-TRIMETHYLPURINE-2, 6-DIONE, CURCUMIN ANTIOXIDANT 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. Caffeine is an xantheine derivative mild CNS activity largly found in Cofee Cafea Arabica, tea Thea sinsensis, which is the largest consumed drink after water in the world. Here the research work is an attempt to mask the taste of bitter tasted caffeine which is an anti psychotic drug and analgesic with antihypertensive and diuretic drug. In this innovative work betacyclodextrine was taken in different molecular weight ratio with caffeine in respective parameter. Pure drug was dissolute in distilled water and compared with physical mixture, kneading mixture. The solvent taken for the drug and betacyclodextrin complexation with comparison to phase solubility study with different solvent. After solvent optimization, temperature was optimized. The dissolution study was carried out and compared. The taste masking property was analyzed by scientific committee / ethical committee. Human volunteer was tasted the pure drug which was bitter in taste. After taste masking by beta cyclodextrine complexation, it was reported by volunteer to be masked bitter taste. The caffeine was extracted by the following method. First the leaves of coffee and fruit pulp, seeds were collected from Cofee board, Koraput, Odisha, which was confirmed by Swaminathan Research centre, Jeypore, as Cofea Arabica plant. It was percolated in Faculty of Pharmacy, Kalinga University lab. Hot water overnights and filtered. The collected sample was placed in separated funnel and added chloroform. After swirling it was stood for time till two phases separated and the chloroform was collected and evaporated till caffeine was found in crystal form. The complexed drug was found to have different improved physical characteristics like bulk density, tapped density, carrs' index, angle of repose. XRD report shown the complexed drug to have more stabilized than pure drug. As the complex shows fuse peaks at low intensities indicating more stable and soluble, compare to the pure drug having intensed peaks showng crystalline nature which indicates its non soluble nature. Micromeritics study of pure drug. The complexed caffeine and curcumin formulated in cream and parameters were evaluated.

KEYWORDS: BCD, 1, 3, 7-Trimethylpurine-2, 6-Dione, Curcumin, XRD, facial cream.

Manuscript

Extraction of Caffeine from Tea/ coffee leaves Principle Extraction is a method used for the separation of organic compound from a mixture of compound. This technique selectively dissolves one or more compounds into an appropriate solvent. The solution of these dissolved

compounds is referred to as the extract. In the case of Caffeine extraction from tea powder, the solubility of caffeine in water is 22mg/ml at 25°C, 180mg/ml at 80°C, and 670mg/ml at 100°C. Here the organic solvent Chloroform is used to extract caffeine from aqueous extract of tea powder because caffeine is more soluble in chloroform (140mg/ml) than it is in water (22mg/ml). The chloroform - caffeine mixture can then be separated on the basis of the different densities of chloroform and water because chloroform is much denser than water and insoluble in it. Residual water is separated from chloroform by drain out the chloroform through separating funnel, thus chloroform passed through the funnel while polar solvents such as water is still remains in the funnel. Water and chloroform is slightly soluble in each other. So, after separating the solvents, residual water will remain the organic layer. Mainly anhydrous sodium sulfite is used for the removal of water from organic layer. Anhydrous sodium sulfite is an insoluble inorganic solid which will absorb water, thus drying it. OBJECTIVE CAFFEINE has poor flow properties. Cyclodextrine plays an important role in formulation development due to its effect on solubility, dissolution rate and absorption of drug. So, the soubity of CAFFEINE is significanty enhanced by forming compex with β-cyclodextrin (BCD).

Experimental Method

Micromeritics study of pure drug (CAFFEINE) measured by tapped density, bulk density, ang e of repose, carr's index, hausner's ratio which found to be 0.1742, 0.2632, 33.82%, 1.52, 33.52 respectively. After complexation it optimized to 0.294, 0.384, 23.43%, 30.064°, 1.306 of above parameters respective y. he ca ibration curve of CAFFEINE with 0.1N HCL and distilled waters with enhanced ratio calibrated a straight line with regression value of 0.999 at 242 nm. Solubility study with solvents distilled water and 0.1N HCl found as 15.78, 84.29mg/100mL respectively. Dissolution of pure drug was found to 20.18%DR after 30min. Complexation made by physical mixture (PM) and kneading method (KM). Phase solubility study shown 5.76,6.24,6.88,7.74, 7.06, 5.54 mg/100ml with molar concentration of BCD 0.5,1,1.5,2.0,2.5,3 respectively. Which was optimized at 1:2. In PM and KM % drug content found 83.82 and 85.62 respective y. he kneading method was optimized by a steering sol vents at various temperature which shown 15m ethanol at 45 was the maximum. The complexation was confirmed by XRD and dissolution carried out at IMMT, BBSR. The fuse peak confirmed the complexation. The optimized dissolution rate found to be 86.43% compared to pure CAFFEINE of 20.18 at 30min.

Antiaging cream and its effect

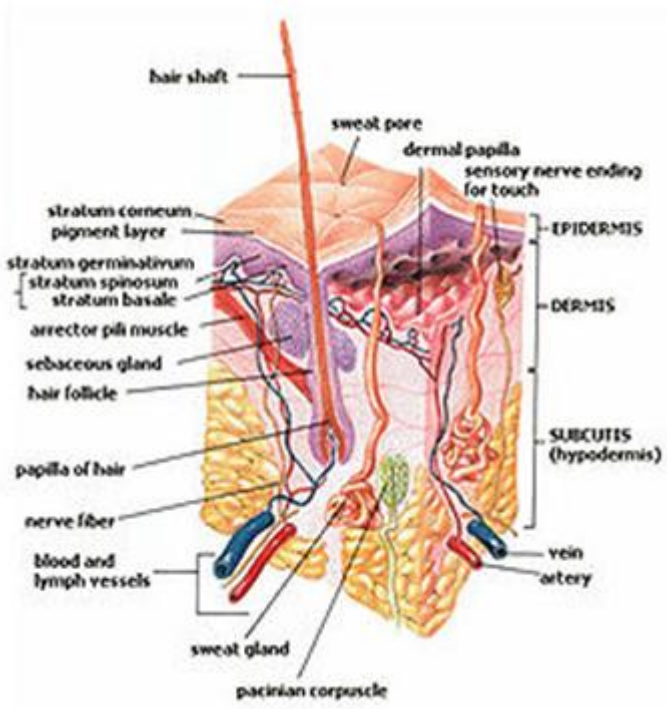
Many anti-aging creams, function in four ways to help the slow skin aging process. It is a very potent antioxidant and it helps maintain the health of the mitochondria, which is the powerhouse of the cell. When this cell is compromised, it cannot perform youthful repair functions. Also, it helps turn 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.

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, bcd complexed 1, 3, 7-trimethylpurine-2, 6-dione,) 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
Caffeine	1
Water	qs



Structure of skin

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 BCD complexed 1, 3, 7-trimethylpurine-2, 6-dione antiaging facial cream formulation was safe and compatible to skin.

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