



QUALITATIVE ANALYSIS OF *CHRYSANTHEMUM MORIFOLIUM* AND *AEGLE MARMELLOS* FROM TEMPLE WASTE

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ABSTRACT

Floral temple waste consisted of variety of flowers and leaves, out of them yellow flowers of *Chrysanthemum morifolium* (common name of sewanti) and leaves of *Aegle marmelos* were chosen for the study. This study deals with the phytochemical screening and thin layer separation of both the plant material of temple waste. Result of phytochemical screening showed the presence of various phytoconstituents including alkaloids, glycoloids, phenols, flavanoids saponins and carbohydrates. The maximum percentage yield and bioactive constituents were found in ethanolic extract of the plant material. Qualitative estimation of phenols and flavanoids was confirmed with the help of thin layer chromatography. The result obtained from present study indicated that floral temple waste also contains bioactive compound and which can be used for medicinal purpose and management of temple floral waste can be done.

Keywords: Waste management, *Aegle marmelos*, *Chrysanthemum morifolium*, Phytochemical, TLC.

INTRODUCTION

India is a big country which is known for temples and pilgrimages. Huge amounts of flowers are offered in temples of India which creates a large amount of flower waste, which is a cause for several environmental pollution and health diseases. These materials are environmentally safe¹. In this study temples of Vidisha City (M.P.) selected, there is number of temples are situated, where large quantity of flowers, bel patra are offered to deities. After this offering flowers and other floral part are heaped as waste material in open place². Floral waste consisted of variety of flowers like (marigold, rose, jasmine, sewanti, belpatra, shami patra) etc. we have choosen yellow *Chrysanthemum morifolium* (sewanti) and *Aegle marmelos* (Bel patra) for our study.

Chrysanthemum morifolium is a species of perennial plant belongs to Asteraceae family. *Chrysanthemum morifolium* may be used for treatment of wind-heat type cold, headache and dizziness, red and painful eyes and toxin-induced swelling. The bioactive compound of *Chrysanthemum morifolium* are volatile oils³, flavonoids⁴, chlorogenic acid⁵, polysaccharides⁶, phenols⁷ and trace elements⁸. Flavonoid compounds, triterpenoids and volatile oils are the main active components⁹. *Chrysanthemum morifolium* also have antioxidant activity due to the presence of flavonoids¹⁰.

Aegle marmelos is a native plant of India. *A. marmelos* belongs to Rutaceae family and commonly known as wood apple. In India, *A. marmelos* is grown as a temple garden plant and the leaves are used to pray Lord Shiva. *A. marmelos* is an important medicinal plant with several ethnomedicinal applications in traditional and folk medicinal systems. Traditionally, *A. marmelos* is used in the treatment of diarrhea and dysentery. Leaves of this plant used to cause infertility/abortion in women. Recently, the plant is screened for its medicinal properties by scientific techniques and reported for various medicinal properties¹¹⁻¹².

MATERIAL AND METHODS

Selection and collection

The plant has been selected on the basis of its availability and Folk use of the plant. Flowers of *Chrysanthemum morifolium* and leaves of *Aegle marmelos* were collected from temples of Vidisha City (M.P.) month of April-May, 2016.

Authentication

Botanical identification is necessary because it ensures that safety and efficacy of the natural plant. Flower of *Chrysanthemum morifolium* and leaves of *Aegle marmelos* were collected from temples of Vidisha City (M.P.) in the month of April-May and authentication of *Chrysanthemum morifolium* (specimen voucher no. 461/Bot/Saifia/18) and *Aegle marmelos* (specimen voucher no. 462/Bot/Saifia/18) was done by taxonomist Dr. Zia ul Hasan at department of botany, Saifia Science College, Bhopal (M.P.).

Drying and Storage

Drying of flower and leaves were carried out under the shade. Dried flowers and leaves were preserved in plastic bags and closed tightly and powdered as per the requirements.

Extraction

The correctly identified flower of *Chrysanthemum morifolium* and leaves of *Aegle marmelos* are dried and coarsely powdered.

Plant material was subjected to successive hot continuous extraction with (500 ml) Pet. ether, ethyl acetate, ethanol and water in a Soxhlet apparatus for 24 hours. The extraction procedure was ensured by pouring a few drops of extract from thimble left no residue on evaporation. After complete extraction the

solvent was evaporated and concentrated to dry residue. Percentage yield was calculated for each extract after drying under vacuum.

Determination of Percentage yield

The percentage yield of each extract was calculated by using formula:

$$\text{Percentage yield} = \frac{\text{Weight of extract} \times 100}{\text{Weight of dried powdered taken}}$$

Qualitative Phytochemical Screening

Chemical tests for the screening and identification of bioactive chemical constituents like alkaloids, carbohydrates, glycosides, saponins, flavonoids, and phenol, in extracts of *Chrysanthemum morifolium* and *Aegle marmelos* under study were carried out in extracts by using standard methods¹³⁻¹⁵.

Chromatographic studies

Each solvent extract was subjected to thin layer chromatography (TLC) as per conventional one dimensional ascending method using silica gel plates were cut with ordinary scissors. Glass capillaries were used to spot the sample for TLC applied sample volume 1-micro litre by using capillary at distance of 1 cm at 5 tracks. In the twin trough chamber with different solvent system¹⁶. Different solvent were prepared for the identification of flavonoids and phenols. For the flavonoids the standard required is quercetine and the solvent (mobile phase) combination is toluene:ethyle acetate:formic acid in ratio (5:4:1 v/v/v) in case of phenols gallic acid used as a standard and same mobile phase prepared for phenols identification in different ratio (7:5:1 v/v/v). Mobile Phase was kept for pre-saturation for 20 mins. After the saturation plats get runs and plates are dried. Observe the dried plates in visible light, short UV light and long UV light detect the bands on the TLC plates. The movement of the bioactive compounds was expressed by its retention factor (Rf), values were calculated for different samples.

$$\text{Rf} = \frac{\text{Distance traveled by solutes}}{\text{Distance traveled by solvent}}$$

RESULTS AND DISCUSSION

Percentage yield of different extract

The crude extracts so obtained after the soxhlet extraction process, extract was further concentrated on water bath evaporation the solvents completely to obtain the actual yield of extraction. To obtain the percentage yield of extraction is very important phenomenon in phytochemical extraction to evaluate the standard extraction efficiency for a particular plant, different parts of same plant or different solvents used. The yield of extracts obtained from different samples using different solvent is depicted in the table no. 1.

Phytochemical Testing

A small portion of the dried extracts were subjected to the phytochemical test using standard methods to test for alkaloids, glycosides, tannins, saponins, flavonoids and steroids separately for extracts of all samples. Small amount of each extract is suitably resuspended into the sterile distilled water to make the concentration of 1 mg /ml. The outcomes of the results are discussed separately in the table no. 2-3.

From the results obtained it is clear that the *Chrysanthemum morifolium* flowers and *Aegle marmelos* leaves shows the presence of alkaloids, glycosides, saponins, tannins, flavonoids, amino acid Diterpenes were found present in plant material when extracted with different solvents using soxhlet extraction procedure. The phytochemical analysis of *Chrysanthemum morifolium* and *Aegle marmelos* indicates the presence of phenols and flavonoids present in sufficiently enough quantity according to preliminary phytochemical analysis. Phenolic and Flavonoids are the phytochemicals that are present in ethanolic extract.

Thin layer chromatography

The thin layer chromatography result confirmed the presence of phenol and Flavonoids compounds. The results and observations were summarized in Table 4.

Table No. 1: Result of Percentage Yield of Different Extract

S. No.	Solvents	Percentage Yield (%) of <i>Chrysanthemum morifolium</i>	Percentage Yield (%) of <i>Aegle marmelos</i>
1.	Ethyl acetate	2.1%	2.8%
2.	Ethanol	4.5%	5.1%
3.	Water	3.2%	3.6%

Table No. 2: Result of Phytochemical screening of successive extract of *Chrysanthemum morifolium*

S. No.	Constituents	Ethyl acetate extract	Ethanol extract	Water extract
1.	Alkaloids	-	+	-
2.	Glycosides	-	-	-
3.	Flavonoids	+	+	-
4.	Diterpenes	+	+	-
5.	Phenolics	-	-	-
6.	Amino Acids	-	+	-
7.	Carbohydrate	+	+	+
8.	Proteins	-	+	-
9.	Saponins	-	-	-

Table No. 3: Result of Phytochemical Screening of successive extract of *Aegle marmelos*

S. No.	Constituents	Ethyl acetate extract	Ethanol extract	Water extract
1.	Alkaloids	-	-	-
2.	Glycosides	-	-	+
3.	Flavonoids	-	+	+
4.	Diterpenes	-	-	+
5.	Phenolics	-	-	+
6.	Amino Acids	-	+	-
7.	Carbohydrate	-	-	+
8.	Proteins	-	+	-
9.	Saponins	-	-	+

Table No. 4: Results of thin layer chromatography

S. No.	Compound	Mobile phase	Rf Value
1.	Quercetin	Toluene: Ethyl acetate: Formic acid (5:4:1)	0.85
2.	Gallic acid	Toluene: Ethyl acetate: Formic acid (7:5:1)	0.63

CONCLUSION

The present study has shown the potentiality of temple floral waste for extracting various valuable products. Due to the presence of various compounds like alkaloids, flavonoids, and saponins that are essential for good health, it can also be used to improve the health status of society. The maximum percentage yield and phytoconstituents found in ethanolic extract and can be used for further biological activities. Temple waste utilization would eventually be beneficial to the society as people would get to live in a cleaner and a healthier environment. The “green temple concept” can prove to be helpful in Government policy. The present works confirm the use of such type of waste material for herbal formulation development for safe and effective management of disease.

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