

**DETERMINATION OF SUN PROTECTION FACTOR BY UV –VISIBLE
SPECTROPHOTOMETRY IN CARICA PAPAYA L**

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ABSTRACT

Cosmeceuticals word denotes that it is a combination of cosmetics and pharmaceuticals. Cosmeceuticals are cosmetic products have medical or drug like effect with biologically active ingredients. In the present study, we try to investigate the in vitro sun protection factor (SPF) of Carica Papaya L fruit extract and in a lotion formulation. Sunscreens lotions are the products that provide protection against solar light and in particular UV radiation. Some plant extract having UV ray absorption property and antioxidant activity therefore they are useful for sun protection.

KEYWORDS: Cosmeceuticals, UV Protective, SPF, Carica Papaya L and Lotion.

INTRODUCTION^[5-7]

History of Cosmeceuticals

The Egyptians were first recognizing the health giving properties of cosmetics in 1600 BC. The term was first used by Rayman Reed in 1961. The term further used by Dr. Albert Kligman in late 1970. People have been using

cosmetics since ancient times for beautifying, promoting attractiveness, altering the appearance and care for body, eyes, teeth, hair, face etc. Tus cosmetics are mainly used for two purposes i.e. care of body parts and enhancing personal appeal.

Difference between Cosmetics and Cosmeceuticals.

Cosmetics	Cosmeceuticals
The Food and Drug Cosmetic Act defines cosmetic product by its intended use, cleansing, beatifying, promoting attractiveness or altering appearance. e.g. Shampoo	Cosmeceuticals are the cosmetic products with biologically active ingredients having drug like benefit. E.g. Antidrandruff Shampoo.
They act very superficial level into skin	They penetrate deep into skin
These are least effective	These are more effective

Advantages of Cosmeceuticals

1. Address the root cause
2. Safe for long term use
3. Complementary role
4. Promote beauty through health and wellness of skin

Main Ingredients used in Cosmeceuticals

- a. Fruit/Herb/Vegetable extracts
- b. Spices
- c. Essential Oils
- d. Vitamins Minerals

Recently fresh fruits like apple, cucumber, watermelon are considered as potential sunscreen resources. Sun light contains UV radiation and radiation spectrum of UV is 200 nm - 400nm. UV radiations are of three types as

follows 1) UVA 400-320 2) UVB 320-290 3) UVC 290-200. Amongst these UV A and UVB are mainly responsible for skin hazards such as sunburn, photo toxicity etc.

UVA radiation damages skin cells and DNA being responsible for photo aging and photo carcinogenesis. UVB radiation causes some changes such as pigmentation and sunburn as well as chronic changes such as immune suppression and photo carcinogenesis. To protect the skin from the sun we apply sunscreen products to avoid all the above mentioned damaging effect.

Sunscreen have an individual sun protection factor , value that is defined as the ratio of the minimal

erythema dose on sunscreen protected skin (MEDp) to the minimal erythema dose on unprotected skin (MEDu)

Aim AND Objective

The aim of the study was to find out sun protective activity in ethanolic extract of fresh papaya pulp vs. marketed sunscreen formulation.

MATERIAL AND METHODS

Fruits of papayas were collected for their sun protective activity by utilizing in vitro sun protective determination method. Extracts were prepared by making dilutions in ethanol. The absorbances of all the aliquots were recorded at different nm with 5 nm interval from 290-320 nm. The SPF values were determined according to the method discussed by Mansur.

Sample Preparation^[2-4]

1 gm of sample was weight, transferred to 100 ml volumetric flask diluted to the volume with ethanol followed by ultrasonication for 5 min and the filtered through cotton rejecting the first 10 ml add 5 ml aliquot was transferred to 50 ml volumetric flask and the diluted

with ethanol. The 5 ml aliquot was transferred a 25 ml volumetric flask make a volume with ethanol.

The absorption spectra of samples ion solution were obtained in range 290-320 nm using 1 cm quartz cell and ethanol as blank.

$$\text{SPF} = \text{C.F.} \cdot \text{Ef}(\lambda) \cdot \text{Abs}(\lambda)$$

Where,

CF=Correction Factor

EF = Erythrogenic effect of radiation with wavelength (λ)

Abs = Spectrometric absorbance value of solution

RESULT AND DISCUSSION

The ethanolic extract of Papaya showed sun protection activity. The SPF value of marketed lotion was found to be 1.168 ± 0.007 while SPF value of Papaya extract was found to be 1.014 ± 0.007 .

Data of average SPF values of fresh extract and marketed lotion were compared to each other indicating that extract has significant values with respect to marketed formulation.

Sr.No.	Wavelength λ (nm)	Ef	Abs		SPF	
			Extract	Formulation	Extract	Formulation
1	290	0.0150	0.670	0.863	0.100	0.129
2	295	0.0817	0.677	0.904	0.553	0.738
3	300	0.2874	0.687	0.909	1.974	2.612
4	305	0.3278	0.713	0.709	2.337	2.324
5	310	0.1864	0.807	0.863	1.504	1.608
6	315	0.0839	0.609	0.762	0.510	0.639
7	320	0.0180	0.670	0.706	0.120	0.127
					1.014	1.168

CONCLUSION

From the results I was concluded that ethanolic extract having ability to absorb UV radiations and thus protection ability. The ethanolic extract of Papaya showed sun protection activity. The SPF value of marketed lotion was found to be 1.168 ± 0.007 while SPF value of Papaya extract was found to be 1.014 ± 0.007 . Thus the proposed UV spectrophotometric method is simple, rapid, employs low cost and can be used in Vitro determination of SPF in many cosmetic formulations.

Future trends

- 1) Genomics
- 2) Nanotechnology
- 3) Nutricosmetics
- 4) Plant stem cell Technology
- 5) Active ingredient
- 6) Market Potential

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