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FORMULATION AND EVALUATION OF DRAGON FRUIT FACIAL CREAM

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ABSTRACT
Hylocereuspolyrhizus and Hylocereusundatus are two varieties of the commonly called dragon fruits, belongs to the Cactaceae family. Dragon fruit contains several types of antioxidants (Betalains, Hydroxycinnamates, Flavonoids) which protect cells from unstable molecules called free radicals, which are linked to chronic disease risk and aging. Dragon fruit is also rich in phyto albumins and vitamin C which are highly valued for their antioxidant properties so make your skin tighter, more flexible and bless you with a beautiful healthy glow. Regular use of this prepared dragon fruit Cream on the face can help in slowing down the process of ageing. It is also used in treating acne and sunburn. Also known as Pitaya, each dragon fruit contains approximately 60 calories. Dragon fruits are rich in vitamins including vitamin C, B1, B2 and B3. They are also rich in minerals including calcium, iron, magnesium and phosphorus. They are also a good source of fibre, protein and omega essential fatty acids.

KEYWORDS: Facial Cream, Dragon Fruit, Evolution Parameters.

INTRODUCTION
Topical drug administration is a localized drug delivery system anywhere in the body through vaginal, ophthalmic, rectal and skin as topical routes. A dermatological delivery system is one that is applied to skin by inuction spraying or dusting. The topical or dermatological preparation are applied to the skin for their physical effects i.e. for their ability to act as skin protestants, cosmetics, lubricant, rubifaciant, counterirritant, astringent, cleansing agent, keratolytics and depilatory agents, altering pigmentation, sclerosing agents etc. A large number of agents have been incorporated into the topical drug delivery system for their therapeutic effectiveness for local or systemic use that includes anesthetic, anti-inflammatory, corticosteroids, antibacterials, antifungal, scabicides, enemas, anti leprotics and sunscreen agents.

Classification of Topical medications
- ✓ Topical solution
- ✓ Lotion
- ✓ Shake lotion
- ✓ Cream
- ✓ Ointment
- ✓ Gel[1]

Creams are semisolid dosage forms containing one or more drug substances dissolved or dispersed in a suitable base. This term has conventionally been applied to semisolids that possess a relatively fluid consistency formulated as either water-in-oil (e.g., Cold Cream) or oil-in-water (e.g., Fluocinolone Acetonide Cream) emulsions. However, more recently the term has been limited to products consisting of oil-in-water emulsions or aqueous microcrystalline dispersions of long-chain fatty acids or alcohols that are water washable and more cosmetically and aesthetically acceptable.[2] A good cream should have the stable, good appearance, melt or soften on application to the skin, spread easily without too much drug, not feel greasy or oil, a light emollient film should remain on the skin after use of the cream and penetrate the skin easily.[3]

Advantage[4]
- Avoidance of first pass metabolism
- Convenient and easy to apply.
- Avoid of possibility.
- Inconveniences of intravenous therapy and of the varied conditions of absorption. Like pH changes presence of enzymes gastric emptying time etc.
- Reaching of efficacy with lower total daily dosage of drug by continuous drug input.
- Avoid fluctuation of drug levels inter and intra patent variations.

Disadvantage[5]
- Skin irritation of contact dermatitis may occur due to the drug and /excipients
- Poor permability of some drugs through the skin.

- Risk of the allergic reaction.
- Can be used only for drugs which require very small plasma conc. action.
- Enzyme in epidermis may denature the drugs.
- Drugs of larger partical size not easy to adsorb through the skin.

Herbal Cosmetics[6]

The concept of beauty and cosmetics dates back to ancient mankind and civilization. Generally herbal cosmetics are also referred to as natural cosmetics. Herbal cosmetics are formulated, using different cosmetic ingredients to form the base in which one or more herbal ingredients are used to cure various skin ailments. Plants are highly used for development new drug products for cosmeceuticals and pharmaceutical application. Herbal cosmetics are the products in which herbs are used in crude or extract form. Herbal Cosmetics, referred as Products, are formulated, using various permissible cosmetic ingredients to form the base in which one or more herbal ingredients are used to provide defined cosmetic benefits only, be called as "Herbal Cosmetics". Herbs do not produce instant cures. They offer a way to put the body in proper tune with nature. A huge number of cosmetic and toiletry formulations have been designed and developed based upon Indian Herbs recently.

Other than traditionally documented applications, some modern trials have also been using the utility of Indian herbs in Personal Care products. The demand of herbal medicines is increasing rapidly due to their skin friendliness and lack of side effects. The best thing of the herbal cosmetics is that it is purely made by the herbs and shrubs and thus is side-effects free.

The natural content in the herbs does not have any side effects on the human body; instead provide the body with nutrients and other useful mineral. The term Cosmeceuticals was first used by Raymond Reed founding member of U.S Society of Cosmetics Chemist in 1961. He actually used the word to brief the active and science based cosmetics. The above term was further used by Dr. Albert Kligman in the year 1984 to refer the substances that have both cosmetic and therapeutic benefits. Cosmeceuticals are cosmetic-pharmaceutical hybrids intended to enhance health and beauty through ingredients that influence the skin's biological texture and function. The word cosmetic was derived from the Greek word "kosmtikos" meaning having the power, arrange, skill in decorating. The origin of cosmetics forms a continuous narrative throughout the history of man as they developed. The man in prehistoric times 3000 BC used colours for decoration to attract the animals that he wished to hunt and also the man survived attack from the enemy by colouring his skin and adorned his body for protection to provoke fear in an enemy.

Herbal Cosmetic Categories[7,8]

- Cosmetics for enhancing the appearance of facial skin
- Cosmetics for hair growth and care
- Cosmetics for skin care, especially in teenager (acne, pimples and sustaining)
- Shampoos, soaps, powders and perfumery, etc.
- Miscellaneous products

Advantages of Herbal Cosmetics[9]

Herbal cosmetics are the modern trend in the field of beauty and fashion. These agents are gaining popularity as now a day's most women prefer natural products over chemicals for their personal care to enhance their beauty as these products supply the body with nutrients and enhance health and provide satisfaction as these are free from synthetic chemicals and have relatively less side-effects compared to the synthetic cosmetics. The name itself suggests that herbal cosmetics are natural and free from all the harmful synthetic chemicals which otherwise may prove to be toxic to the skin. Instead of traditional synthetic products different plant parts and plant extracts are used in these products, e.g. Aloe Vera gel and Coconut oil. They also consist of natural nutrients like Vitamin E that keeps skin healthy, glowing and beautiful.

Following are some of the advantages of using natural cosmetics which make them a better choice over the synthetic ones:

*** Safe to use**[10]

Compared to other beauty products, natural cosmetics are safe to use. They are hypoallergenic and tested and proven by dermatologists to be safe to use anytime, anywhere. Since they are made of natural ingredients, people don't have to worry about getting skin rashes or experience skin itchiness.

Example - BHA (Butylated Hydrovanisole) and BHT (Butylated Hydroxy toluene) are closely related synthetic antioxidants and are used as preservatives in lipsticks and moisturizers. BHA and BHT can induce allergic reactions in the skin. The international Agency for Research on Cancer classifies BHA as a possible human carcinogen. Herbal cosmetics contain vitamin c.

*** Compatible with skin**[11,12]

Natural cosmetics are suitable for all skin types. No matter if you are dark or fair, you will find natural cosmetics like foundation, eye shadow, and lipstick which are appropriate irrespective of your skin tone. Women with oily or sensitive skin can also use them and never have to worry about degrading their skin condition. Coal tar derived colours are used extensively in cosmetics, Coal tar is recognized as a human carcinogen and the main concern with individual coal tar a colour (whether produced from coal tar or synthetically) is they can cause cancer. But natural colours that are obtained from herbs are safer.

Excipient	Function
Steric acid	Steric acid is a saturated fatty acid, uses as surfactant and softening agent
Cetyl alcohol	Emollient emulsifier, or thickning agent, carrying agent. Surfactant helps after the viscosity and increases the capacity of non aqueous.
Methyl paraben	Anti-fungal and preservative.
Propyl paraben	Anti fungal and anti microbial properties to extend the self beauty and cosmetic product
Glycerin	Lubricant and humitant. glycerin attack water to skin half's skin and help skin to smoother and softer
Triethalonamine	Uses as buffering agent, masking agent fragrance ingredient
Water	_

Choice of selection Natural cosmetics may still be a new type in the beauty industry but they already offer a variety of beauty products for all make up crazy people out there to choose from. One will find a variety of cream, lotion, soap, shampoos, conditioner and many more which are all naturally formulated.

Dragon Fruit[13,14,15]

The dragon fruit also known as pitaya or pitahaya is the fruit of several cactus species indigenous to the Americas."Pitaya" usually refers to fruit of the genus Stenocereus, while "pitahaya" or "dragon fruit" refers to fruit of the genus Hylocereusfamily -Cactaceae. Dragon Fruit come in three types, all with leathery, slightly leafy skin: pitaya or pitahaya is the fruit of several cactus species indigenous to the Americas."Pitaya" usually refers to fruit of the genus Stenocereus, while "pitahaya" or "dragon fruit" refers to fruit of the genus Hylocereus. Dragon Fruit come in three types, all with leathery, slightly leafy skin:

- Hylocereusundatus (Pitayablanca or white-fleshed pitaya) has red-skinned fruit with white flesh. This is the most commonly seen "dragon fruit".
- Hylocereuscostaricensis (Pitayaroja or red-fleshed pitaya, also known as Hylocereuspolyrhizus) has red-skinned fruit with red flesh.
- Hylocereusmegalanthus (Pitayaamarilla or yellow pitaya, also known as Selenicereusmegalanthus) has yellow-skinned fruit with white flesh.

The fruit's texture is sometimes likened to that of the kiwifruit because of its black, crunchy seeds. The flesh, which is eaten raw, is mildly sweet and low in calories. The seeds are eaten together with the flesh, have a nutty taste and are rich in lipids, but they are indigestible unless chewed.

Rich in Vitamin C

Dragon fruit is a good source of vitamin C, meeting 15 percent of the daily value in one small fruit. Vitamin C is a water-soluble vitamin you need to make collagen, the amino acid L-carnitine and neurotransmitters. It also acts as an antioxidant, protecting your cells from oxidative damage by free radicals, which may help lower your risk of heart disease and cancer. Vitamin C has also been shown to regenerate other antioxidants in your body, such as vitamin E.

The Benefits of the Fruit Peel

The peel of the dragon fruit contains vitamins and minerals nutritional value greatly. One of them is that of anthocyanin. This is powerful antioxidants beta-carotene than substance to 10 times also of anthocyanin, peel remains in the blood within the body for 75 hours. The blood is conveyed this message to all over the body, have activity against oxidation, antioxidants, prevent aging, aging.

Therefore, the major byproduct of dragon fruits is the peel. It is known that the peels also contain more or less antioxidant properties due to their color. Pitaya peel constitutes 22% of the whole pitaya fruit, which is presently discarded.

Formulation procedure[16,17,18,19,20]

Procedure for extraction of vitamin C from dragon fruit

Procedure for extraction of vitamin C from dragon fruit peel

Peel Carefully remove Dragon fruit peel and allow drying at 70˚c for 2 hr. the dried peel is then powdered and remove the large particles. Accurately weigh 5gm of powdered peel is transferred in beaker which containing 70% hydro alcoholic mixture and set in water bath for 1 hr. Filter the extract and wash the residue with the same solvent. Allow to cool, concentrate and store in proper container

Procedure for extraction of vitamin C from dragon fruit pulp

Separate the pulp from peel and weighed pulp is transferred in 100 ml of hot water and homogenize for 15 min. separate the seed from pulp by filtration through muslin cloth. The filtrate is stored in proper container.

Formula for Cream

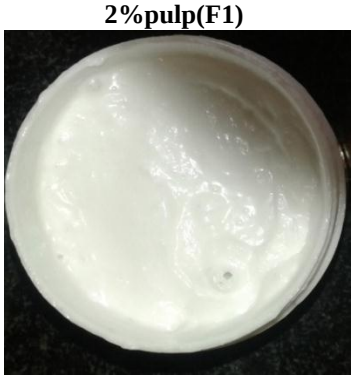
Ingredient	Quantity			
	2% Pulp (F1)	4%Pulp (F2)	6%Pulp (F3)	2%Peel (F4)
1. Stearic Acid	25gm	25gm	25gm	25gm
2. Isoproply Alcohol	4ml	4ml	4ml	4ml
3. Sodium Hydroxide	0.5gm	0.5gm	0.5gm	0.5gm
4. Proply Paraben	1gm	1gm	1gm	1gm
5. Cetyl Alcohol	0.60ml	0.60ml	0.60ml	0.60ml
6. Glycerin	13ml	13ml	13ml	13ml
7. Extract	2%	4%	6%	2%
8. Water	q.s	q.s.	q.s.	q.s.

Melt Stearic acid in china dish on water bath at 70˚c. In a beaker dissolve NaOH and propyl Paraben and liquid paraffin in water, add glycerin to it. Mix the above solution with extract. Heat this aqueous extract solution up to 70˚c on water bath. When both aqueous and oily phase reaches the same temperature (70˚c), add aqueous phase to the melted stearic acid with continuous stirring. Remove the dish from heat and continue the stirring. When the temperature reaches 40˚c, add perfume and mix uniformly until it becomes cool and a homogenous Cream is obtained.

OBSERVATION

2%peel (F4)

2%pulp(F1)



6%pulp (F3)

Evaluation Parameters[21,22,23,24,25]

1] Appearance and Homogeneity

Developed cream was tested for physical appearance and homogeneity by visual observation.

2] Spreadability

The Spread ability of the cream formulation was determined by measuring the spreading diameter of 1g of cream between two horizontal plates (20cm*20cm) after one minute. The standard weight applied on the upper plate was 125g.

3] Skin Irritation Studies

Cream was applied on the human volunteers and treated skin was examined visually for erythema and edema.

4] Content of vitamin c

It is determined by plotting calibration curve of Pure Ascorbic Acid aqueous solution treating with KMnO4 that reduces the color of permanganate. The color intensity is being measure at 530nm in UV/VIS Spectrophotometer.

5] 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 occurs in w/o type Cream i.e. the disperse globules appear color less in the red ground. Globules appear red the ground colorless. The Cream is o/w type i.e. reverse condition.

6] Ease of Removal

The ease of removal of the Cream applied was examined by washing the applied part with tap water.

7] pH

pH of the herbal cream is between 6 to 7.

RESULT

Parameters	**Pulp Extract Cream**			**Peel Extract Cream**
	2%(F1)	**4%(F2)**	**6%(F3)**	**2%(F4)**
1. Homogenicity	Homogeneous	Homogeneous	Homogeneous	Homogeneous
2. pH	7.3	7.2	7.2	7.1
3.Spreadability	Spread Easily At 1min	Spread Easily At 1.5min	Spread Easily At 1min	Spread Easily At 1min 20sec
4. Ease of removal	Easily Remove	Easily Remove	Easily Remove	Easily Remove
5. Skin Irritation	No Irritation	No Irritation	No Irritation	No Irritation
6. Dye Test:	o/w	o/w	o/w	o/w
7. Content of vit.c	82.59µg/ml	84.60µg/ml	86.76µg/ml	99.50µg/ml
8. Appearnce-				
A] Colour	White	White	White	Faint Pink
B] Taste	Tasteless	Tasteless	Tasteless	Tasteless
C] Odour	Charecteristic	Charecteristic	Charecteristic	Charecteristic

CONCLUSION

From the present work it can be concluded that it is possible to develop stable, compatible cream containing herbal fruit extract of dragoan fruits having good antioxidant property. These studies suggest that composition of extracts and cream base of F3 and F4 are more stable and safe, while remaining formulations were not stable and resulted in breakdown of the emulsion when stored for long time. In Between F3 & F4, F4 is more stable than F3 as it shows good results. Hence F4 is final formulation. This formulations had almost constant pH, homogeneous, non-greasy and easily removed after the application, showed a good physical characteristics, Spread ability, Content of vit.c, stability etc. Hence, this study showed that F4 was the best formulation for facial cream.

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