ISSN: 0975-8585

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Comparative sun protection factor determination of fresh fruits extract of Cucumber vs marketed cosmetic formulation.

Hogade Maheshwar G*[a], Basawaraj S Patil [a], Dhumal Prashant[b]

[a].RMES's College of Pharmacy, Old Jewargi road, Balaji Nager, Gulbaraga Karnataka, India.
[b].Shivlingeshwar College of Pharmacy, Hasegav, Maharashtra, India.

ABSTRACT

The aim of study was to evaluate the correlation between natural fresh (Cucumber) and marketed cucumber lotion as sun protective agent. The in-vitro Sun Protection Factor of fresh aqueous extract from fruits of *Cucumis sativus* and randomly selected marketed pure cucumber lotion is determined according to spectrophotometric method of Mansur et al. The results indicate that there was no more good correlation between the in-vitro SPFs values.

KEYWORDS: Sun Protection Factor, Photo protection, Erythema, Cucumber Extract.

Corresponding author
Email: maheshhogade@gmail.com

ISSN: 0975-8585

INTRODUCTION

UV radiation comes from sun with radiation spectrum of 200nm -400nm. The distinguished major bands are UVA (400-320 nm)and UVB (320-290 nm) and UVC (290-200 nm). Despite its benefits, the sin may become a terrible enemy of the skin by inducing photoaging and in some cases photo carcinogenesis [1].various studies show the great influence of solar radiation on skin. Between these UV-A and UV-B are mainly responsible for skin hazards such as sunburn, cutaneous degeneration, photosensensitivity, phototoxicity, and ectinic elastisis [2]. It is well documented that ultraviolet (UV) light indices immune suppression and oxidative stress, which play an important role in the induction of skin cancers [3]. Earlier investigation evidenced that ultraviolet (UV) radiation is know to cause distinct mutations in keratinocytes that ultimately contribute to the development of the non-melanoma skin cancers, which include basal cell carcinoma (BCC) and squamous cell carcinoma (SCC). The process, by which these mutations are introduced, begins with the reaction of UV photons with cellular DNA. All these investigation make it necessary to protect the skin from such carcinogenic radiation. Available marketed sunscreen produces protection on the basis of active principles that provide protection through various mechanisms such as reflection or absorption of radiation by them [4]. Studies have been performed on various plant (*Helichrysum, Rrangula, Chamomole, Hamamelis virginiana, Cinnamomum zeylanicum* and *Rosa damascene* etc,).

Total extracts which contains phytoconstituents like flavonoids, tannins, anthraquinones and cinnamate etc. also play valuable role in sun protection, if they are applied directly on the skin [5, 6]. In the series of sun protectants, cucumber plant is widely exploited since long time and found best as traditional used plant. The motivation for evaluation and comparison of effectiveness of cucumber extracts and marketed cucumber formulation.

All available marketed sunscreens with a SPF number filters out the UVB parts of ultraviolet radiation. Labeled “broad-spectrum” will filter out some of the UVA as well as UVB. It is well known for some time that UVB radiation causes skin cancer [7]. But recent evidence suggested that UVA radiation also increases the risk of skin cancer [8], as well as skin wrinkling and ageing [9]. It is felt appropriate to use natural agents, which can protect and treat the ailments of skin and maintain natural immunity of skin. Fresh cucumber extract has many qualities for its use as skin caring product. So many useful ingredients in cucumber it can help you in treating so many skin problems. It has become part of daily beauty product into face packs, facials, juice and many other things which can affect your skin [10].

MATERIAL AND METHOD

In present study, it was planned to evaluate the photoprotective property of cucumber from UVA as well as UVB radiation and compare the marketed formulation (cucumber) and fresh extract of cucumber fruits.

ISSN: 0975-8585

Fruits of cucumber were carefully collected and evaluated for sun protective efficiency by utilizing simple and rapid in-vitro sun protection determination method. Marketed cucumber product was randomly selected and compared with fresh cucumber extracts by making different dilution (100 & 200µg/ml) in ethanol. The absorbances of all aliquots were recorded at different nm with the 5 nm intervals from 250-350 nm. The in-vitro SPF values were determination at wavelength from 290-320 nm according to the method discussed by Mansur et al.

Reagents and samples

Ethanol (Merck®) analytical grade. Commercially available sunscreen emulsions of various manufactures were purchased from local pharmacies. The samples are showed in Table II.

Apparatus

Beckman DU-70 UV/Visible spectrophotometer, equipped with 1 cm quartz cell, computer and printer Epson FX-850.

Methods

Sample preparation

1.0g of all samples was weighed, transferred to a100 mL volumetric flask, diluted to volume with ethanol, followed by ultrasonication for 5 min and then filtered through cotton, rejecting the ten first mL. A 5.0mL aliquot was transferred to 50mL volumetric flask and diluted to volume with ethanol. Then a 5.0mL aliquot was transferred to a 25mL volumetric flask and the volume completed with ethanol.

The absorption spectra of samples in solution were obtained in the range of 290 to 450 nm using 1 cm quartz cell, and ethanol as a blank. The absorption data were obtained in the range of 290 to 320, every 5 nm, and 3 determinations were made at each point, followed by the application of Mansur equation [11,12].

$$\mathrm{SPF} = C.F.\sum_{290}^{320} \mathrm{EE}(\lambda).\mathrm{Abs}.(\lambda)$$

Where, CF=10 (correction factor), EE (λ) = Erythmogenic effect of radiation with wavelength λ and Abs. (λ) = Spectrophotometric absorbance value of a solution

RESULTS AND DISCUSSION

The table 1 showed that cucumber extract has sun protection activity as the concentration of extract increases from 100-200µg/ml. The cucumber extracts have high

protective property as compared to marketed formulation for both UVA and B ranges that was statistically analyzed ($p \leq 0.05$). The SPF value of marketed cucumber lotion was found to be 0.61±0.059 at 200µg/ml concentration while SPF value of cucumber extracts at different concentration i.e. 100 & 200µg/ml were found to be 0.39 ± 0.039 and 0.67 ± 0.54 respectively. Data of average SPF values of fresh cucumber extracts and marketed cucumber lotion were compared to each other at same concentration (200µg/ml) indicating fresh cucumber extract was found to be greater than marketed formulation. The marketed cucumber lotion civers broad ranges of UV absorbance while fresh cucumber extracts absorbs skin erythmal producing UV-B radiation suggesting more potent sun protective as compared to marketed formulation contains cucumber lotion. This might be due to the synthetic composition base ingredients in the marketed cucumber lotion.

Table 1: Determination of SPF value using of Marketed Cucumber lotion and fresh fruit Cucumber extract.

Sl. No.	Wave length	EE Value	CM-200µg/ml	CE1- 200µg/ml	CE2- 100µg/ml
1	290	0.015	0.0700±0.0027	0.102±0.002	0.050±0.001
2	295	0.0817	0.0700±0.002	0.110±0.002	0.049±0.001
3	300	0.2874	0.0583±0.001	0.099±0.003	0.0416±0.003
4	305	0.3278	0.0500±0.002	0.0903±0.0015	0.041±0.001
5	310	0.1864	0.0480±0.002	0.088±0.002	0.033±0.002
6	315	0.0839	0.0476±0.0015	0.075±0.0025	0.0296±0.001
7	320	0.018	0.0496±0.0015	0.0803±0.001	0.034±0.003
Sun Protection Factor			0.61±0.059	0.67±0.54	0.39±0.039

SPF: Sun Protective Factor, EE: Erythemogenic effect, CM: Marketed Cucumber lotion, CE1:Fresh cucumber Extracts (100µg/ml), CE2: Fresh cucumber Extracts (200µg/ml).

CONCLUSIONS

The proposed UV spectrophotometric method is simple, rapid, employs low cost reagents and can be used in the *in vitro* determination of SPF values in many cosmetic formulations. The proposed methodology may be useful as a rapid quality control method. It can be used during the production process, in the analysis of the final product, and can give important information before proceeding to the *in vivo* tests.

ACKNOWLEDGEMENTS

We are thankful to Prof. Hariprassanna R.C, Principal,RMES's College of Pharmacy, Gulbarga for providing the facilities to carry out the research work.

REFERENCES

[1] Grossman D andLeffell D. Arch Dermatol 1997; 133: 1263-1270.

ISSN: 0975-8585

[2] Hawk J. Skin photoaging and the health benefits of cutaneous photoprotaction, In: Coohil, TP, Valdenmar publishing, overland park, Kansas, 2001; 31-32.
[3] Mukhtar H, Elmets C A. Photochem Photobiol 1996; 63: 355-447.
[4] Klingman L H, Alkin F J and Klingman A M. J Am Acad Dermatol 1980; 3: 30-35.
[5] Zi X, Feyes DK and Agarwal R. Clin Cancer Res 1998; 4: 1055-1064.
[6] Proserpio G. Cosmet Toilet 1967; 91: 39-46.
[7] Kricker A, armstring B K and English D R. Cancer Causes Control 1994; 5: 367-392.
[8] Parker S L, Tong T, Bolden S and Wingo P A. Cancer J Clin 1996; 46: 5-27.
[9] Koh H K, Kligler B E and Lew R A. Photochem Photobiol 1990; 51:765-759.
[10] Takabayashi J, Dicke M, Posthumus MA: J Chem Ecol 1994; 20: 1329-1354
[11] Elizangela A, Daniella A,Erika Rosa Maria et, al. Brazilian J Pharm Sci 2004; 40: 381-85
[12] Ashawant MS, Saraf S and Swarnlata S. Indian J Pharm Educ Res 2008; 42:4