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Research Article

PHYTOCHEMICAL SCREENING OF SECONDARY METABOLITES OF *ARGEMONE MEXICANA* LINN. FLOWERS

NUPUR JOSHI*, SHASHANK BHATT*, DR. SURESH DHYANI*, JYOTI NAIN

Department of Biotechnology Rajiv Gandhi Govt. P.G. College, Mandsaur, Madhya Pradesh, India, 458001, NIMS University, Jaipur, Rajasthan. Rajiv Gandhi Govt. P.G. College, Mandsaur, Madhya Pradesh, India. 458001
Email: shashank_bhatt2003@yahoo.co.in, nupurjoshi2013@gmail.com

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ABSTRACT

Argemone mexicana Linn. belongs to the family of Papaveracea. The flowers were collected and extract prepared from petroleum ether, chloroform, methanol, 95% ethanol and distilled water with cold percolation method. Different types and effective compounds were qualitatively conformed. These metabolites were alkaloids, flavonoids, glycosides, saponins, tannins, phenol, lignin etc. These metabolites show their high effectivity by which they belong to medicinal plant category.

Keywords: Alkaloids, Tannins, Lignin, *Argemone mexicana* Linn.

INTRODUCTION

Plants are the most important parts of all living organisms. They provide different types of products as like fruits, bark, leaves and medicines. Near about 80% plant species compounds are used as medicine [WHO, 1993]. In India, 45,000 plant species are officially recorded and 7500 medicinal plant species growing in its 16 agro-climatic zones under 63.7 million hectares of forest coverage [H. Tag, 2007]. Many secondary metabolites have medicinal functions. According to the Ayurveda, medicinal plant's parts are used in the treatment of various diseases.

According to the medicinal properties, plants can be involved into medicinal plants categories. Medicinal plants have two types of metabolites one of which is primary and another secondary. Primary metabolites are involved in all process directly but secondary metabolites do not involve directly into metabolic processes. It can increase all metabolic and catabolic reaction.

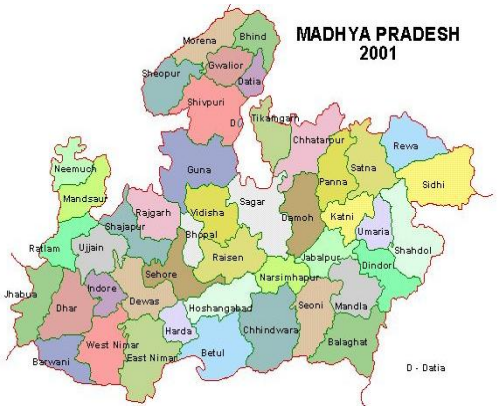
One of the most important plants is *Argemone mexicana* Linn. that grows in the dry field areas. *Argemone mexicana* Linn. is belong to the family of Papaveracea and commonly found on road-sides. It grows throughout the subtropical and tropical regions. Its common name is 'Mexican prickly poppy' and 'Satyanashi'. It is an indigenous herb with yellow juice and yellow flower. Its height varies between 0.3 to 0.12m long. Its leaves are sessile, semi-amplexicaul, sinuately, pinnatified, and spiny on margins. Various parts of this plant have medicinal effect and reported to posses potent emetic, narcotic activities [Krishnamurthy A, 1969].

Argemone mexicana Linn. also shows antihelmintic, anti-inflammatory, wound healing, anti-bacterial and antifungal activities [Bhattacharjee I. *et al.* 2006]. *Argemone mexicana* Linn. is used in the treatment of dropsy and jaundice diseases [Willcox ML *et al.,* 2007]. The root is used in the treatment of chronic skin diseases [Chevallier A., 1996, Chopra. R. N. *et al.* 1986]. The seeds are also useful as demulcent, emetic, expectorant, laxative. It is also used as an antidote in snake poisoning. It is also useful in the treatment of molluscidal and nematocidal activity [Sushma Singh, 1999, S. Sing, 2000], Anti-cancer activity [Chang, Y.-C, 2003], Anti-stress, Anti- HIV activity [Chang *et al.*, 2003].

MATERIAL AND METHODS

Collection of Plant Material

Argemone mexicana Linn. is found all over the world. I had collected the flowers from Mandsaur district, Madhya Pradesh. Mandsaur District forms the northern projection of Madhya Pradesh. It lies between the parallels of latitude 23^0 45' 50" North and 25^0 2' 55" North, and between the meridians of longitude 74^0 42' 30" East and 75^0 50' 20" East.



Preliminary Screening of Secondary Metabolites

The flowers were dried and powdered using mixer grinder, and subjected to cold percolation process for 48 hours, methanol and distilled water. After this process, the extracts were filtered and used for preliminary phytochemical screening such as alkaloids (Iodine, Wagner, and Dragendorff's test), flavonoids (Pew's, Shinoda and NaOH tests), glycosides(Keller-Killani, Conc. H_2SO_4, and Molisch tests), lignin (Labat and Lignin tests), phenols (Ellagic acid and Phenol tests), saponins (Foam and Haemolysis test), sterols (Libermann- Burchard, and Salkowski tests), tannins (Gelatin and Lead acetate tests) were carried out [Shashank Bhatt *et al.,*2011].

Preliminary Screening of Phytochemical Test

Phytochemical Screening

The filtrate obtained was subjected to preliminary phytochemical screening.

Test for Alkaloids

Iodine Test: A few drops of dilute iodine solution were added into 3 ml test solution added. Blue colour appeared; and disappeared on boiling and reappeared on cooling [Khandewal K.R., 2008].

Wagner's Test: Few drops of Wagner's reagent were added into 2 to 3 ml extract. Formation of reddish brown precipitate indicates the presence of alkaloids [Kokate C. K. *et.al;* 2001].

Dragendorff's Tests: Few drops Dragendorff's reagent was added into 2 to 3 ml extract. Formation of orange brown precipitate indicates the presence of alkaloids [Kokate C. K. *et.al;* 2001].

Test for Flavonoids

Pew's Tests: Zinc powder was added into 2-3 ml. extract, followed by drop wise addition of con. HCl. Formation of purple red or cherry colour indicates the presence of flavonoids [Peach K., Tracey MV. 1956].

Shinoda Tests:- 2-3 ml. extract and few fragments of magnesium metal were added into a test tube, followed by dropwise addition of concentrated HCl. Formation of magenta colour indicates the presence of flavonoids [Kokate C. K. *et.al;* 2001].

NaOH Tests: 2-3 ml. of extract and few drops of sodium hydroxide solution were added into a test tube. Formation of intense yellow colour that became colourless on addition of few drops of dilute HCl indicates the presence of flavonoids [Khandewal K.R., 2008].

Test for Glycosides

Keller-Killani Test: Glacial acetic acid was added into 2 ml. extract and one drop 5% $FeCl_3$ and conc. H_2SO_4. Reddish brown color appears at the junction of the two liquid layers and the upper layer of bluish green indicates the presence of glycosides [Kokate C. K. *et al;* 2001].

Glycosides test: 1 ml. water was added into the small amount of extract and shaked well. Then aqueous solution of NaOH was added. The appearance of yellow colour indicates the presence of glycosides [Treare GE, Evans WC. 1985].

Concentrate H_2SO_4 Test: 2ml. glacial acetic acid, one drop of 5% $FeCl_3$ and conc. H_2SO_4 were added into 5ml extract, the appearance of brown ring indicates the presence of glycosides [Khandewal K.R., 2008].

Molisch's Test: 2 drops of Molisch's regent was added into 1 ml of extract, and 2 ml of concentrate H_2SO_4 was added carefully into above solution. Formation of violet ring at the junction indicates the presence of glycosides [Kokate C. K. *et. al;* 2001].

Test for Phenols

Ellagic Acid Test: The test solution was treated with few drops of 5% (w/v) glacial acetic acid and 5% (w/v) $NaNO_2$ solution. The solution turned muddy or niger brown precipitate occurred in the extract. It indicates the presence of phenols solution [Gibbs R.D., 1974].

Phenol Tests: 0.5 ml of $FeCl_3$ (w/v) solution was added into 2 ml of test solution, formation of an intense colour indicates the presence of phenols [Gibbs R.D., 1974].

Test for Lignins

Lignin test: 2 ml of 2% (w/v) furfuraldehyde was added into the test solution. Formation of red colour indicates the presence of lignin [Gibbs R.D., 1974].

Labat test: The test solution was mixed with gallic acid; it developed olive green colour indicating the positive reaction for lignins [Gibbs R.D., 1974].

Test for saponins

Foam Test: The extract was diluted with 20 ml of distilled water and was shaken in a graduated cylinder for 15 minutes. A 1 cm. layer of foam, indicates the presence of saponins [Kokate C. K. *et .al;* 2001].

Haemolysis Tests: - One drop of extract and one drop of blood was placed on the glass slide. Hemolytic zone appeared [Kokate C.K., 1994].

Test for Sterols

Liebermann-Burchard Test: Chloroform was mixed into 2ml. extract. 1-2 ml. acetic anhydride and 2 drops of concentrated H_2SO_4 were dropped into the test tube. First red, then blue and finally green colour indicates the presence of sterols [Kokate C. K. *et.al;* 2001].

Salkowski's Test: 2ml chloroform and 2 ml concentrated H_2SO_4were added to the 2 ml extract and shook well. The layer of red chloroform and acid shows greenish yellow fluorescence. It indicates the presence of sterols [Kokate C. K. *et.al;* 2001].

Test for Tannins

Gelatin Test: Gelatin (gelatin dissolves in warm water immediately) solution was added into the extract. Formation of white precipitate indicates the presence of tannins [Treare GE, Evans WC. 1985].

Lead acetate test: Few drops of 10% lead acetate solution were added into 5 ml of extract. Formation of yellow or red precipitate indicates the presence of tannins [Treare GE, Evans WC. 1985.

RESULT AND DISCUSSION

The flowers of *Argemone mexicana* were shade dried, powdered and subjected to cold percolation with petroleum ether, chloroform, methanol, 95% ethanol and distilled water for 48 hours. The results of the phytochemical screening of flowers extracts of *Argemone mexicana* were present in Table-1. Different types of secondary metabolites such as alkaloids, flavonoids, glycosides, phenol, lignins, saponins, sterols and tannins were presented. *Argemone mexicana's* flower is also effective as compared to other parts because most parts of secondary metabolites are present in it [Table-1].

Alkaloids have different types of activities as pain-killers, antimicrobial, stimulants, muscle relaxants, anaesthetics, anti-microbial, anti-diabetic, anti-cancerous, anti-HIV, antioxidants etc.

Flavonoids have inherent ability to modify the body's reaction to allergen, virus and carcinogens. They show ant-allergic, antimicrobial and anticancer activity by which it can be used for different diseases that is generally found in bark. Tannins have general antimicrobial and antioxidant activities [Rievere *et al.*, 2009].

Current reports show that tannins may have potential value such as cytotoxic and antineoplastic agents [Aguinaldo *et al.,* 2005]. Saponins have antifungal properties [Aboada and Mohanta *et al.*, 2007]. These contents show different types of activities against different pathogens. Therefore, it can be used in the treatment of diseases.

Saponins are used in hypercholesterolemia, hyperglycemia, antioxidant, anticancer, anti-inflammatory and weight loss etc. according to medical field. It is a bioactive antibacterial agents of plants [Mandal *et al.,* 2005: Manjunatha, 2006].

Plant steroids have cardiotonic activity, possess insecticidal and antimicrobial properties. It is generally used in herbal medicines and cosmetic products (Callow; 1936).

Phenolic compounds have anti-oxidative, antidiabetic, anticarcinogenic, antimutagenic and anti-inflammatory (Arts and Hollman; 2005, Scalbert *et al.;* 2005).

CONCLUSION

Argemone mexicana have different types of medicinal properties. According to my result I have concluded that the most of the compounds are found in flowers. These are alkaloids, flavonoids, glycosides, saponins, lignins, phenol, sterols and tannins that are highly effective against different types of diseases.

Table 1: Phytochemical Study of *Argemone mexicana* Linn. Flower

Test	Petroleum Ether	Chloroform	Methanol	95% Ethanol	Distilled water
Alkaloids					
Iodine Test	-	-	-	-	-
Wagners Test	-	-	+	+	-
Dragendorff's Test	-	-	+	+	-
Flavonoids					
Pews Test	-	-	+	+	-
Shinoda Test	-	-	+	+	-
NaOH Test	-	-	+	+	-
Glycosides					
Keller- Killani Test	-	+	+	+	+
Glycosides Test	-	-	+	+	-
Conc. H2SO4	-	+	+	+	+
Molishs Test	-	+	+	+	-
Phenol					
Ellagic Test	-	-	+	+	-
Phenol Test	-	-	+	+	-
Lignin					
Lignin Test	-	-	+	+	-
Labat Test	-	-	+	+	-
Saponins					
Foam Test	-	-	+	+	-
Haemolysis Test	-	-	+	+	-
Sterols					
Libermann- Burchard Test	-	+	+	+	+
Salkowski Test	-	+	+	+	+
Tannins					
Gelatin Test	-	-	+	+	-
Lead Acetate Test	-	-	+	+	+

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