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THE COMPARATIVE PHYTOCHEMICAL SCREENING BETWEEN *DATURA STRAMONIUM* LINN. AND *LANTANA CAMARA* LINN.

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ABSTRACT
Phytochemical screening is valuable for the development of new drugs by which different diseases can be treated. The *Datura stramonium* and *Lantana camara* are the most useful plants because their parts are a good source of secondary metabolites. The seeds of *Datura stramonium* and leaves of *L. camara* were used for phytochemical screening and hexane, chloroform, methanol and distilled water were used for the extraction of secondary metabolites by cold percolation method. The seeds of *D. stramonium* have alkaloids, glycosides, sterols and tannins while leaves of *L. camara* have alkaloids, flavonoids, glycosides, phenol, lignins, saponins, sterols and tannins. Generally, both plants have shown different pharmacological activities against albino rats and also used indetermination of larvicidal activity of mosquitoes.

KEY POINTS: Secondary Metabolites, *Datura stramonium* Linn. and *Lantana camara* Linn.

INTRODUCTION
Plants are the most important source of food products and also provide the medicinal contents from their parts. Each part has different metabolites that allowing defense mechanism. These types of plants belong to medicinal plant category and they are used since ancient times according to our holy and historical books. These books provide information about the treatment of diseases. The medicinal plants are also used in the treatment of typical diseases such as asthma, cancer, diabetes etc. Some plants have two types of characteristics one of which is medicinal and another toxic. Both characteristics depend upon the quantity of dose in which limited quantity provide good effect while more quantity damage the tissues or organs of the body. The leaves' juice of *D. stramonium* was used with warm milk to expel intestinal worms, specifically tapeworm (Rajbhandari KR; 2001). These plants have metabolites that can be used in the prevention of crops against infectious diseases.

In this research, the seeds of *Datura stramonium* and green leaves of *Lantana camara* were selected for the study of secondary metabolites. These plants have both medicinal and toxic effects on human health. *Datura stramonium* belongs to *Solanaceae* family that grows in temperate, tropical and subtropical regions (Berkov S. *et al.*; 2006). The seeds of *D. stramonium* develop into a bucket like pericarp. The seeds are dull and dark in color (Preissel U *et al.*; 2002, Das S *et al.*; 2012). Its improper consumption affects the central nervous system with symptoms such as confusion, bizarre behavior and subsequent amnesia but death is rare (Norton S.; 2008).

Lantana camara is a small perennial shrub that is cultivated in tropical, subtropical and temperature climates. The leaves of *L. camara* have shown antimicrobial, fungicidal and insecticidal properties (Chavan and Nikam; 1982). Various metabolic contents have been identified by phytochemical studies (Venkatachalam *et al.* 2011; Kensa, 2011; Kalita, 2011; Bhakta, 2009). The parts of this plant have been used in the development of traditional herbal medicines that are used in the treatment of cancer, skin itches, leprosy, rabies, chicken pox, asthma and ulcer (GISD; 2014). *L. camara* is also a toxic to livestock such as cattle, sheep, horse, dogs and goats.

MATERIAL AND METHODS
Collection of Plant Material
The seed of *Datura stramonium* and leaves of *Lantana camara* were selected for the phytochemical screening of metabolic contents. These parts were collected from Mandsaur, District Mandsaur. Mandsaur 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.

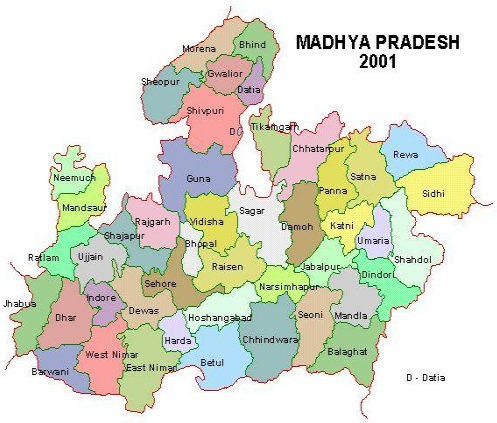

Figure-1 Map of Madhya Pradesh

Identification of Plant and Preliminary Screening of Secondary Metabolites

Datura stramonium and *Lantana camara* were collected from Mandsaur Madhya Pradesh and these were identified by Dr. S.N. Mishra, Principal Scientist, All India Coordinated Research Project on Medicinal and Aromatic Plants, College of Horticulture, Mandsaur, affiliated to R.V.S.K.V. Vishwavidyalaya, Gwalior. The seed of *Datura stramonium* and leaves of *Lantana camara* were crushed using mixer grinder, and kept to cold percolation process for 48 hours with hexane, chloroform, methanol and distilled water. After it, the extracts were filtered and used for preliminary phytochemical screening (Bhatt S. *et al.,* 2012).

Preliminary Screening of Secondary Metabolites

The seed of *D. stramonium* and green leaves of *L. camara* were crushed using mixer grinder, and subjected to cold percolation process for 48 hours with hexane, chloroform, methanol and distilled water. After the cold percolation process, the extracts were filtered and used for preliminary phytochemical screening such as alkaloids (Iodine, Dragendorff's test and Wagner 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 (Salkowski test), tannins (Gelatin tests) were carried out (Bhatt S. *et. al.*,2012).

Preliminary Screening of Phytochemical Test

Phytochemical Screening

The filtrate obtained was subjected to preliminary phytochemical screening.

Test for Alkaloids

Iodine Test: Took 3 ml of test solution into test tube and added few drops of dilute iodine solution. Blue colour appeared; but disappeared on boiling and reappeared on cooling (Khandewal K.R., 2008).

Wagner's Test: Took 2 to 3 ml extract solution in test tube and added few drops of Wagner's reagent. Formation of reddish brown precipitate into solution that indicates the presence of alkaloids (Kokate C. K. *et.al;* 2001).

Dragendorff's Tests: Took 2 to 3 ml extract in test tube and added few drops of Dragendorff's reagent. Orange brown precipitate produced that 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:- Took 2-3 ml. extract in test tube and added few fragments of magnesium metal into it, followed by dropwise addition of conc. HCl. Formation of magenta colour indicates the presence of flavonoids (Kokate C. K. *et.al;* 2001).

NaOH Tests: Took 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 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 extract, and 2 ml of concentrate H_2SO_4 was added 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: Took 2 ml extract 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

that 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: 2 ml test solution was mixed with gallic acid; it developed olive green colour that indicates the positive reaction for lignin (Gibbs R.D., 1974).

Test for saponins

Foam Test: 2 ml 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: Took one drop of extract on the glass slide and added one drop of blood. Both are mixed with wood stick and observed. Hemolytic zone appeared (Kokate C.K., 1994).

Test for Sterols

Salkowski's Test: 2ml extract was taken into a test tube and added 2 ml chloroform. Then conc. H_2SO_4 was added into test tube side by side. 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: 1 ml Gelatin (gelatin dissolves in warm water immediately) solution was added into 2 ml extract. Formation of white precipitate indicates the presence of tannins (Treare GE, Evans WC. 1985).

RESULT AND DISCUSSION

The cold percolation method is one of the effective methods for the extraction of primary and secondary metabolites. Four solvents i.e. hexane, chloroform, methanol and distilled water were used for the extraction of secondary metabolites from seeds of *Datura stramonium* and leaves of *Lantana camara*. The result of phytochemical screening of *Datura stramonium's* seeds and leaves of *L. camara* were mentioned in Table-1 and 2. In the solvent of methanol, alkaloids, glycosides, sterols and tannins presented in the seeds of *D. stramonium* while alkaloids, flavonoids, glycosides, phenol, lignins, saponins and sterols presented in the screening analysis of *L. camara*. Methanol and distilled water are an effective solvent that have the capacity to extraction of secondary metabolites in 48 hrs while chloroform is mild solvent for extraction of secondary metabolites from both plant's parts.

Each secondary metabolic content such as alkaloids, flavonoids, saponins, tannins etc. has specific pharmacological activity. Flavonoids have shown anti-allergic, antimicrobial and anticancer activity by which it can be used for different diseases found in bark. It has been proved that tannins have general antimicrobial and antioxidant activities (Rievere *et. al.*, 2009).

Tannins may have potential value such as cytotoxic and antineoplastic agents (Aguinaldo *et. al.*, 2005). Saponins have antifungal properties (Aboada and Efuwape, 2001; Mohanta et. al., 2007) that have different types of activity against different pathogens. Therefore, it can be used in the treatment of diseases. Saponins are also used in treatment of hypercholesterolemia, hyperglycemia, antioxidant, anticancer, anti-inflammatory and weight loss activity etc. according to medical field. It is a bioactive antibacterial agent of plants (Mandal *et. al.* 2005: Manjunatha, 2006). Steroids possess insecticidal and antimicrobial properties that are generally used in herbal medicines and cosmetic products (Callow; 1936). Phenolic compounds have shown anti-oxidative, antidiabetic, anticarcinogenic, antimutagenic and anti-inflammatory (Arts and Hollman; 2005, Scalbert *et. al.;* 2005).

Table-1 Phytochemical Analysis of *Datura stramonium* Plant Seeds

Solvent	Hexane	Chloroform	Methanol	D.W.
Alkaloids				
Iodine test	-ve	-ve	-ve	-ve
Dragndorff test	-ve	+ve	+ve	-ve
Wagner test	-ve	-ve	+ve	+ve
Flavonoids				
Pews test	-ve	-ve	-ve	-ve
Shinoda test	-ve	-ve	-ve	-ve
NaOH test	-ve	-ve	-ve	-ve
Glycosides				
Keller Killani test	+ve	+ve	+ve	+ve
Conc. H_2SO_4 test	+ve	+ve	+ve	+ve
Molish test	+ve	+ve	+ve	+ve
Phenol				
Ellagic test	-ve	-ve	-ve	-ve
Phenol test	-ve	-ve	-ve	-ve

Lignins				
Lignin test	-ve	-ve	-ve	-ve
Labat test	-ve	-ve	-ve	-ve
Saponins				
Foam test	-ve	-ve	-ve	+ve
Haemolysis test	-ve	-ve	-ve	-ve
Sterols				
Salkowaski test	+ve	+ve	+ve	+ve
Liebermann-Burchard Test	+ve	+ve	+ve	+ve
Tannins				
Gelatin test	-ve	-ve	+ve	+ve

(+) Presence
(-) Absent

Table-2 Phytochemical Analysis of *Lantana camara* Plant Leaves

Solvent	**Hexane**	**Chloroform**	**Methanol**	**D.W.**
Alkaloids				
Iodine test	-ve	-ve	-ve	-ve
Dragndorff test	-ve	-ve	+ve	+ve
Wagner test	-ve	+ve	-ve	-ve
Flavonoids				
Pews test	-ve	-ve	-ve	-ve
Shinoda test	-ve	-ve	-ve	-ve
NaOH test	-ve	-ve	+ve	+ve
Glycosides				
Keller Killani test	+ve	+ve	+ve	+ve
Conc. H_2SO_4 test	+ve	+ve	+ve	+ve
Molish test	-ve	+ve	+ve	+ve
Phenol				
Ellagic test	-ve	+ve	-ve	-ve
Phenol test	-ve	+ve	+ve	+ve
Lignins				
Lignin test	-ve	-ve	+ve	+ve
Labat test	-ve	+ve	+ve	-ve
Saponins				
Foam test	-ve	+ve	+ve	+ve
Haemolysis test	-ve	+ve	+ve	-ve
Sterols				
Salkowaski test	-ve	+ve	+ve	-ve
Tannins				
Gelatin test	-ve	+ve	-ve	+ve

(+) Presence
(-) Absent

CONCLUSION

Cold percolation method is one of most important method for the extraction of secondary metabolites from plant's parts. The seeds of *Datura stramonium* and leaves of *Lantana camara* were used for the extraction of secondary metabolites. Alkaloids, glycosides, sterols and tannins present in the seeds of *D. stramonium* while alkaloids, flavonoids, glycosides, phenol, lignins, saponins, sterols and tannins present in the screening analysis of *L. camara*. These contents have specific activity against specific diseases. In the four solvents, the methanol has good property for extraction of metabolic contents.

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