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Development Of A Herbal Powder For Immunity Boosting Using Moringa, Giloy, And Lemon

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Abstract: The immune system is essential for protecting the body from infections and diseases. The growing interest in natural remedies for immunity boosting has led to research on various herbal combinations. This study focuses on the formulation and evaluation of an immunity booster powder incorporating Giloy (*Tinospora cordifolia*), Moringa (*Moringa oleifera*), and Lemon (*Citrus limon*) powders. Fresh raw materials were cleaned, shade-dried, and pulverized into fine powders. Various formulations were developed in different ratios, ensuring uniform mixing.

Physicochemical parameters, such as moisture content, ash value, and pH, were assessed for the formulated powders. Phytochemical screening revealed the presence of alkaloids, flavonoids, phenolics, and saponins. The antioxidant potential was evaluated using the DPPH radical scavenging assay and reducing power assay. The formulation with equal proportions of Giloy, Moringa, and Lemon powders demonstrated the highest antioxidant activity, suggesting a synergistic effect of the combined ingredients. *Index Terms* - Component, formatting, style, styling, insert.

Keywords: Herbal powder, Moringa, Giloy, Lemon, Immunity boosting, Phytochemical analysis, Immunomodulatory activity

I. INTRODUCTION

Understanding the Power of Our Immune System and Nature's Allies

The immune system is like a vigilant army, tirelessly defending our bodies against harmful invaders like viruses, bacteria, and other pathogens. When this army is strong, it keeps us healthy and helps us bounce back faster if we do fall ill. But when it's weakened—due to poor nutrition, high stress, aging, or an unhealthy lifestyle—we become more susceptible to infections and even chronic diseases.

Supporting our immune system, especially in today's fast-paced world, is more important than ever. While modern medicine certainly has its place, many people are turning to natural and holistic ways to keep their immune system strong. One of the most promising ways to do this is by tapping into the nutritional power of fruits and herbs.

Certain fruits and herbs have been used for centuries to boost immunity and overall wellness. Moringa, Giloy, and Lemon are three such natural treasures. Each one offers a unique set of health-boosting properties, but when combined, their effects can be even more powerful.

Moringa, often called the “miracle tree,” is packed with vitamins, minerals, and antioxidants. It’s particularly rich in dietary fiber, which keeps the digestive system happy and helps regulate blood sugar levels. A healthy gut is closely linked to a strong immune system, so Moringa’s benefits go far beyond just nutrition.

Giloy, also known as Guduchi, is a beloved herb in traditional Indian medicine. It’s known for its immune-modulating properties, which means it helps balance and strengthen the body’s natural defenses. When taken regularly, Giloy may help the immune system respond better to infections and lower inflammation.

Lemons, meanwhile, are celebrated for their high vitamin C content. Vitamin C is a potent antioxidant that helps fight free radicals—unstable molecules that can damage cells and contribute to aging and disease. Plus, vitamin C supports collagen production, keeping our skin, bones, and tissues healthy and resilient.

A Natural Path to Better Immunity and Wellness

Imagine combining the immune-boosting properties of Moringa, Giloy, and Lemon into one potent blend. Together, these ingredients offer a synergistic defense against chronic diseases, infections, and oxidative stress—the kind of stress that can silently wear down our health over time.

What’s exciting about these natural powders is not just their individual benefits, but how they work together. The antioxidants from Moringa, the immune-boosting effects of Giloy, and the vitamin C from Lemon create a natural shield for the body. This blend helps combat harmful free radicals, reduces inflammation, and keeps the body’s defenses strong.

Incorporating these powerful powders into your daily diet doesn’t have to be complicated. A spoonful in your morning smoothie, a sprinkle over your favorite salad, or even mixing them into warm water with a squeeze of fresh lemon can be an easy and delicious way to give your immune system a boost.

Beyond physical health, there’s something deeply comforting about returning to nature’s remedies. It’s a gentle reminder that the Earth has always offered us powerful tools to heal and protect ourselves. As modern life becomes increasingly hectic, embracing these natural allies can bring us back to a more balanced, mindful way of caring for our health.

This exploration of Moringa, Giloy, and Lemon powders underscores a simple but profound truth: small, mindful choices can have a big impact on how we feel every day. So, let’s nurture our bodies with these ancient, trusted sources of wellness—and in doing so, honor the wisdom of nature that has always supported us.

Role of Natural Remedies for Immunity Boosting

Herbs and natural products have been traditionally used to manage infections and support overall well-being. Their beneficial roles in immunity include:

1. Antioxidant Activity

Phytochemicals like flavonoids and vitamin C neutralize reactive oxygen species (ROS) that damage immune cells. The antioxidant properties of natural remedies support cellular repair and maintain a healthy immune environment.

2. Anti-inflammatory Effects

Herbs such as Giloy contain bioactive compounds that inhibit pro-inflammatory mediators, balancing immune responses and reducing chronic inflammation.

3. Micronutrient Content

Vitamins (A, C, E) and minerals (zinc, selenium) are crucial for the development and function of immune cells. Lemon and Moringa powder are especially rich in these micronutrients.

4. Adaptogenic Properties

Adaptogenic herbs like Giloy help the body adapt to stress, improving overall resilience and reducing fatigue associated with infections.

Table 1: Key phytochemicals in Giloy, Moringa, and Lemon

Herb	Key Phytochemicals	Known Health Benefits
Giloy	Berberine, tinosporin	Immunomodulatory anti-inflammatory
Moringa	Quercetin, chlorogenic acid	Antioxidant, antimicrobial, nutrient-rich
Lemon	Vitamin C, hesperidin	Antioxidant, collagen, antimicrobial boosts

MATERIAL :



MORINGA

Moringa (*Moringa oleifera*), commonly known as the drumstick tree or “miracle tree,” is a fast-growing, drought-resistant plant native to India. Every part of the tree—leaves, seeds, pods, and flowers—offers exceptional nutritional and medicinal benefits. Moringa leaves are a powerhouse of nutrients, including vitamins (A, C, and E), minerals (calcium, iron, potassium), and a rich source of protein. Traditionally, it is used for its anti-inflammatory, antioxidant, antimicrobial, and anti-diabetic properties. Moringa seeds also have detoxifying and water-purifying effects. The leaves and pods are widely consumed in soups, curries, and salads. Moringa is also found in powdered form as a dietary supplement. Studies have shown Moringa to be beneficial in reducing blood sugar, lowering cholesterol, and protecting against oxidative stress. Due to its incredible nutritional profile and therapeutic uses, Moringa has gained global recognition as a potent superfood and a valuable medicinal plant.



GILLOY

Giloy (*Tinospora cordifolia*), also known as Guduchi or Amrita, is a highly valued climbing shrub in Ayurvedic medicine. It belongs to the family Menispermaceae and is widely found in tropical and subtropical regions of India. Giloy is renowned for its rejuvenating and immune-boosting properties. Its stem, leaves, and roots are used to prepare extracts or decoctions with various health benefits. Giloy contains numerous bioactive compounds such as alkaloids (berberine, magnoflorine), terpenoids, lignans, glycosides, and phenolic compounds, which collectively contribute to its therapeutic effects. Traditionally, Giloy has been used as an adaptogen to enhance immunity, as an antipyretic to reduce fever, and for its anti-inflammatory, antioxidant, antimicrobial, and hepatoprotective actions. Recent studies suggest Giloy may also have antidiabetic and liver-protective benefits. It is commonly consumed as fresh juice, powder, or standardized extracts in capsules or tablets.



LEMON

Lemon (*Citrus limon*) is a small evergreen tree from the Rutaceae family, known for its tart, bright-yellow fruit. Native to Asia, lemons have been cultivated worldwide for centuries. Rich in vitamin C, citric acid, and flavonoids, lemon is a powerhouse for immune support and antioxidant protection. Its juice and zest are widely used in culinary applications for flavoring and preservation. In traditional medicine, lemon has been valued for its antibacterial, antiviral, and digestive benefits. Lemon water is often consumed for detoxification, digestion, and skin health. Additionally, lemon oil, extracted from the peel, has applications in aromatherapy and natural cleaning products due to its refreshing scent and antimicrobial activity. Research suggests that lemons may help reduce kidney stone formation and lower the risk of cardiovascular disease. With its vibrant taste and impressive health benefits, lemon remains a versatile and widely used natural remedy and culinary ingredient.

Table 1

Parameter	Method	Importance
Moisture Content	Hot air oven method	Shelf-life and microbial stability
pH	pH meter in 1% solution	Compatibility with digestive system
Ash Value	furnace at 550°C	Total mineral and inorganic content

PLAN OF WORK

1. STUDY THE MARKET	Analyze existing herbal Their composition, claims, and limitations. Study consumer references for herbal product
2. Literature Review	Collect information on the therapeutic properties of herbs such as Moringa, Giloy, and Lemon. Review published research on herbal shampoo formulations and evaluation techniques.
3. Selection of Ingredients	Based on historical and scientific evidence of immunity boosting benefits. Availability and cost- effectiveness of raw material.
4. Formulation Development	Determine ingredient proportions based on trial-and-error or previous studies.

Evaluation of the Powder

Physicochemical Evaluation Phytochemical Screening (Qualitative)

Alkaloids: Dragendorff's and Wagner's tests Flavonoids: Shinoda test

Phenolic compounds: Ferric chloride test

Ferric Chloride Test for Giloy, Moringa, and Lemon

1. Giloy (*Tinospora cordifolia*)

Giloy stem extract contains phenolic compounds and tannins.

When ferric chloride is added to a filtrate of Giloy extract, it may produce a greenish or bluish-black color, indicating the presence of phenolics.

2. Moringa (*Moringa oleifera*)

Moringa leaves are rich in polyphenols and flavonoids.

Ferric chloride added to Moringa leaf extract can yield a green to blackish-green coloration, confirming phenolic presence.

3. Lemon (*Citrus limon*)

Lemon juice contains phenolic acids (like ferulic acid, caffeic acid).

Ferric chloride reaction with lemon juice or peel extract may show a faint greenish or bluish-black color depending on the phenolic content.

Tannins: Gelatin test Preparation of Extract:
Extract the plant sample in water or an appropriate solvent.

Addition of Gelatin Solution:

Prepare a 1% gelatin solution (often containing a bit of sodium chloride to aid precipitation). Add an equal volume of gelatin solution to the plant extract.

Observation:

Formation of white precipitate indicates the presence of tannins

Saponins: Froth test Extract Preparation:

Boil or shake the plant material with water. Filter the extract to obtain a clear solution.

Test:

Shake 2–3 ml of the extract vigorously in a test tube for 2–3 minutes.

Observation:

Persistent froth/foam (lasting for at least 10 minutes) indicates the presence of saponins.

Antioxidant Assays

a) DPPH Radical Scavenging Assay

Principle: DPPH solution changes color from purple to yellow in presence of antioxidants. Procedure:

Prepare 0.1 mM DPPH solution in methanol.

Add 1 ml of sample extract to 2 ml of DPPH solution. Incubate for 30 min in dark.

Measure absorbance at 517 nm. Calculate % scavenging activity:

b) Reducing Power Assay

Measures electron-donating capacity of antioxidants. Procedure:

Mix sample extract with phosphate buffer and potassium ferricyanide. Incubate at 50°C for 20 min.

Add trichloroacetic acid, centrifuge, mix supernatant with FeCl₃. Measure absorbance at 700 nm.

Increased absorbance = higher reducing power.

Organoleptic Evaluation

Color: greenish-brown (due to Moringa and Giloy). Taste: herbal, slightly bitter, tangy (lemon notes). Odor: mild herbal aroma.

Texture: fine, homogenous powder.

Table 2: Summary of Formulation Evaluation

Formulation	Moisture (%)	Ash (%)	pH	DPPH Activity (%)	Taste Acceptability
F1	5.2	6.8	6.1	82%	High
F2	5.5	7.0	6.	75%	Moderate
F3	5.3	6.9	6.2	78%	High

Conclusion

This study successfully formulated an immunity booster powder using Giloy, Moringa, and Lemon powders. The powder displayed promising antioxidant activity, suggesting that the combination of these three natural ingredients offers synergistic effects for enhancing immune function. The physicochemical properties indicated good stability and palatability, while the phytochemical screening confirmed the presence of health-promoting secondary metabolites. The formulation F1 (1:1:1) showed the best overall antioxidant activity and sensory acceptability, making it a potential candidate for natural immunity-boosting supplements.

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