

TLC Profiling of Maxicana Poppy Revealed Four New Retardation Factors: Protopine, Anthraquinone, Cardiac Glycosidase and One Unknown R_f Factor

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ABSTRACT

Argemone maxicana commonly called the maxicana poppy, bears yellow flowers and is a medicinal plant over a long period of time. Due to its huge advantages it is under investigation of finding role in number of diseases. Phytochemicals reported from *Argemone maxicana* has gain importance in fighting diseases. Eight reported phytochemicals via different methods is reported earlier. In this study, thin layer chromatography and extraction based on polarity solvent used to obtain more phytochemicals of pharmaceutical importance.

Keywords: *Argemone maxicana*, Retardation factor (R_f), Phytochemicals, TLC, etc.

INTRODUCTION

Argemone maxicana, bearing yellow flower and prickles all over itself, has been traditionally used as medicinal plant over long period of time (Sharma *et al.*, 2018; Vidyasagar *et al.*, 2014). This plant belongs to Order (Papaverales); Family (Papaveraceae); Genus (*Argemone* L.); and species (*Argemone mexicana* L.). Each chunk of plant is used for treatment against numerous diseases. Leaves of maxicana poppy have successfully been used to treat cough and cold, recently developing ulcers, skin disease, and for keep going normal cholesterol and blood circulation (Alam A and Khan AA 2020), (Khan MA and Bhadauria S 2018). The latex of this plant is useful for the treatment of eye infection, conjunctivitis, worm infestation and painful periods in women (Rauta *et al.*, 2013) (Brahmachari *et al.*, 2013). The ethanol extract of seed is reported to be used as antidote for snake poision because of the presence of alkaloids berberine (Miriam *et al.*, 2022) and protopine which decrease the speed of the movement of venom in the body, which is still contradictory. (Bahekar *et al.*, 2012).

Argemone maxicanas how such activities in attendance with phytochemicals like flavonoids, alkaloids, phenols, tannins, cardiac glycosidase, saponin, amino acids and terpenoids. Other phytochemicals of the plant is not yet reported. The phytochemicals individually on in combination can reveal specific roles in antimicrobial properties (Magaji *et al.*, 2019) (Rajvaidhya *et al.*, 2012). So, separation of each phytochemical is vital for further consideration. The current study was accomplished for improving TLC profiling for extraction of more number of components of *Argemone maxicana* than reported till date. It

might have other phytochemicals which may be reported in future in research activity.

Materials and Methods

Sample collection: *Argemone mexicana* was collected from roadside dry soil near Deepatoli, Kathal More road Ranchi, Jharkhand.

Sample cleaning and extraction: Mid-age leaves of *Argemone maxicana* were collected, cleaned with tap water and sterilized with 70% ethanol. Extra water content was removed using tissue paper for further process. The leaves were then chopped into small pieces and crushed with solvent mix (Bunshi Bioscience Pvt Ltd) using sterile mortar pestle. The sample was then transferred to 1.5 ml micro centrifuge tubes liquid extract were dried in desiccator. Weight of dried extract were recorded and quantified

TLC plate preparation and sample spotting: TLC plates were prepared and samples were spotted in triplicates.

TLC running: Spotted samples were transferred to TLC chamber pre incubated with TLC running buffer (Bunshi Bioscience Pvt. Ltd.) for 30 mints. Spotted plate were placed in TLC chamber and allowed to separate components for 1 hr. Separated components were documented and photographed in visible light (Figure 1B) and ultra violet light (Figure 1A).

R_f value calculation: Each spot generated by migration of solvent were measured from the origin and retardation factor (*R_f* value) was calculated by the following formula.

$$R_f \text{ value} = \frac{\text{Distance travelled by the pigment}}{\text{Distance travelled by solvent}}$$

Result

Eleven proper separated spots obtained (Figure 1. (B) Visible light) and *R_f* value obtained (Table 1) compared with previous reports (Table 2). Ten spots were found with *R_f* similar or close to previous reports.

Table 1: Retardation factor (*R_f*) of each appeared fragments in TLC

Serial No	Fragment number	<i>R_f</i> value
1	F1	0.008
2	F2	0.035
3	F3	0.47
4	F4	0.5
5	F5	0.54
6	F6	0.59
7	F7	0.64
8	F8	0.71
9	F9	0.78
10	F10	0.83
11	F11	0.93

Table 2: Analysis between obtained and reported Retardation Factor (R_f) of each fragments with their references.

Sl. No:	Reported R_f value	Result	Phytochemical	References
1.	NA	0.008	NA	NA
2.	0.22	0.35	Protopine	Ahmad <i>et al.</i> , 2020
3.	0.46	0.47	Saponin	Kumar <i>et al.</i> , 2015
4.	0.50	0.50	Amino Acids	Kumar <i>et al.</i> , 2015
5.	0.56	0.54	Alkaloids	Mehta <i>et al.</i> , 2017
6.	0.58	0.59	Anthraquinone	Rogers <i>et al.</i> , 2005
7.	0.64	0.64	Terpenoids	Bhattacharjee <i>et al.</i> , 2010
8.	0.71	0.71	Steroids	Bhattacharjee <i>et al.</i> , 2010
9.	0.79	0.78	Tannins	Mehta <i>et al.</i> , 2017
10.	0.81	0.83	flavonoids	Mehta <i>et al.</i> , 2017
11.	0.99	0.93	Cardiac glycosidase	Dutta <i>et al.</i> , 2018

Discussion:

Current study resembled one new component obtain by TLC solvent (Bunshi Bioscience Pvt Ltd). Ten other components obtained is already reported in previous study (Table 2). In which the listed components are Flavonoids, Tannins having R_f value 0.81 and 0.58 respectively (Mehta *et al.*, 2017), Terpenoids, Steroids with R_f value 0.64 and 0.71 (Bhattacharjee *et al.*, 2010), Alkaloids having R_f value 0.56 (Mehta *et al.*, 2017), Amino acids, Saponin having R_f value 0.50 and 0.46 (Kumar *et al.*, 2015) (Singh *et al.*, 2010), Protopine with R_f value 0.22. Four components of R_f value 0.35, 0.50, 0.93, 0.008 are found, where three were reported protopine, anthraquinone and cardiac glycosidases in other plant (Singh, 2021). Other one seems to be new component reported in current study.

Conclusion:

In *Argemone mexicana* there are numerous of phytochemicals present which play a vital role in treatment of various illness (Verma, 2017). Identification or finding of new components is the priority to improve our knowledge. Our work reporting solvent mix and methods which can release eleven components from *Argemone maxicana* by using simple techniques like TLC. Improvement on such extraction process can be done and required to get exposure of unknown components for understanding the use of components in helping mankind.

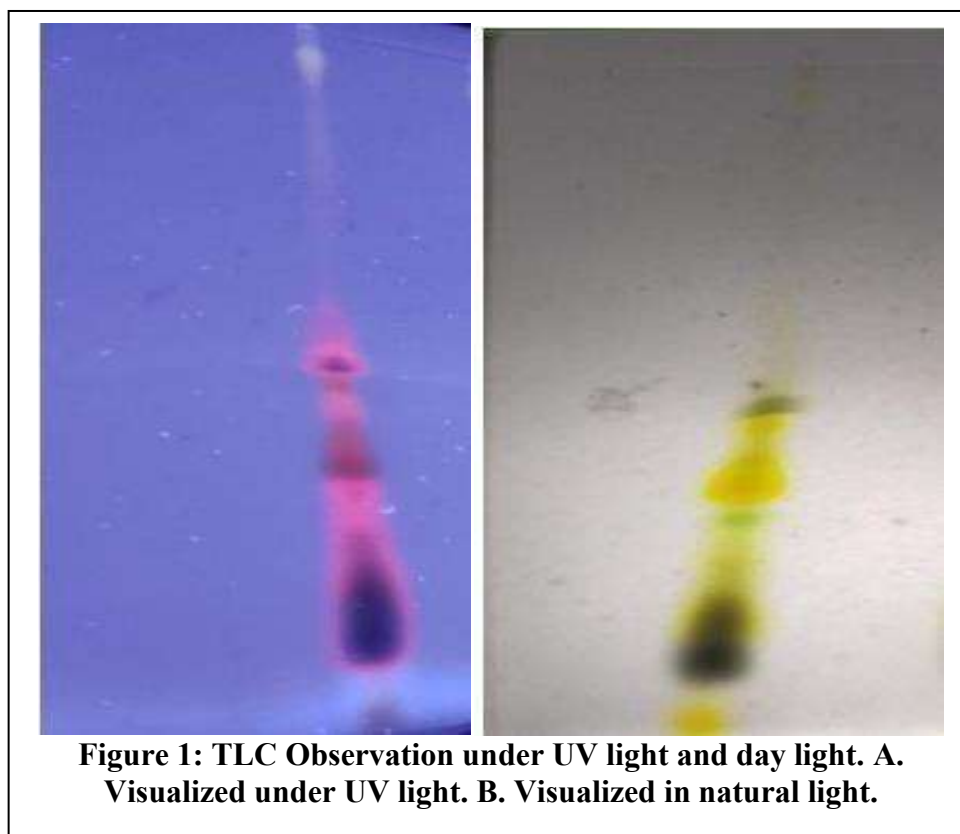


Figure 1: TLC Observation under UV light and day light. A. Visualized under UV light. B. Visualized in natural light.

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