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"Formulation And Evaluation: - Herbal Nutraceutical Tablet"

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Abstract:-

The surge in lifestyle-related disorders has driven interest in natural alternatives for health maintenance. Herbal nutraceuticals, derived from plant sources, offer potential benefits without the adverse effects associated with synthetic medications. This study formulates and evaluates a herbal tablet combining bioactive extracts known for antioxidant, anti-inflammatory, and immune- enhancing properties. The formulation process involved selecting synergistic herbs and excipients to produce a stable dosage form.

Tablets were evaluated for physical integrity, uniformity, and dissolution, along with in vitro antioxidant and antimicrobial assays. Results indicated promising therapeutic potential and quality, supporting further clinical trials for safety and efficacy validation.

Introduction:-

Oral drug delivery remains the most preferred route due to ease of administration and patient compliance.

Nutraceuticals, especially in tablet form, integrate nutritional and therapeutic functions, offering a bridgebetween food and medicine. These products, often comprising bioactive compounds like flavonoids andalkaloids, are gaining popularity for their role in disease prevention and wellness enhancement.

Herbal ingredients such as Amla, Ginger, Tulsi, Liquorice, Cinnamon, and Mint have long been recognizedfor their therapeutic profiles:

- Amla provides essential nutrients with immune- modulating properties.
- Ginger shows cardioprotective and anti-obesity benefits.
- Liquorice acts as an expectorant and supports respiratory health.
- Tulsi and Mint exhibit antimicrobial, anti-inflammatory, and gastroprotective effects.

Combining these herbs in a standardized tablet ensures consistent dosage, better compliance, and potential

health benefits without significant side effects.

Materials and Methods:-

Herbal Nutraceutical Tablet Formulation

The formulation involved the use of dried and powdered herbal ingredients such as cinnamon leaves.

Excipients including lactose, starch, and magnesium stearate were incorporated to ensure proper binding,flow, and tablet integrity.

The powders were sieved (sieve no. 80), mixed thoroughly, and granulated using wet granulation. Granulesunderwent pre-compression evaluations including bulk density, tapped density, Carr's index, Hausner's ratio,and angle of repose. Four batches (F1- F4) were compressed using a single-punch tablet press.

Post-compression evaluations included:

- Weight variation
- Hardness
- Friability
- Disintegration time
- Dissolution studies
- pH measurement

In vitro assays were also conducted to assess antioxidant and antimicrobial activity.

Plan of Work:-

1. Selection of Herbs: Based on therapeutic benefits and safety profiles.
2. Standardization: Ensuring consistent active constituents across batches.
3. Formulation Design: Optimization of herbal blend and excipients.
4. Manufacturing: Granulation, compression, and optional coating.
5. Quality Control: Evaluation of tablet hardness, friability, disintegration, and dissolution.

Herbal Nutraceutical Tablet Formulation

6. Stability Testing: Assessment under varying environmental conditions.
7. Clinical Evaluation: Optional studies on safety and efficacy.
8. Regulatory Compliance and Marketing: Documentation, approval, and product launch.

Aim and Objectives:-

Aim: To develop and evaluate a safe, effective, and standardized herbal nutraceutical tablet.

Objectives:

- Formulate a tablet containing bioactive herbal extracts.
- Ensure safety, stability, and bioavailability.
- Conduct in vitro and physical evaluations to validate quality.
- Explore potential therapeutic benefits in promoting health and wellness.

Procedure:-

1. Selection of Herbs:

Choose herbs based on their known pharmacological effects and safety profile (e.g.,anti-inflammatory, antioxidant, immune-boosting effects).

Standardize the active ingredients in the herbs to ensure consistency and efficacy.

2. Extraction and Preparation:

Extract bioactive compounds from the chosen herbs using appropriate solvents (e.g.,water, ethanol).

Standardize the extract to ensure a consistent dosage of active ingredients in eachtablet.

3. Formulation Development:

Calculate the correct dose of each herb to be included in the tablet.

Select excipients to aid in tablet formation, improve bioavailability, and ensure stability. Excipients like binders (e.g., starch, cellulose) and disintegrants (e.g., croscarmellose) are included.

4. Granulation:

Prepare the granules by wet or dry granulation methods, depending on the propertiesof the herbal ingredients and excipients.

5. Tablet Compression:

Compress the granules into tablets using a tablet press, ensuring uniform weight, size, and appearance.

6. Coating (Optional):

Coat the tablets if needed for taste masking, controlled release, or stability.

7. Evaluation and Testing:

Hardness Test: Measure the tablet's resistance to breakage.

Friability Test: Assess how well the tablets can withstand mechanical stress without chipping or breaking.

Disintegration Test: Ensure the tablets break down in a suitable time frame for effective absorption.

Dissolution Test: Evaluate the release of active ingredients from the tablet in simulated gastrointestinal conditions.

Stability Studies: Store the tablets under different environmental conditions to assess their shelf-life and efficacy over time.

FORMULATION TABLE:-

INGREDIENT	QUANTITY PER TABLET	QUANTITY FOR 1000 TABLET
HERBAL EXTRACT (Eg. Turmeric Extract)	1000 mg	100 g
HERBAL EXTRACT (Eg. Ginger Extract)	75 mg	75g
STARCH (BINDER) & LACTOSE (FILLER)	20 mg & 50 mg	20g & 50 g
Sodium Starch Glycolate (DISINTEGRANT)	10 mg	10 g
MAGNESIUM STEARATE (LUBRICANT)	5 mg	5 g
COLORING AGENT (OPTIONAL)	As Required	As Required
TOTAL WEIGHT PER TABLET	250 mg	250 g

Results:-

The developed tablets exhibited uniformity in weight, appropriate hardness, low friability, and acceptable disintegration and dissolution profiles. Antioxidant and antimicrobial activity tests supported their therapeutic potential. Stability testing confirmed integrity under standard storage conditions.

Conclusion:-

The herbal nutraceutical tablet demonstrates promise as a natural supplement with potential health benefits. Its formulation ensures consistency, efficacy, and consumer safety, representing a viable alternative to synthetic products.