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Lantana camara: Secondary Metabolite Isolation by Analytical Techniques

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ABSTRACT

The Plant *Lantana camara* belongs to the family Verbenaceae, have always been an important source of phytomedicinal agents since ancient times, Until today, it continue to provide modern medicine with novel treatments and to support to identify and isolate compounds from Indian flora with potential biological activity and medicinal value. It has been reported to be used in folk remedies For instance, used for antibacterial, antiulcer, antioxidant, and also treatment for malaria, rheumatisms, asthma, tumors. Many Literature review and phytochemical investigations have been done on this plant, reported to contain various compounds like triterpenoids, proteins, carbohydrates, lactones, furfural, flavonoids, alkaloids, glycosides, tannins, steroids.

The ethanolic extract were subjected for column chromatography for the isolation of secondary metabolites by using stationary phase as silica gel with mesh number of 230-400 and the mobile phase was 20% & 30% ethyl acetate/hexane. The Functional groups, structural analysis of the isolated metabolites identified from IR spectrum resembled functional groups of flavonoid chemical structure, Yellow color is characteristic of flavonoids.

Keywords: *Lantana camara*, secondary metabolites, Column chromatography, TLC, IR spectroscopy.

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INTRODUCTION

The natural plants have a significant use in the finding and production of new pharmaceuticals which are then clinically useful [1]. They can be used as primary materials to produce some drugs of synthetic origin or they can be used to make products, which then assist in making fully synthetic drugs [2].

The main objective of the present study is to investigate and scientifically look to isolate and chemically identify secondary metabolite(s) of potential medicinal value from Indian *L. camara* [3-4].

The IR spectra and Chromatography of the important biological compound isolated from *Lantana camara* plant, It has been reported to be used in folk remedies For instance, used for antibacterial, antiulcer, antioxidant, and also treatment for malaria, rheumatisms [5], asthma, tumors. Many Literature review and phytochemical investigations have been done on this plant, reported to contain various compounds like triterpenoids, proteins [6], carbohydrates, lactones, furfural, flavonoids, alkaloids, glycosides, tannins, steroids [7].

Figure 1: Plant of *Lantana camara*

MATERIALS AND METHODS

Collection of plant material

The plant *Lantana camara* were collected from medicinal garden of Smt. S. S. Patil College of Pharmacy, Chopda.

Authentication: The collected *Lantana camara* plant was authenticated by from Department of Botany, S.S.V.P.S's L. Science College, Dhule (M.S.).

Preparation of Extract

Since literature showed that polar extracts possessed biologic activities of interest, Ethanol was chosen to be used for extraction, At room temperature, the ground leaves were soaked in ethanol for 6 days in which the solvent was collected and replaced with fresh solvent everyday Extract(s) were dried using Rotary Evaporation [8-9].

Isolation and Purification

Column Chromatography

Figure 2: First and Second Columns

- **First column**: stationary phase used was silica gel with mesh number of 230-400 and the mobile phase was 20% ethyl acetate/hexane. Dimensions of the column were 3 cm in diameter and 40 cm in height.
- **Second column**: it was prepared to further purify fractions isolated from the first column. stationary phase used was silica gel with mesh number of 230-400 and the mobile phase was 30% ethyl acetate/hexane. Dimensions of the column were 1.5 cm in diameter and 20 cm in height.

Thin Layer Chromatography (TLC)

- TLC was performed on fractions isolated from first and second columns.
- Anisaldehyde-H2SO4 spray reagent was used for visualization.

Figure 3: TLC plate demonstrating R, F1, and F2

Infra-red (IR) Spectroscopy

Infra-red (IR) Spectroscopy was conducted on one of the purest fraction isolated from the second column.

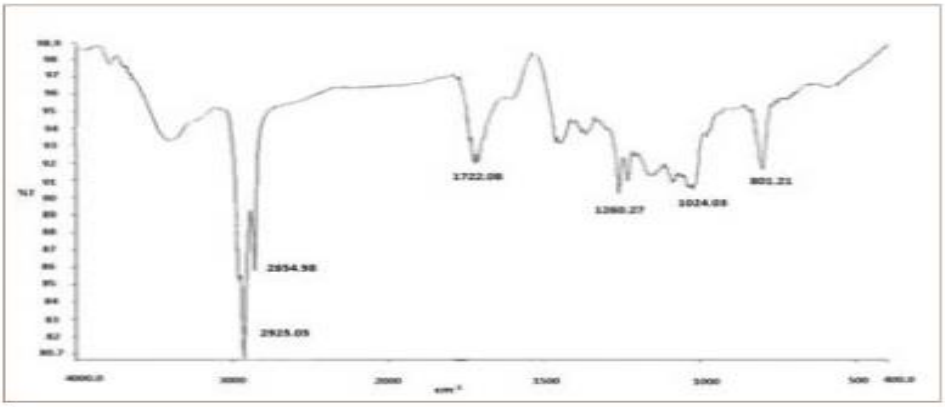
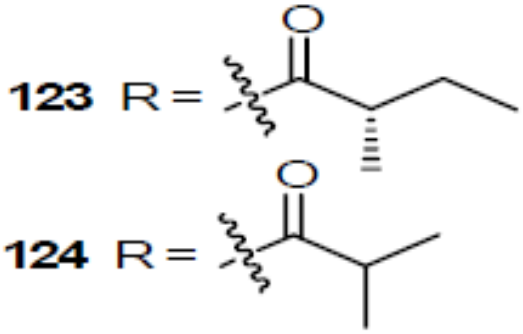


Figure 4. IR Spectrum of F2

Figure 4: IR Spectrum of F2

- O-H stretch at 4300 cm-1
- C-H stretch at 2925 cm-1 and 2854 cm-1
- C=O stretch at 1722 cm-1
- Aromatic C=C stretch at 1475 cm-1
- Aromatic C-H bend at 801 cm-1



Lantadene C (123) isolated from the leaves of the hepatotoxic plant *L. camara* was identical with dihydrolantadene A, reported earlier (John et al., 1983; Sharma et al., 1992). The molecular structure of lantadene C (123) has been deduced from single crystal xray diffraction analysis. It resembles lantadene A in the pentacyclic portion of the molecule but differs in the side chain region. Atom C-34 is cis to C-35 in lantadene C but is trans in lantadene A (55) (Sharma et al., 1992). Sharma et al., (1990) reported another novel triterpene named lantadene D (124) from *L. camara.*

RESULTS AND DISCUSSION

Approximately 145 g of dried powdered leaves yielded 10 g extract (R) as in Figure 3.

Two grams of R were applied on the first column resulted in 150 mg of F1 as in Figure 3. F1 appeared as two spots of the same color which suggested that the new less polar spot was a decomposition product of the more polar one. Therefore, further purification of F1 was conducted using a second column and 2.6 mg of essentially pure fraction (F2) were isolated as in Figure 3. Figure 4 shows IR spectrum of F2 and demonstrates. Based on available literature, F2 was suggested to be a flavonoid given that. Functional groups that were identified from IR spectrum resembled functional groups of flavonoid chemical structure. Yellow color is characteristic of flavonoids.

CONCLUSION

An essentially pure secondary metabolite with potential medicinal value has been isolated. Judging from the color and IR Spectrum, it appears to be a flavonoid. Further investigations are needed for full structure elucidation and determination of biological activity. *L. camara* of india is a rich source of secondary metabolites of potential medicinal value and deserves further investigation.

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CONFLICT OF INTEREST

There is no conflict of interest with this research.

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