International Journal of Pharmacy and Pharmaceutical Research (IJPPR)
Volume 31, Issue 4, April 2025 **ijppr.humanjournals.com** ISSN: 2349-7203

Sun Screen Potential of *Murraya koenigii* (L.)

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Received: 2025-4-05 Revised: 2025-4-17 Accepted: 2025-4-25

ABSTRACT

Murraya koenigii (L.) Spreng, colloquially known as meethi neem, kari patta or curry leaves belongs to the Rutaceae. The plant is renowned in various traditional system of medicine for its peculiar aroma and therapeutic significance. The plants prosper well in tropical and subtropical climates *M. koenigii* is significantly used in Indian culinary and complementary system of medicine to mitigate various disorder. UV-radiation perceived as major cause that vitiate the intuitive nature and function of skin. UV-radiation may cause detrimental effect to the usual characteristics of human skin. UV-filters or sunscreens are the agent that could help to assuage the deleterious effect of UV radiation by absorbing and tempering the harmfulness to a major extent. The present study supports the sun protective efficacy of *Murraya koenigii* in concentration dependent manner that could broad cosmeceutical horizon of *Murraya koenigii* (L.).

Keywords: Sun screen, *Murraya koenigii* , UV radiations, SPF

INTRODUCTION

Plants are vital for human existence in the earth. Plants recognized as a preferential source of medicine and used to alleviate, recuperate and treat variety of ailments from ancient times. *Murraya koenigii* (L.) Spreng, colloquially known as meethi neem, kari patta or curry leaves belongs to the Rutaceae. The plant is renowned in various traditional system of medicine for its peculiar aroma and therapeutic significance. The plants prosper well in tropical and subtropical climates *M. koenigii* is significantly used in Indian culinary and complementary system of medicine to mitigate various disorder. Leaves, bark and roots are used in skin eruptions, stimulant, tonic, stomachic, dysentery, diarrhea, anthelmintic, inflammation, analgesic, curing piles, itching, leukoderma, vomiting and blood disorders. The vital constituents of plant are O-phellandrene, P-caryophyllene, P-elemene and P-gurjunene, α-pinene, β-phellandrene, β-caryophyllene carbazole alkaloids, coumarins, acridine, carbazole alkaloids, essential oil, carotenoids, saponins, proteins, steroids, tannins, flavonoids, phenylpropanoids. glycosides, phenolics, nicotinic acid, vitamin C, sesquiterpenes etc. The leaves of plant are green, lanceolate, exstipulate, bipinnately compound with reticulate venation. The plant has been asserted to possess array of therapeutic properties includes anti-oxidant, antimicrobial, antibacterial, immunomodulation, hepatoprotective, antidiabetic, wound healing, antipyretic, cytotoxic, antiulcer, cholesterol lowering, anti-obesity, neuroprotection and antitrichomonal effects. Due to presence of vital corresponding component, sunscreen activity has been chosen for the study. Sun screen agent are compounds which principally used to protect the skin from deleterious UV radiations and oxidative stress. [1-6]

$$SPF = \frac{\text{Minimal erythemal dose in sunscreen protected skin}}{\text{Minimal erythemal dose in non-sunscreen protected skin}}$$

MED is the minimum time interval or dosage of ultraviolet irradiation engender noticeable erythema on protected or unprotected skin. Higher SPF value would be beacon of higher protection against UV radiation. The sample absorbance was recorded at 5 nm interval in the range of 290-320 nm.SPF is determined by spectrophotometer. The SPF value was reckoned by using the formula. [7-14]

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

Where CF is denoting Correction factor (10), EE (λ) indicates erythmogenic effect of bring about by radiation at wavelength (λ) Abs (λ) corresponds to spectrophotometric absorbance values at discrete wavelength (λ). The value of EE(λ)×I(λ) taken as a constant and displayed in Table 1.

MATERIAL AND METHODS-

Analytical grade chemical and glassware of ASGI mark had been used to perform study. The analysis of sample was done in UV-VIS Spectrophotometer model UV-1700 Pharmaspec Shimadzu.

Collection and Processing of Plant material

The leaves of *Murraya koenigii* have been collected in the month of March from Madhav university campus, abu road, Rajasthan, India. The collected plant leaves were thoroughly washed with tap water then shade dried till crumpled. The dried leaves were used to made coarse powder. The powder is shifted to obtain uniform size, The powdered was then subjected to extraction with selected solvents.

Extraction of Plant Material

The hydro alcoholic extract has been prepared by steeping the plant drug in the selected solvent for seven days consecutive with occasional stirring. 200g of powdered plant material was accurately weighed, each 50 g of drug was extracted with 60%,70%,80% and 90% of alcohol respectively, the extract is then filtered thrice through whatman filter, the filtrate was collected, evaporated to dryness. The residual solvent was expunged in desiccator. The yield of individual extract was reckoned and recorded. [8,9]

Sample Preparation

10 mg of plant extract mixed with 100 mL of hydroalcoholic solution to get 100µg/mL. The mixture is then filtered through Whatman filter paper, three dilution 40µg/mL, 50µg/mL and 60µg/mL were made with stock solution, each sample had been scanned thrice for selected wavelength at 5 nm intervals through UV spectrophotometer. The base line correction was made with similar solvent used for extraction. The absorbance of selected dilutions of *Lantana camara* extract was recorded. [8,9]

In vitro SPF Determination

The UV absorption efficacy of *Murraya koenigii* extracts were evaluated by spectrophotometric method. The 40µg/mL, 50µg/mL and 60µg/mL dilutions of disparate extract were made from initial stock solution, the devised dilutions were scanned thrice in the range of 290 nm to 320 nm at 5 nm interval. The mean of absorbance was taken for each discrete concentration, the absorbance values has been multiplied with the constant. the summation of those multiplied with correction factor constant10. [7-14]

Table 1: Product Function Used in Calculation of SPF

Sr. No	Wavelength in nm	EE(λ) X I (normalized)
1	290	0.015
2	295	0.0817
3	300	0.2874
4	305	0.3278
5	310	0.1864
6	315	0.0839
7	320	0.018
Total		1

RESULT AND DISCUSSION

The percentage yield of plant extract with different solvents was found as *Murraya koenigii* 5.8%,6.3%,6.8%,7.1% The result corroborated that 90% hydroalcoholic solvent had more extractable efficiency in terms of maximum yield compared to other extraction solvent used in the study. The spectrophotometric SPF evaluation method could be useful in development of sun protective preparation. It would be the better alternative for preliminary evaluation before going to *In-vivo* study. In this study plant extracts were evaluated by UV-spectrophotometry. The SPF was reckoned by Mansur equation. The observation and outcome revealed that hydro alcoholic extracts of *Murraya koenigii* had potential of sun screen and could be used as favorable sunscreen ingredients in cosmeceutical development. 90% hydroalcoholic extract had shown greater potential compared to other used in the study, although extract of 60% hydroalcoholic had observed as lowest UV screening potential.

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Table no.2- In vitro SPF value at concentration 40µg/mL

Sr. No	Wave length in nm	EE(λ) X I (normalized)	MK 60% (absorbance) 40µg/ml	MK 70% (absorbance) 40µg/ml	MK 80% (absorbance) 40µg/ml	MK 90% (absorbance) 40µg/ml
1	290	0.015	3.1155±0.019	3.9554±0.012	4.7425±0.018	5.8577±0.016
2	295	0.0817	2.8254±0.017	3.5249±0.011	4.4531±0.016	5.6141±0.020
3	300	0.2874	2.6224±0.021	3.2124±0.018	4.1982±0.014	5.2912±0.015
4	305	0.3278	2.2552±0.015	2.9629±0.015	3.8625±0.015	4.9674±0.016
5	310	0.1864	1.7973±0.011	2.5154±0.018	3.5501±0.019	3.7658±0.018
6	315	0.0837	1.5752±0.014	2.1204±0.013	3.2217±0.018	3.5515±0.017
7	320	0.018	1.1106±0.019	1.9565±0.011	2.9859±0.018	3.1480±0.012

Value=Mean± SD, MK- *Murraya koenigii*

Table no.3- In vitro SPF value at concentration 50µg/mL

Sr. No	Wave length in nm	EE(λ)XI (normalized)	MK 60% (absorbance) 50µg/ml	MK 70% (absorbance) 50µg/ml	MK 80% (absorbance) 50µg/ml	MK 90% (absorbance) 50µg/ml
1	290	0.015	3.9684±0.011	4.8911±0.012	5.7582±0.012	6.4471±0.011
2	295	0.0817	3.6274±0.015	4.6954±0.015	5.5528±0.017	6.1934±0.015
3	300	0.2874	3.3081±0.019	4.3514±0.014	5.2625±0.018	5.8187±0.017
4	305	0.3278	3.1224±0.018	4.1952±0.011	4.9162±0.019	5.5264±0.018
5	310	0.1864	2.8117±0.017	3.8181±0.021	4.5014±0.021	5.2781±0.021
6	315	0.0837	2.5442±0.012	3.5859±0.016	4.2512±0.015	4.9254±0.012
7	320	0.018	1.9241±0.014	2.9114±0.019	3.8914±0.012	4.3715±0.015

Value=Mean± SD, MK - ***Murraya koenigii***

Table no.4- In vitro SPF value at concentration 60µg/mL

Sr. No	Wave length in nm	EE(λ)XI (normalized)	MK 60% (absorbance) 60µg/ml	MK 70% (absorbance) 60µg/ml	MK 80% (absorbance) 60µg/ml	MK 90% (absorbance) 60µg/ml
1	290	0.015	4.9361±0.017	5.4194±0.022	6.7451±0.016	7.6935±0.018
2	295	0.0817	4.6224±0.019	5.2584±0.017	6.5074±0.012	7.3812±0.014
3	300	0.2874	4.2101±0.024	4.9552±0.014	6.1403±0.021	7.1511±0.015
4	305	0.3278	3.9581±0.015	4.5621±0.012	5.7741±0.017	6.8204±0.011
5	310	0.1864	3.7538±0.012	4.1851±0.011	5.4714±0.019	6.6851±0.013
6	315	0.0837	3.4714±0.011	3.9887±0.017	4.9887±0.013	6.3175±0.022
7	320	0.018	3.1141±0.015	3.2115±0.011	4.5281±0.015	5.9134±0.019

Value=Mean± SD, MK - ***Murraya koenigii***

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Table no.5- Spectrophotometric values of SPF at different concentration

Sr.No.	Extract	SPF 40µg/ml	SPF 50µg/ml	SPF 60µg/ml
1	**MK** 60%	3.224	4.431	5.722
2	**MK** 70%	4.176	5.924	6.574
3	**MK** 80%	5.561	7.041	8.298
4	**MK** 90%	6.787	7.944	9.843

MK - *Murraya koenigii*

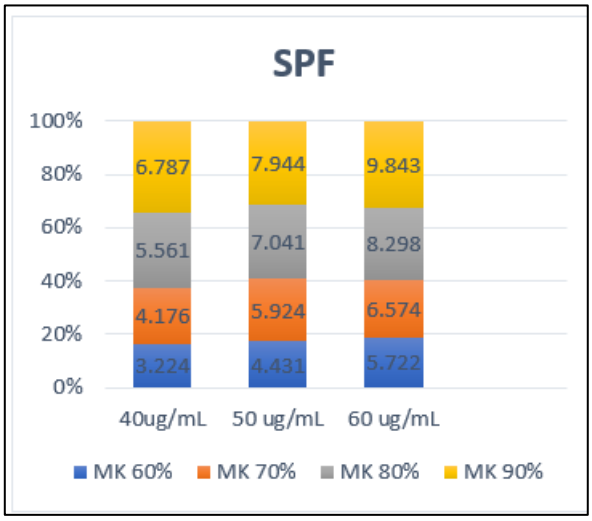

Figure 1-Graphical Presentation of SPF value

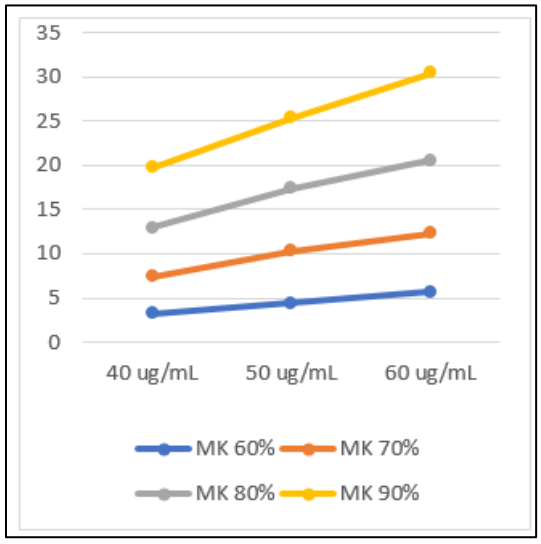

Figure 2 – Line diagram for SPF value

The result substantiates the photo protective efficiency is contingent to concentration of solute, As the ratio of extract increased the SPF has been increased that might be due to more promising solute at higher concentration. The plant selected for the study already had multitudinous medicinal benefits, this additional property would extend therapeutic vein of *Murraya koenigii*.

CONCLUSION

Murraya koenigii prospers well in tropical and subtropical climates. The plant is renowned for its therapeutic significance. The present study unfolds new horizon and scope for investigation of drug. The efficacy of hydroalcoholic extract of leaves made plant more apposite to use as sun screen agent. The nature could redress suffering and ailments of mankind. In the recent years many novel compounds have been successfully discovered from the natural sources and many are there in the vault of nature. Natural therapy is always convivial and biocompatible than synthetic counterparts. *Murraya koenigii* is traditionally acclaimed for its medicinal properties. The study paves the way for further research and investigation in relevant field. The present study unfolded the sun protective efficacy of *Murraya koenigii* in concentration dependent manner that could heighted cosmeceutical horizon of the drug.

REFERENCES

1. Ranyoto YD, Nurrochmad A, Fakhrudin N. *Murraya koenigii* L. Spreng.: An updated review of chemical composition, pharmacological effects, and toxicity studies. J Appl Pharm Sci. 2024;14(06):011–027. http://doi.org/10.7324/JAPS.2024.169254
2. Ayanar Snehal Bhanudas, Thasale Shubham Pramod, Dambe Bhakti Sanjay, Burunkar "A Review on Murraya koenigii (Curry Leaves): A Versatile Multi-Potential Medicinal Plant" International Journal of Science and Research Methodology (IJSRM) 2024; Vol. 27 (9): 1-11.
3. Ajay S, Rahul S, Sumit G, Paras M, Mishra A, Gaurav A. Comprehensive review: Murraya koenigii Linn. Asian J Pharm Life Sci. 2011; 2231:4423.

4. Goel A, Sharma A, Kulshrestha S. A phytopharmacological review on Murraya koenigii: an important medicinal plant. Int J Pharm Sci Rev Res. 2020 May;62(2):113-119.
5. Chauhan B, Dedania J, Mashru RC. Review on Murraya koenigii: versatile role in management of human health. World Journal of Pharmacy and Pharmaceutical Sciences. 2017 Jan 9;6(3):476-493.
6. Igara CE, Omoboyowa DA, Ahuchaogu AA, Orji NU, Ndukwe MK. Phytochemical and nutritional profile of Murraya koenigii (Linn) Spreng leaf. Journal of Pharmacognosy and Phytochemistry. 2016;5(5):07-09
7. Costa SC, Detoni CB, Branco CR, Botura MB, Branco A. In vitro photoprotective effects of *Marcetia taxifolia* ethanolic extract and its potential for sunscreen formulations. Rev Bras Farmacogn. 2015; 25: 413-418
8. Dwivedi AK, Spectrophotometric Evaluation of Sun Screen Potential of *Azadirachta Indica*, Int.J. of Pharm. Sci., 2024, Vol.2, Issue 2, 184-189. doi.org / 10.5281 / zenodo. 10634571
9. Dwivedi AK "Spectrophotometric Determination of Sun Screen Potential of Selected Medicinal Plants" *Int. J. Pharm. Sci. Rev. Res.,* 74(2), May - June 2022; PP: 104-107; DOI: 10.47583/ijpsrr. 2022. v74i02.01
10. Li L, Chong L, Huang T, Ma Y, Li Y, Ding H. Natural products and extracts from plants as natural UV filters for sunscreens: A review. Animal Model Exp Med. 2023 Jun;6(3):183-195. doi: 10.1002/ame2.12295. Epub 2022 Dec 19. PMID: 36536536; PMCID: PMC10272908
11. Dwivedi AK, Spectroscopic Evaluation of Sun Screen Potential of *Hibiscus rosa sinensis,* Journal of Pharmacognosy and Phytochemistry 2024; 13(2): 162-164. doi.org/10.22271/ phyto. 2024. v13.i2b.14896
12. Sutar MP and Chaudhari SR, Screening of in vitro sun protection factor of some medicinal plant extracts by ultraviolet spectroscopy method" Journal of Applied Biology & Biotechnology Vol. 8(6), pp. 48-53,2020; DOI: 10.7324/JABB.2020.80608
13. Mansur JS, Breder MNR, Mansur MCA, Azulay RD. Determinacao Do Fator De Protecao Solar Por Espectrofotometria. an Bras Dermatol Rio De Janeiro 1986; 61:121-4.
14. Poudel B, Gurung A, Subedi HR et al *In Vitro* Sun Protection Factor Determination of Selected Medicinal Plants and Formulation of Sunscreen Cream Sys Rev Pharm 2022; 13(10): 664-671 Vol.13, Issue,10,2022, DOI: 10.31858/0975-8453.

How to cite this article:
Abhinay Kumar Dwivedi Ijppr.Human, 2025; Vol. 31 (4): 319-323.

Conflict of Interest Statement: All authors have nothing else to disclose.