International Journal of Pharmaceutical Research and Applications
Volume 8, Issue 3 May-June 2023, pp: 907-911 www.ijprajournal.com ISSN: 2249-7781

Spectrophotometric determination of sun screenpotential of peanut shell.

Sehban Ansari*[1]
[1*]*Department of Pharmacy, School of Health Sciences, Sushant University, Gurugram- 122003, Haryana, India*

Submitted: 05-05-2023 Accepted: 15-05-2023

ABSTRACT
Skin is one of the largest and prominent organs whichcame in to direct contact with the outer environment.Every individual aspires and really want to make their skin healthy, glowing and beautiful. From the ancient time human keeps using different kinds of natural substances to protect the skin from harmful agents of the outer environments. Apart from the other harmful agent's like Ultraviolet radiation has found as most crucial agent to help the skin function and appearance. The radiation emitted by the sun composed of varying wavelengths of ultraviolet radiations UVC (100‑ 280 nm), UVB (290-320 nm) and UVA (320‑ 400 nm).UVC is the most biologically damaging radiation, but it isfiltered and absorbed by ozone layer.1 The radiation reaches at the earth surface basically composed of UVA and UVB, which is majorly responsible for sunburn, malignancies, ageing and other damaging effects and so many other problems on the skin. Various fixed oil, volatile oil, plant extracts plant derived sunscreen agent used in cosmetics that may absorb, reflect, or scatter UV radiations.2 The Efficacy of sunscreen agents can be evaluated through Sun Protection Factor (SPF) the efficacy of a sunscreen is usually expressed by the sun protection factor (SPF), which is defined as the UV energy required to produce a minimal erythemal dose (MED) in protected skin, divided by the UV energy required to produce an MED in unprotected skin.
Key Words: Peanut shell, SPF, UV, Skin

I. INTRODUCTION

Peanut, also known as groundnut, is a legume crop that is widely cultivated from its edible seeds. The scientific name of the peanut plant is Arachis hypogaea. peanuts are grown in many countries, including the United States, China, India, and Nigeria, among others.

Peanuts are an important source of protein and oil, and are used in a variety of food products, including peanut butter, candy, and snack foods. In addition, peanut shells and stems are used as animal feed, and peanut oil is used in cooking and in the production of biodiesel. Peanuts are also valued for their ability to fix nitrogen in the soil, which can benefit other crops in a rotation system.

A peanut shell is the outermost layer or covering of a peanut, which is a legume and not a nut. The peanut shell is typically thin, brittle, and papery, and is usually light brown in colour. It serves to protect the edible part of the peanut, which is the kernel or seed that is commonly consumed roasted or salted. The peanut shell is not typically eaten, but it can be used as animal feed or as a source of fiber for paper and other products. Additionally, some people use peanut shells as a natural mulch for gardening [1-4].

The peanut shell is composed of several components, including:

1. Cellulose: Cellulose is the primary component of the peanut shell, making up about 40-45% of its dry weight. It is a complex carbohydrate that provides structural support to the plant.
2. Hemicellulose: Hemicellulose is another complex carbohydrate that makes up about 20-25% of the peanut shell's dry weight. It is more soluble than cellulose and is involved in binding the plant cell wall components together.
3. Lignin: Lignin is a complex organic polymer that makes up about 20-30% of the peanut shell's dry weight. It provides rigidity and support to the plant, as well as resistance to degradation.
4. Protein: The peanut shell also contains a small amount of protein, making up about 3-4% of its dry weight.
5. Fat: The peanut shell contains a small amount of fat, making up less than 1% of its dry weight.
6. Ash: Ash is the inorganic residue left after the peanut shell has been burned. It typically makes up less than 5% of the shell's dry weight and contains minerals such as calcium, potassium, and phosphorus.

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Many researchers have investigated the use of peanut shells as a carbon source for crop fertilization, as a substrate to remove some impurities ofpolluted water, as a source of oligosaccharides and as a potential antioxidant and antimicrobial [5-6].

II. MATERIAL AND METHODS:

The peanuts has been collected from the local shop. Also Ethanol chemical have been used for the purpose of study & the glasswares used in the study have borosilicate. UV-SIS Spectrophotometer model UV-1800 Shimadzu, Japan has been used for SPF determination [7].

Collection and processing of Sample material.

The fresh Peanuts has been procured from the local area shop in the month of February. All collected shell sample were grind using electric grinder. The fine powdered has been used for extraction with suitable solvents [8].

Extraction of sample material

The alcoholic extract of sample material has been prepared by soxhlet method. 60g of each powdered sample material has been taken extracted with 80% ethanol, the extract has been filtered using whatman filter paper, and the filtrate has been collected.The filtrates were concentrated under reduced pressure and at the temperature 40degree C using rotatory evaporator. The concentrated extracts were placed in the dessicator to remove remaining solvent. The percentage yield of each extract was calculated[9-10].

- **Sample preparation**

The stock solution has been prepared by using 10mg of each plant extract dissolved in 100ml of methanol to get 100 µg/ml of concentration and filtered through Whatman filter paper to get clear solution, three dilution 40µg/ml, 50µg/ml and 60µg/ml were made using stock solution. All the samples were scanned thrice for specified wavelength 400 nm to 800 nm using UV-Visible spectrophotometer (Model UV- 1800 Shimadzu). The base line correction has been made by using solvent used for extraction of sample material, then sample absorption has been measured by using one cm quartz cell where 80% ethanol solution were used as blank. Theabsorption of peanut shell extracts were recorded[11-12].

$$SPF = CF \times 320 \sum 290 \; EE \times I \times Abs$$

CF = correction factor (10),
EE (λ) = erythmogenic effect of radiation with wavelength λ,
Abs (λ) = spectrophotometric absorbance values at wavelength λ.
The values of EE x I (λ) are constants

Wavelength (λ nm)	EE*I(Normalised)
290	0.110
295	0.811
300	0.817
305	0.287
310	0.186
315	0.839
320	0.180

In vitro SPF Determination

The sun protection potential of various herbal extracts have been measured by rapid, reliable in vitro method. The definite concentration 40µg/ml,and 60µg/ml of each sample extract were made from initial stock solution and then each extract was scanned between wavelength 400-800 to at the interval of 5 for three times and average of these values are taken as absorbance of particular concentration of each extract [13-15].

Table 1: In vitro SPF value at concentration 60ug/ml

Sr.no	Wavelength (λ nm)	Extract of shell (conc) 60ug/ml
1	290.00	0.913
2	295.00	0.810
3	300.00	0.998

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4	305.00	0.945
5	310.00	0.864
6	315.00	0.983
7	320.00	0.790
		6.303

[Measurement properties]
- Wavelength Range (NM): 290 -320
- Scan medium: Medium
- Sampling interval : 0.5
- Auto sampling interval: Enabled

Measuring mode: Absorbance

Table 2: In vitro SPF value at concentration 40ug/ml

S.no	Wavelength in (λnm)	Extract of shell (conc) 40ug/ml
1	290.00	0.423
2	295.00	0.995
3	300.00	1.011
4	305.00	0.976
5	310.00	0.899
6	315.00	0.970
7	320.00	0.122
		5.396

[Measurement properties]
- Wavelength Range (NM): 290 -300
- Scan medium: Medium
- Sampling interval : 0.5
- Auto sampling interval: Enabled

Measuring mode: Absorbance

SL.no	Wavelength (λ nm)	EE*I Extract of shell (conc) at 40	extract of shell (conc.) at60	
1	290 0.1100.423		0.913	
2	295	0.811	0.995	0.810
3	300	0.817	1.011	0.998
4	305	0.287	0.976	0.945
5	310	0.186	0.899	0.864
6	315	0.839	0.970	0.983
7	320	0.180	0.122	0.790
SPF Value		5.39	6.30	

Table 3: In vitro SPF value at concentration 40 and 60 ug/ml

III. RESULT AND DISCUSSION

The SPF value of methanolicpeanut shell extract (at 40 and 60 ug/ml) was found outbe 5.39 ±0.003and6.30 ± 0.002 respectively.The methanolic extract offered high SPF value. The highestvalue value of SPF indicated that the methanolic extract ofpeanut shell can be used as potent sunscreen agent.

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IV. CONCLUSION

The result obtained were showed that ability of extracts to absorb UV- radiation and hence proved UV protection ability. This will be abetter, cheaper and safe alternative to harmful chemical sunscreens that used now a day in the industry. Besides its anti-solar activity and effects, making it a useful sun care as well as skin care product.

Acknowledgment

The authors would like to thank Principal Prof (Dr.) Jyoti Sinha and Associate Professor Dr. Vinod Kumar; Dept. of Pharmacy, School of Health Sciences, Sushant University, Gurugram, India for providing necessary research facilities.

Conflict of Interest

The author declared no conflict of interest

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