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Sun Protection Factor Activity of Unregistered Facial Cream in Makassar City

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Abstract : Sunscreen products are cosmetic preparation used for the purpose of effectively absorb sunlight especially in the area of ultraviolet (UV) wavelength so as preventing the occurrence of skin disorders caused by sunlight. This study aimed to determine the value of the Sun Protection Factor (SPF) on unregistered face cream circulating in Makassar, because of the cream products in circulation in the name of anti-ultraviolet radiation. The sample was selected randomly to represent areas in Makassar. The method used to establish the SPF values refer to Mansur equation. Absorption spectrum of the sample obtained using UV-Vis Spectrophotometer instrument by using 96% ethanol as a blank. Absorption recorded at intervals of 5 nm wavelength of 290-320 nm. Spectrophotometer is used as a method for its ability to emit UV radiation which will then be absorbed by the sample, which can be detected abilities as UV protection The results showed that all three samples had activity of UV protection with SPF values of samples A, B and C respectively 23.92 (medium), 28.75 (medium), 36.28 (high). Concern to the next is what compounds contained in the cream so as to give effect as UV protection.
Keywords : *Sun Protection Factor* (SPF), face cream, sun screen, UV protection.

Introduction

Cosmetic used in body care and health care are included in the category of aesthetics. Many things can be used to maintain health, including the use of soymilk to prevent bone damage [1], and the use of preparations creams to counteract the effects of UV radiation that can result in health human skin and disrupt the appearance of the skin [2].

The sun's rays are electromagnetic waves that is the source of all kinds of rays. Sunlight at Earth's surface consists of several spectrum is infrared light (> 760 nm), visible light (400-760 nm), ultraviolet light (UV) A (315-400 nm), UVB (290-315 nm), and UVC rays (100 to 290 nm) which is very dangerous, has a very high energy and carcinogenic [3].

In connection with the condition that it is currently on the market many types of sunscreen cosmetics such as face cream that uses one or several kinds of active substances absorbing UV rays [2]. The effectiveness of a sunscreen can be shown one of which is the value of the Sun Protection Factor (SPF), which is defined as the amount of UV energy required to achieve a minimum erythema dose (MED) on the skin protected by a sunscreen, divided by the amount of UV energy is required to reach MED on the skin that are not given protection. MED as a period of low or dose of UV radiation required to cause erythema [4-5].

This research method has previously carried out by Mbanga have compared the SPF value of the research results with existing SPF value on the label cream, as well as to determine whether the sample has an

activity as a sunscreen [6]. This is what underlies the need to do research on the determination of the value of Sun Protection Factor (SPF) of unbranded face cream in Makassar.

Experimental

Sample Preparation

Three samples were weighed face cream (samples A, B, C) each 1 g, then put in a 50 mL beaker and diluted with 25 mL ethanol 96%. Ultra sonication of solution for 6 minutes and then filtered. A solution of 10 mL pipette is then inserted into each 25 mL volumetric flask, and then diluted with ethanol 96% and homogenized [6].

Determination of SPF value

Determining the value of SPF is done using the equation Mansur. Absorption spectrum of the sample obtained using UV-Vis Spectrophotometer instrument by using 96% ethanol as a blank. Absorption value recorded at intervals of 5 nm wavelength of 290-320 nm. Uptake value (Abs) obtained multiplied by EE x I for each interval. EE value x I each interval can be seen in Table 1. The results of multiplication uptake by EE x I summed. The sum is multiplied by a correction factor (CF) is a value of 10 to get the SPF value of the samples tested. SPF calculation according to the Mansur method [7] :

$$SPF\ spectrophotometer = CF \times \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times Abs(\lambda)$$

CF = Correction factor
EE = Spectrum effect erythema
EE = Spectrum of the sun's intensity
Abs = Absorbance of the sample

EE x I is a constant. The value of the wavelength of 290-320 nm and any difference of 5 nm was determined by Sayre et al (1979) as shown in the following table [8] :

Table 1. Value of EE x I at wavelength 290-320 nm

Wavelength (λ nm)	EE x I
290	0,0150
295	0,0817
300	0,2874
305	0,3278
310	0,1864
315	0,0839
320	0,0180
Total	**1**

Results and Discussion

The results of research on the determination of Sun Protection Factor (SPF) of unregistered face cream in Makassar using UV-Vis spectrophotometry can be seen in the following table :

Table 2. SPF calculation result of sample A

Sample A			
Wavelength	**Abs**	**EE x I**	**Abs x (EE x I)**
290	3,432	0,0150	0,0515
295	3,466	0,0817	0,2832
300	3,168	0,2874	0,9105
305	2,474	0,3278	0,8110
310	1,388	0,1864	0,2587
315	0,792	0,0839	0,0664
320	0,569	0,0180	0,0102
Total			**2,3915**

SPF = $CF \times \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times Abs(\lambda)$
SPF = 10 x 2,3915
SPF = **23,92**

Table 3. SPF calculation result of sample B

Sample B			
Wavelength	Abs	EE x I	Abs x (EE x I)
290	3,015	0,0150	0,0452
295	3,073	0,0817	0,2511
300	3,037	0,2874	0,8728
305	2,971	0,3278	0,9739
310	2,846	0,1864	0,5305
315	2,143	0,0839	0,1798
320	1,177	0,0180	0,0212
Total			**2,8745**

SPF = $CF \times \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times Abs(\lambda)$
SPF = 10 x 2,8745
SPF = **28,75**

Table 4. SPF calculation result of sample C

Sample C			
Wavelength	**Abs**	**EE x I**	**Abs x (EE x I)**
290	3,713	0,0150	0,0557
295	3,738	0,0817	0,3054
300	3,772	0,2874	1,0841
305	3,557	0,3278	1,1660
310	3,531	0,1864	0,6582
315	3,562	0,0839	0,2989
320	3,311	0,0180	0,0596
Total			**3,6279**

SPF = $CF \times \sum_{290}^{320} EE(\lambda) \times I(\lambda) \times Abs(\lambda)$
SPF = 10 x 3,6279
SPF = **36,28**

Table 5. SPF value of all sample

Sample	SPF value	Category
A	23,92	medium
B	28,75	medium
C	36,28	high

SPF value classification according to the European Commission (EC) Recommendation in Osterwalder and Herzog (2009) are as follows: SPF value 6-10, provide low protection. SPF value of 15-25, provides moderate protection. SPF value of 30-50, giving high protection. 50+ SPF value, provide very high protection. The higher the SPF value desired, required amount of sunscreen active ingredient higher [9]. This study uses a face cream that is not known for certain compositions, while we know that the natural ingredients that can be used as an antidote to UV radiation as well as antiradical, such as soy that can counteract free radicals because of the content of isoflavonoids like genistein [1,10]. The other, we can use purified extract of cocoa beans as a natural ingredients, because the content of total flavonoids [11]. In the future we will try to formulate a face cream made from soy or other natural ingredients, with expectations other than to serve as UV protection as well as free-radical scavengers. Another matter in this research is the need for analysis of chemical components in an unregistered face cream then be related activities as uv protection.

Conclusion

Unregistered face cream samples obtained in Makassar have an ability as UV protection with varying strength, therefore, a cream can be used to keep the skin from sun exposure.

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