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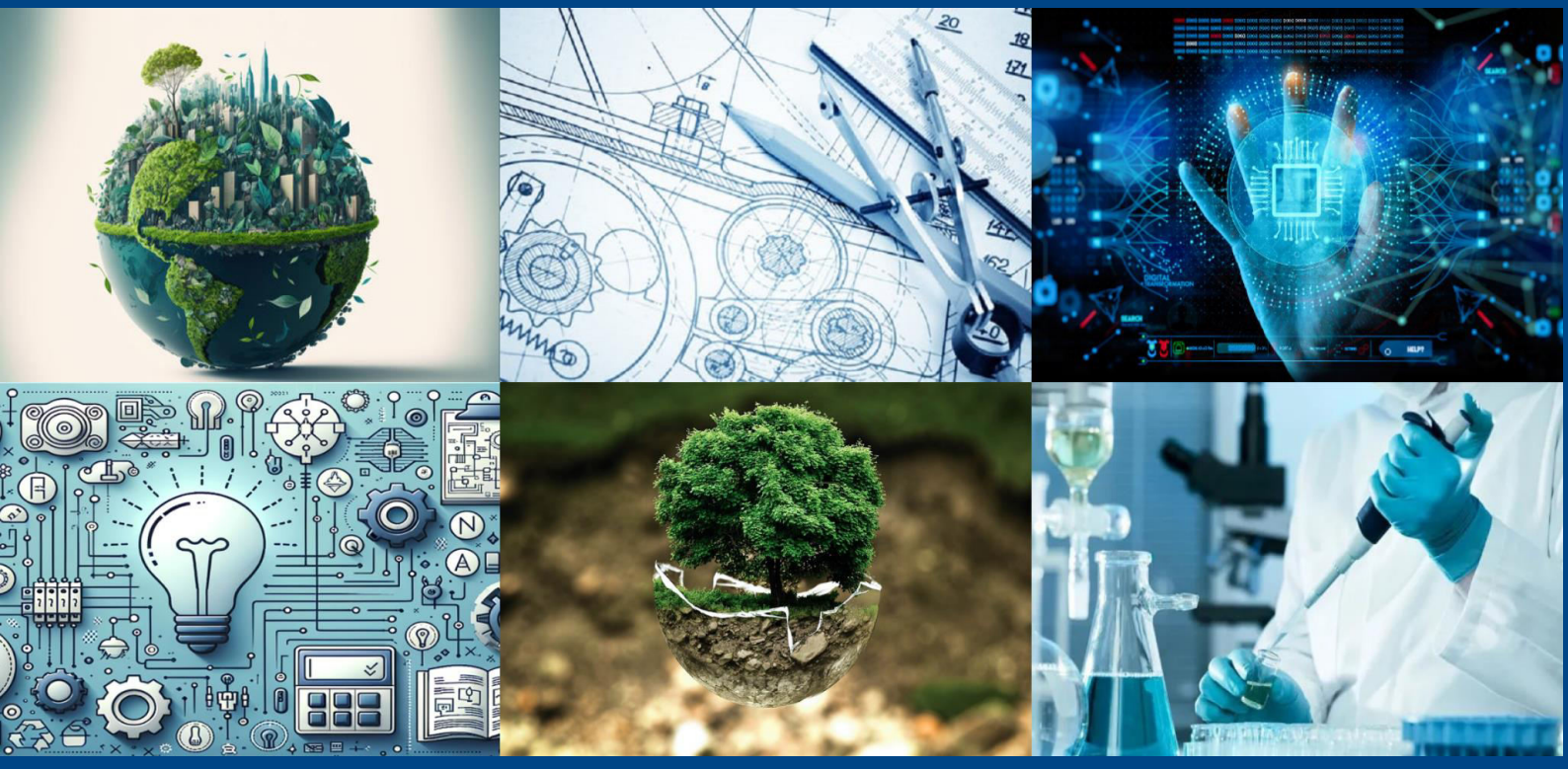

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Phytochemical Screening of Polyherbal Powder for the Management of Obesity

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ABSTRACT: The present study was carried out to formulate a polyherbal powder for the management of obesity using selected medicinal plants such as Triphala, Ginger, Vidanga, Gurmar and Guduchi. All the herbal drugs were collected in dried form and powdered separately. The powders were passed through sieve no. 60 to obtain uniform particle size and then accurately weighed and mixed thoroughly to prepare a uniform polyherbal powder formulation. The prepared polyherbal powder was subjected to preliminary phytochemical screening which revealed the presence of important bioactive constituents such as alkaloids, flavonoids, tannins, saponins and glycosides. These phytoconstituents are responsible for various pharmacological activities including antioxidant, digestive and anti-obesity effects. The formulation was also evaluated for organoleptic properties such as color, odour and taste. The powder was found to be brownish in color with a characteristic herbal odour and slightly bitter taste, indicating proper blending and good quality of the herbal formulation.

KEYWORDS: Polyherbal Powder, Obesity Management, Herbal Formulation, Triphala, Ginger, Vidanga, Gurmar, Guduchi, Phytochemical Screening, Organoleptic Properties.

I. INTRODUCTION

Obesity is a common health disorder characterized by excessive accumulation of body fat due to an imbalance between energy intake and energy expenditure. It increases the risk of various diseases such as diabetes, hypertension, and cardiovascular disorders. Management of obesity includes lifestyle modification, proper diet, physical activity, and the use of herbal medicines. Herbal formulations are widely used because they are natural, safe, and have fewer side effects compared to synthetic drugs. The polyherbal powder contains five important herbs: Triphala, Ginger, Vidanga, Gurmar, and Guduchi. Triphala helps improve digestion and metabolism and supports weight management. Ginger enhances thermogenesis and fat metabolism, which helps in reducing body weight. Vidanga helps in removing toxins and improving digestion. Gurmar is known for reducing sugar cravings and regulating blood glucose levels, which indirectly helps in weight control. Guduchi acts as an immunomodulator and improves metabolism, supporting the management of obesity.

II. MATERIAL AND METHOD

Collected herbs

The herbal ingredients Triphala, Ginger, Vidanga, Gurmar, and Guduchi were collected from the local herbal market. All the herbs were purchased in the required quantity and were carefully selected to ensure good quality. The collected drugs were cleaned properly to remove impurities such as dust and foreign particles. After cleaning, the herbs were dried and used for the preparation of polyherbal powder formulation.

Preformulation Studies

• Organoleptic Properties

Organoleptic properties refer to the physical characteristics of a drug that can be observed by the human senses. These properties are evaluated using sight, smell, taste, and touch. They include parameters such as color, odor, taste, shape, size, and texture. Organoleptic evaluation helps in the identification and quality assessment of crude drugs.

S No	Ingredients	Colour	Taste	Odor
1	Triphala	Brown to dark brown	Astringent & Sour dominant	Mild, fruity, slightly tannic

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2	Ginger	Pale yellow to light brown	Pungent, slightly bitter	Characteristic Pungent
3	Vidanga	Dark brown to reddish	Pungent, Astringent	Mild, slightly aromatic, earthy
4	Gurmar	Greenish brown	Bitter	Mild, leafy, herbaceous
5	Guduchi	Light brown	Bitter, astringent	Mild, woody, earthy

Table no: 01

• Solubility

Solubility is the ability of a substance (solute) to dissolve in a solvent to form a homogeneous solution at a specific temperature and pressure.

S No	Ingredients	Ethanol	Water
1	Triphala	Soluble	Slightly soluble
2	Ginger	Soluble	Slightly soluble
3	Vidanga	Soluble	Slightly soluble
4	Gurmar	Soluble	Slightly soluble
5	Guduchi	Soluble	Soluble

Table no: - 02

• PH determination

pH determination is the process of measuring the acidity or alkalinity of a solution. It indicates the concentration of hydrogen ions present in the sample.

S No	Ingredients	PH value
1	Triphala	4.5(acidic)
2	Ginger	5 (mildly acidic)

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3	Vidanga	6(acidic)
4	Gurmar	5 (mildly acidic)
5	Guduchi	5.5 (slightly acidic)

Table no: 03

• Angle of repose

Angle of repose is the maximum angle formed between the surface of a pile of powder and the horizontal plane when the powder is allowed to flow freely. It is used to determine the flow property of powder in pharmaceutics.
Formula:
Where:
Θ (theta) = Angle of repose, H = Height of the powder cone & R = Radius of the base of the powder cone

Table No: - 04

S No	Ingredients	Angle of repose
1	Triphala	33.69°
2	Ginger	45°
3	Vidanga	26.56°
4	Gurmar	35.53°
5	Guduchi	29.74°

• Bulk density
Bulk density is defined as the mass of powder divided by the total bulk volume (including the spaces between particles) before tapping. It is used to evaluate the packing and flow properties of powder in pharmaceutics.
Formula: Bulk density = Mass of powder/ Bulk volume

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S No	Ingredients	Bulk density
1	Triphala	0.41gm
2	Ginger	0.41gm
3	Vidanga	0.41gm
4	Gurmar	0.41gm
5	Guduchi	0.41gm

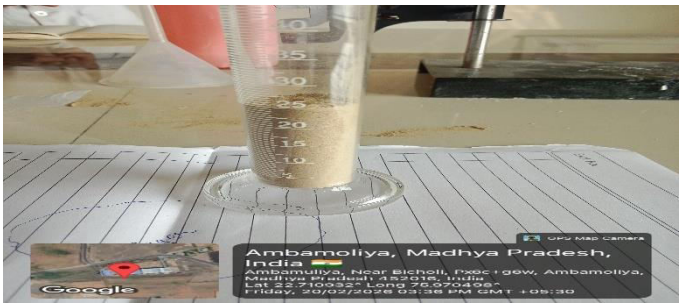

Table no: - 05

• Tapped density

Tapped density is the density of a powder after it has been tapped or mechanically vibrated to remove the air spaces between the particles. It represents how closely the powder particles pack together after tapping.

Formula

Tapped density =Mass of Powder\Tapped volume

S No	Ingredients	Tapped density
1	Triphala	0.416gm
2	Ginger	0.45gm
3	Vidanga	0.5gm
4	Gurmar	0.41gm
5	Guduchi	0.5gm

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Table no: -06

• Particle Size Analysis

Particle size analysis was carried out for the powdered drugs Triphala, Ginger, Vidanga, Gurmar, and Guduchi to ensure uniformity and suitability for formulation. The dried herbal materials were cleaned, dried and powdered using a mechanical grinder. The obtained powders were then passed through a standard sieve to obtain uniform particle size. The powders were found to be moderately fine and free flowing, which is suitable for the preparation of polyherbal powder. Proper particle size distribution plays an important role in improving the mixing of ingredients and maintaining uniformity in the formulation. It also helps in enhancing dissolution, absorption and overall effectiveness of the herbal preparation. Uniform particle size ensures better stability and quality of the final polyherbal formulation

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• Moisture content

Moisture content is the amount of water present in a sample or powder, expressed as a percentage of the total weight of the sample. It is determined by drying the sample and measuring the loss in weight, which represents the water present in the material.

Formula

Moisture content = Initial wt – final wt / Initial wt .100

S No	Ingredients	Moisture content
1	Triphala	9.8%
2	Ginger	24.33%
3	Vidanga	10.4%
4	Gurmar	5.6%
5	Guduchi	9%

Table no: 07

• Ash value

Ash value is the amount of inorganic residue (minerals and salts) left after complete incineration (burning) of a crude drug. It indicates the total mineral content and presence of impurities such as sand, soil, or adulterants in the drug.

Ash value% = wt of ash / wt of crude drug. 100

S No	Ingredients	Ash value
1	Triphala	7%
2	Ginger	19%
3	Vidanga	17%
4	Gurmar	26.5%
5	Guduchi	10%

Table no: 08

• Extraction

Accurately weighed required quantities of Triphala, Ginger, Vidanga, Gurmar, and guduchi powders. Mixed each powder with distilled water in a 1:10 ratio (drug: Water). Boiled the mixture gently for 30–45 minutes until the volume was reduced to one-Fourth. Allowed the decoction to cool and filtered through muslin cloth and filter paper. Collected the filtration and stored it in airtight containers for further phytochemical screening use.

• Phytochemical Screening

1. Test for Alkaloids (Mayer's Test): - To 2 ml of plant extract, a few drops of Mayer's reagent were added. Formation of a cream or white precipitate indicates the presence of alkaloids.
2. Test for Flavonoids (Shinoda Test): - To 2 ml of extract, a small piece of magnesium ribbon and a few drops of concentrated HCl were added. Development of pink or red confirms the presence of flavonoids.

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3. Test for Tannins (Ferric Chloride Test): - To 2 ml of extract, a few drops of 5% ferric chloride solution were added. Blue-black or greenish coloration indicates the presence of tannins.
4. Test for Saponins (Foam Test): - The extract was diluted with distilled water and shaken vigorously for 15 minutes. Persistent froth formation indicates the presence of saponins.
5. Test for Phenolic Compounds: - To 2 ml of extract, a few drops of ferric chloride solution were added. Deep blue or black coloration confirms phenolic compounds.

S No	Test	Triphala	Ginger	Vidanga	Gurmar	Guduchi
1	Alkoloids	+ve	-ve	+ve	-ve	+ve
2	Saponins	-ve	-ve	-ve	+ve	+ve
3	Flavonoids	+ve	+ve	+ve	+ve	+ve
4	Tannins	+ve	-ve	-ve	+ve	+ve
5	Phenolic compound	+ve	+ve	+ve	+ve	+ve
6	Glycosides	-ve	-ve	-ve	+ve	+ve
7	Carbohydrates	+ve	+ve	+ve	+ve	+ve

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Table no: 09

III. RESULT AND DISCUSSION

The Preformulation studies of the polyherbal powder containing Triphala, Ginger, Vidanga, Gurmar, and Guduchi were carried out to evaluate its physicochemical and flow properties. The organoleptic evaluation showed that the prepared powder had a characteristic herbal odor, a slightly bitter taste, and a brown colored fine powder appearance. These properties indicate the presence of natural phytoconstituents from the selected herbal ingredients. The ash value determination showed the presence of an acceptable amount of inorganic matter, indicating the purity and quality of the herbal powder. The moisture content of the formulation was found to be within the acceptable limit, suggesting good stability and reduced chances of microbial growth during storage.

IV. CONCLUSION

The present study concludes that the polyherbal powder containing Triphala, Ginger, Vidanga, Gurmar, and Guduchi showed acceptable physicochemical and flow properties during Preformulation studies. The results of organoleptic evaluation, ash value, moisture content, and flow properties were found within suitable limits. These findings indicate that the selected herbal ingredients are appropriate for the development of a stable and effective poly-herbal powder formulation for the management of obesity .

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