Screening of preliminary phytochemical analysis for Homoeopathic Drugs

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Abstract

The maximum number of homeopathic drugs, approximately 60-70% is made from the plant kingdom. However, others are made from other sources like animals, minerals, Immaterial energy, healthy and diseased products. All the parts of the plant are used to prepare the homeopathic drugs by using extraction of polar solvents like ethanol and water. The therapeutic action of the drugs depends upon the phytochemical present in the particular drug. The Drugs are chemicals or like substances which organic, inorganic or other origin.

Keywords

Homoeopathic medicines, Phytochemical screening, Primary metabolites, Secondary metabolites.

Introduction

Plants are the major source of drug in homoeopathic medicines. The medicinal value of the plants depends upon the presence of natural chemical constituents. The chemical constituents which are responsible for the therapeutic effect is called the active principle. Homeopathic medicines are based on the principle that high dilutions of potentially active molecules retain a memory of the original substance. The problem of quality control with homoeopathic potencies serve one of the areas of greatest challenge. The extremely high dilutions of homoeopathic potencies make it almost impossible to apply analytical test by conventional methods in the
laboratory. No existing tests have yet been able to standardize the high potentied of homoeopathic medicines. Finished products in homoeopathic medicinal preparations include the mother tincture, potencies and triturates. The Mother tincture can be subjected to a qualitative and quantitative analysis that evaluates the identity, purity and stability of preparation.

Phytochemistry is the chemistry of the plants or chemical constituents of plants and used to prepare the drugs naturally. The phytochemical property of each plant species is unique and specific to it. The active principles of a drug are the potent constituents of the drug that is individual to the drug and are responsible for the pharmacodynamics action of the drugs. In phytochemical studies, two different metabolite compounds are present. Primary metabolites like Carbohydrate, Fat, Protein are directly involved in the growth and development of a plant and the Secondary metabolites like Alkaloid, Glycosides, Tannin & Tannic acid, etc are produced in other metabolic pathways that, although important, are not essential to the functioning of the plant. Secondary plant metabolites are also used in signalling and regulation of primary metabolic pathways.

Materials and Methods

1. Collection of plant material

The collection of drugs substances should be under supervision of a qualified and experience of botanists having experiences of knowledge of botany, pharmacogonosy and taxonomy as per guidelines.

2. Extraction methods

Mother tincture is prepared by using maceration and percolation method as per guidelines of Homoeopathic Pharmacopoeia of India.

i. Maceration

Maceration process shall be used in such cases where the drug material requires ample time for the extraction of medicinal properties. Gummy and mucilaginous substances and those having much viscid juice which do not allow alcohol to permeate the mass readily as in the process of percolation should be macerated in the preparation of the tincture.
ii. Percolation

This method adopted for the extraction of dried drugs, dry vegetable substances and other organic (animal) substances. Reduce them to powder form according to one of the grades of fineness as specified in the formula of respective drug monograph.

**Phytochemical screening analysis**

1. **Primary metabolites**
   
i. Carbohydrates (Molisch’s test)

   Small quantity of extract was dissolved in 5ml of distilled water and filtered. To this solution, 2-3 drops of α-Naphthol added and 1ml of Concentrated Sulphuric acid was added along the sides of test tube so as to form two layers. The formation of the violet colored ring at the interface indicated the presence of carbohydrates.

   ii. Proteins (Xanthoprotein test)

   To 1ml of extract was taken a few drops of Nitric acid were added along the sides of the test tube. The yellow color developed confirms the test for protein.

   iii. Lipids

   Rub a small quantity of extract on a filter paper and observed for the permanent translucent stain.

2. **Secondary metabolites**

   i. Alkaloids (Dragendorff’s test)

   To 0.5g of the test substance and a few drops of Acetic acid were added, followed by the addition of 2-3 drops of Dragendorff’s reagent and shaken well. The color of the precipitate formed was noted. The orange, red or prominent yellow color of the precipitate formed was noted.
ii. Flavonoids (Pew test)

A small quantity of residue was dissolved in 5ml of Ethanol and treated with a few drops of Concentrated Hydrochloric acid and 0.5g of Magnesium turning and 1ml of Concentrated Hydrochloric acid were added. The presence of flavonoid was observed by the formation of magenta red color developed within a minute.

iii. Terpenoids

To 0.5g of the extract, 2ml of Chloroform and 3ml of Concentrated Sulphuric acid was added carefully to form a layer. A reddish brown coloration of the interface indicates the presence of terpenoids.

iv. Tannins

About 0.5g of the extract is taken in a boiling tube and boiled with 20ml distilled water and then filtered add a few drops of 0.1% ferric chloride was added mixed well and allowed to stand some time. Observed for brownish green or a blue-black coloration.

v. Phenols (Ferric chloride test)

The extract (50mg) was dissolved in 5ml of distilled water. To this few drops of neutral 5% ferric chloride solution was added. A dark green color indicates the presence of phenolic compounds.

vi. Steroids

2ml of acetic anhydrides was added to 0.5g of extract and 2ml of Sulphuric acid was added by the sides of the test tube and observed the color change from violet or blue-green.

vii. Sterols (Liebermann-Bauchard test)

The extract was dissolved in chloroform and few drops of acetic anhydride was added along with a few drops of Concentrated Sulphuric acid from the sides of the test tube and observed for the formation of blue to blood red color.
viii. **Saponins**

0.5g of extract was added to 5ml of distilled water in a test tube. The solution was shaken vigorously and observed for a stable persistent froth. The frothing was mixed with 3 drops of olive oil and shaken vigorously after which it was observed for the formation of an emulsion indicates the presence of saponins.

ix. **Glycosides (Keller Killani test)**

About 0.5ml of extract was taken and added 1ml of Glacial Acetic acid containing few traces of Ferric chloride and 1ml of Concentrated Sulphuric acid and observed for the formation of reddish brown color at the junction of two layers. The presence of glycosides will turn the upper layer bluish green color.

x. **Acidic compound**

To the extract, Sodium bicarbonate solution was added and observed for the production of effervescences.

xi. **Resins**

2ml of distilled water was added to the extract and noted for the turbidity.

xii. **Pholabatannins**

Few drops of extract was boiled with 1% aqueous Hydrochloric acid and then allowed to stand for the formation of red precipitate.

xiii. **Reducing sugar (Fehling’s Reagent)**

To the dilute extract, a few drops of Fehling’s solution A and B was added in equal volume and heated for 30 minutes and develops a brick red colored precipitate.
**Discussion**

The different chemical components of plants which used in homoeopathy are responsible for the therapeutic action upon human beings. So, this preliminary phytochemical screening is essential to identify the phytochemicals like primary and secondary metabolites are present in the homoeopathic drugs. This screening test is very useful to continue for further processes like separation of a particular compound using column and thin layer chromatography and elucidate the structure using NMR studies.

**Reference**

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