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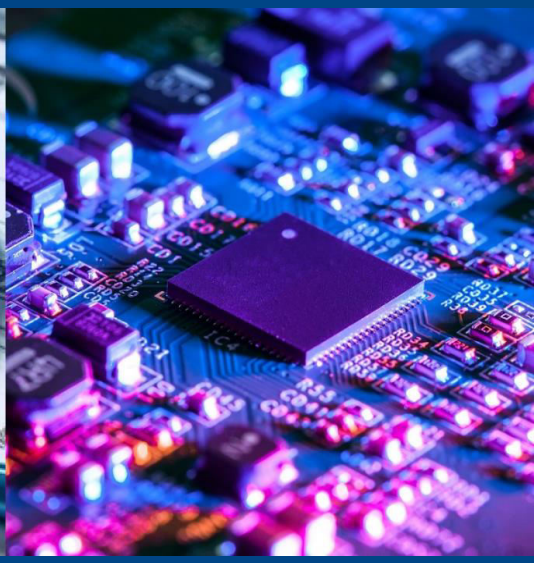

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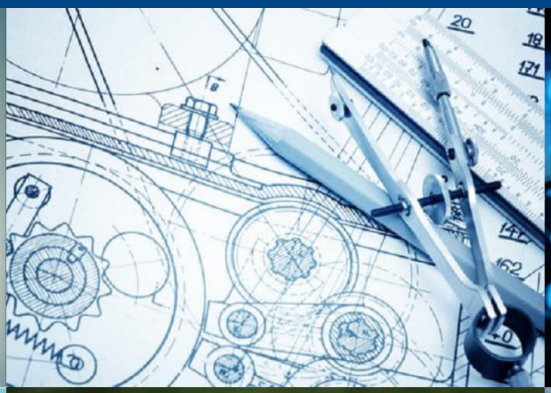

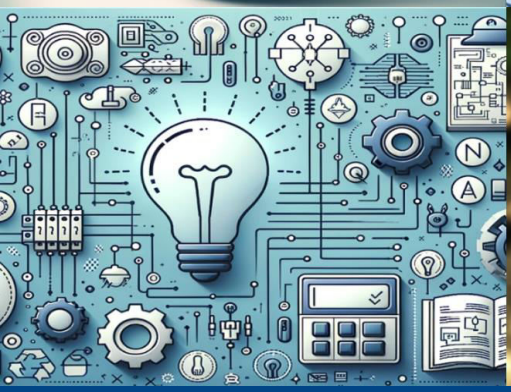

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Phytochemical Screening of Herbal Ingredients Used in the Formulation of Herbal Syrup for Parkinson's Disease

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ABSTRACT: Parkinson's disease is a progressive neurological disorder characterized by tremors, rigidity, and impaired motor function. Herbal medicines have gained attention due to their neuroprotective and antioxidant properties. The present study aimed to perform phytochemical screening of selected herbal ingredients used in the formulation of a herbal syrup intended for the supportive management of Parkinson's disease. The ingredients selected were Mucuna pruriens, Bacopa monnieri, and Withania somnifera. Preliminary phytochemical tests were conducted to identify major secondary metabolites such as alkaloids, flavonoids, tannins, saponins, glycosides, terpenoids, phenolic compounds, carbohydrates, and proteins. The results indicated the presence of several bioactive constituents that may contribute to neuroprotective activity. These findings support the use of these herbs in herbal formulations aimed at neurological disorders.

KEYWORDS: polyherbal syrup, phytochemical screening, Parkinson's disease, mucuna pruriens, Bacopa monnieri, and Withania somnifera.

I. INTRODUCTION

Parkinson's disease is one of the most common neurodegenerative disorders affecting millions of people worldwide. The disease mainly occurs due to the degeneration of dopaminergic neurons in the brain, leading to dopamine deficiency. This results in symptoms such as tremors, muscle rigidity, bradykinesia, and postural instability.

Herbal medicines are widely used in traditional systems of medicine due to their therapeutic potential and minimal side effects. Mucuna pruriens is well known for its natural source of L-DOPA which helps in restoring dopamine levels in the brain. Bacopa monnieri possesses neuroprotective and memory-enhancing properties due to the presence of bacosides. Withania somnifera is widely recognized for its antioxidant and adaptogenic activities that help protect neurons from oxidative stress.Phytochemical screening is an important step in herbal drug research because it helps identify the presence of biologically active constituents responsible for therapeutic effects. Therefore, the present study was carried out to evaluate the phytochemical constituents present in these herbal ingredients.

II. MATERIALS

The following herbal ingredients were used for phytochemical screening:

S.no	Ingredients	Biological source
1.	Mucuna pruriens powder	Seeds of Mucuna pruriens
2.	Bacopa monnieri powder	Whole plant of Bacopa monnieri
3.	Withania somnifera powder	Roots of Withania somnifera

All chemicals and reagents used for phytochemical tests were of analytical grade.

III. PRE-FORMULATION STUDIES

Preformulation studies were carried out to evaluate the physicochemical properties of Mucuna pruriens, Bacopa monnieri (Brahmi), and Withania somnifera (Ashwagandha) powders before formulation.

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Organoleptic Evaluation: The powders were examined visually for color, odor, taste, and texture using sensory observation.

Solubility Analysis: A small quantity of each powder was added separately to water, chloroform, acid and ethanol, shaken well, and observed for solubility.

Mucuna pruriens

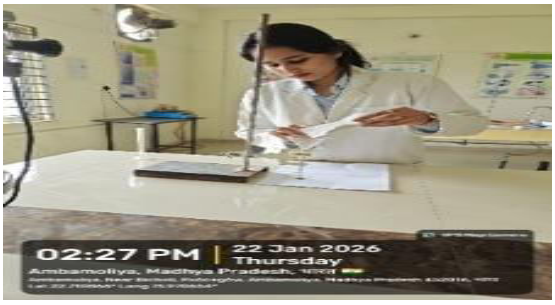
Ashwagandha

Brahmi

Particle Size Analysis:-The powders were passed through standard sieves, and uniform particle size was confirmed.

Bulk Density and Tapped Density: Accurately weighed powder was filled into a graduated cylinder to measure bulk volume. The cylinder was tapped 100 times to obtain tapped volume, and densities were calculated.
Bulk Density = Mass / Volume
Tapped density = Mass / tapped volume

Angle of Repose: Powder was allowed to flow through a funnel to form a cone, and the angle was calculated using the height and radius of the pile.



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Hausner's Ratio:- Hausner's ratio is an indirect index of powder flowability calculated using bulk density and tapped density.Hausner's ratio: = Tapped / bulk

Carr's Index (Compressibility Index):- Carr's index indicates the compressibility and flow property of powder. Carr's index = tapped – bulk / tapped

Moisture Content (Loss on Drying):- A known quantity of powder was dried in a hot tray dryer at 105°C until constant weight was obtained, and percentage moisture loss was calculated.

Ash value:- Ash value is determined to measure the total inorganic residue present in the herbal drug after complete incineration. It helps in detecting impurities such as sand, soil, and other inorganic matter.

pH Determination:- A 1% aqueous solution of each powder was prepared, and pH was measured using a pH paper

IV. METHODOLOGY

Preparation of Extract

The herbal powders were extracted using the decoction method. Accurately weighed quantities of each powder were mixed with distilled water and heated for 30–45 minutes until the volume was reduced. The mixture was then cooled and filtered through muslin cloth andfilter paper. The filtrate obtained was used for phytochemical screening.

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V. PHYTOCHEMICAL SCREENING TESTS

The extracts were subjected to various qualitative phytochemical tests to detect the presence of active constituents.

Test for Alkaloids (Mayer's Test)

A few drops of Mayer's reagent were added to the extract. Formation of a creamy white precipitate indicated the presence of alkaloids.

Test for Flavonoids (Shinoda Test)

Magnesium turnings and concentrated hydrochloric acid were added to the extract. Development of a pink or red color confirmed the presence of flavonoids.

Test for Tannins (Ferric Chloride Test)

Ferric chloride solution was added to the extract. A dark blue or greenish color indicated the presence of tannins.

Test for Saponins (Foam Test)

The extract was shaken vigorously with water. Persistent foam formation indicated the presence of saponins.

Test for Glycosides (Legal's Test)

The extract was treated with sodium nitroprusside and sodium hydroxide solution. Formation of a pink color indicated the presence of glycosides.

Test for Terpenoids (Salkowski Test)

The extract was mixed with chloroform and concentrated sulfuric acid. Formation of a reddish-brown layer indicated the presence of terpenoids.

Test for Phenolic Compounds

Addition of ferric chloride solution produced a blue-green coloration indicating phenolic compounds.

Test for Carbohydrates (Molisch Test)

Addition of Molisch reagent followed by sulfuric acid produced a violet ring, indicating the presence of carbohydrates.

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VI. RESULTS

Phytochemical Test	Mucuna pruriens	Bacopa monnieri	Withania somnifera
Alkaloids	+ve	+ve	+ve
Flavonoids	+ve	+ve	+ve
Tannins	+ve	+ve	+ve
Saponins	+ve	+ve	+ve
Glycosides	+ve	+ve	+ve
Terpenoids	+ve	+ve	+ve
Phenolics	+ve	+ve	+ve
Carbohydrates	+ve	+ve	+ve

VII. DISCUSSION

The phytochemical screening results revealed the presence of several important bioactive compounds such as alkaloids, flavonoids, tannins, terpenoids, and phenolic compounds in the selected herbal ingredients. These compounds are known for their antioxidant, anti-inflammatory, and neuroprotective activities.

Mucuna pruriens contains natural L-DOPA which plays an important role in the management of Parkinson's disease. Bacopa monnieri contains bacosides that help protect neurons from oxidative stress. Withania somnifera contains withanolides which exhibit strong antioxidant and neuroprotective effects.

Therefore, the presence of these phytochemicals supports the therapeutic potential of the herbal formulation intended for neurological disorders.

VIII. CONCLUSION

The present study confirmed the presence of several bioactive phytochemicals in Mucuna pruriens, Bacopa monnieri, and Withania somnifera. These phytoconstituents are known to possess neuroprotective and antioxidant properties that may help in the supportive management of Parkinson's disease. The findings provide a scientific basis for the development of herbal syrup formulations using these ingredients.

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