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Formulation and Evaluation of Natural Immunobooster Medicine

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Abstract: Herbal supplements that boost immune function are in greater demand as a result of the growing interest in natural and preventative healthcare solutions. In light of this, the current investigation intends to create and assess a polyherbal immunity-boosting powder utilizing medicinal plants that have long been acknowledged for their adaptogenic, immunomodulatory, and antioxidant qualities. *Withania somnifera* (Ashwagandha), *Ocimum sanctum* (Tulsi), *Zingiber officinale* (Ginger), *Curcuma longa* (Turmeric), and *Emblica officinalis* (Amla) are all well-balanced in the herbal composition. These components were chosen due to their ethnomedical applications, literature support, and the existence of potent phytoconstituents such as terpenoids, alkaloids, flavonoids, and phenolics. The raw plant ingredients were shade-dried, ground, and then uniformly blended in predetermined ratios to create the powdered product. To ascertain the quality and stability of the formulation, physicochemical analyses were performed, encompassing organoleptic characteristics, moisture content, bulk density, tapped density, angle of repose, pH, and microbial load. Furthermore, the DPPH radical

scavenging assay was used to evaluate the powder's antioxidant capacity, and assays for nitric oxide and lymphocyte proliferation were used to evaluate its in vitro immunomodulatory activity. The findings showed that the prepared herbal powder has strong antioxidant and immunomodulatory properties, is microbiologically safe, and has desirable physicochemical properties. According to these results, the herbal immunity-boosting powder may be used as a safe and efficient dietary supplement to strengthen immune function, especially in people with compromised immunity or as a prophylactic during pandemics and seasonal fluctuations.

Keywords: Herbal formulation, Immunity booster, Antioxidant activity, Polyherbal powder, *Withania somnifera*, *Ocimum sanctum*, Immunomodulatory agents

1. INTRODUCTION

The body's capacity to defend itself against harmful pathogens such as bacteria, viruses, fungi, and other infectious agents is known as immunity. Innate immunity and acquired immunity are the two fundamental mechanisms upon which the immune system depends [1]. The first line of defense is innate immunity, which is present from birth and is made up of specialized cells, soluble compounds, and physical barriers that stop infections from entering the body [2]. Conversely, acquired immunity builds up gradually as the body encounters particular antigens, such as bacteria, toxins, or vaccinations, enabling the body to create specialized defenses [3]. The growing emphasis on maintaining a robust immune system has led to a rise in the demand for immunity boosters [4]. Herbal immune boosters in particular are becoming more and more popular due to their natural origin and therapeutic qualities. Both during seasonal changes and for preserving overall health, these nutrients are beneficial [5]. To solve issues like the unpleasant taste of some herbal constituents, innovations such as chewable and swallowable pills have been developed to increase their acceptance [6]. Because of their antiviral, anti-inflammatory, and antibacterial properties as well as their capacity to modify the immune system, herbal treatments have long been utilized to treat respiratory infections [7].

1.1. Immune Booster Supplement: In order to create a herbal immune booster, these potent ingredients must be chosen and combined into forms that are easy to use, like powders, tablets, or capsules [8]. Two well-known functional foods from the Zingiberaceae family, ginger (*Zingiber officinale* Roscoe) and turmeric (*Curcuma longa* L.), are renowned for their potent anti-inflammatory properties. Ginger's phenolic components, particularly 6-gingerol (6-g) and 6-shogaol (6-s), are primarily responsible for its anti-inflammatory qualities [9]. These bioactive compounds efficiently lower pro-inflammatory mediators such as TNF- α and IL-6 [10]. Likewise, turmeric's anti-inflammatory qualities have been extensively researched in preclinical and clinical contexts. Its active ingredients, known as curcuminoids, are curcumin (C), demethoxycurcumin (D), and bisdemethoxycurcumin (B) [11]. Ginger and turmeric have similar modes of action in decreasing inflammation, targeting overlapping molecular pathways. Cinnamon (*Cinnamomum zeylanicum* and *Cinnamomum cassia*), also called the "eternal tree" of tropical medicine, belongs to the Lauraceae family [12]. It includes several resinous chemicals, including cinnamaldehyde, cinnamate, cinnamic acid, and essential oils. In addition to its therapeutic benefits, cinnamon is commonly used as a spice and flavoring agent [13]. Despite its great nutritional content, *Moringa oleifera*, a perennial tree from the Moringaceae family, remains an

underappreciated species [14]. Tulsi provides numerous health advantages, including antibacterial, anti-inflammatory, antioxidant, anti-diabetic, antihypertensive, and immunomodulatory properties [15]. It aids with stress management, cognitive enhancement, immunological support, and disease prevention, supporting total physical and mental well-being [16]. Ginseng, obtained from the root of *Panax ginseng** and *Panax quinquefolius** (family: Araliaceae), is noted for its high concentration of saponins, ginsenosides, phenolic compounds, carbohydrates, and carotenoids. Interest in natural medicines is growing, with *Glycyrrhiza glabra* (Licorice) gaining attention for its medicinal properties [17].

2. MATERIAL AND METHODS

2.1. Selecting and Preparing Raw Materials Because each element affects the final product's efficacy, safety, and aesthetic appeal, choosing raw materials is a crucial step. At this point, effectiveness, quality, and safety are crucial factors to consider. Additionally, the final product's pleasantness and satisfaction depend heavily on the flavor and aroma of the ingredients. Peeling bark, sieving, trimming, rejecting damaged regions, and removing pollutants and foreign elements are some of the procedures in the preparation process, which differs according to the plant component used. With a focus on quality and freshness, local markets were the source of hygienic and fresh ingredients including ashwagandha, cinnamon, moringa, licorice, ginger, tulsi, turmeric, ginseng, and moringa [18].

2.2. Drying: Sun drying is a natural process that uses air movement and solar heat to remove moisture from objects. Ginger, tulsi, turmeric, ginseng, licorice, moringa, ashwagandha, and cinnamon were among the herbs that were sun-dried for 48 hours after collection [19]. Place the herbs on trays in a bright, well-lit place to ensure they dry properly. The heat from the sun promotes moisture evaporation, allowing the plants to dry organically. To achieve the best results, keep an eye on the weather and choose bright, dry days [20]. The drying time varies depending on the type of herb, weather conditions, and layer thickness. Complete drying can take anywhere from a few days to a week [21].



Figure 1: Drying of Drugs

2.3. Powder Formulation [22]:

- Material Preparation
- Grinding the Material

- SettingUp theSieve
- SievingProcess
- Collectingand Storingthe Powder



Figure 2: Sieving of Powder Figure 3: Mixing of Powder

Table 1: Formulation contents

S. no.	Ingredient	Partused	Properties	Quantity (in gm)
1	Ginger	Rhizome powder	Anti-Microbial	10
2	Tulsi	Leaves powder	Vitcandzinc	10
3	Turmeric	Rhizome powder	Anti-inflammatory	7.5
4	Amla	Fruit powder	Antioxidant, Anti-inflammatory	3
5	Liquorice	Root powder	Maintainenergylevel	4.5
6	Moringa	Leaves powder	Analgesic, Lowercholesterol	4
7	Ashwagandha	Root powder	Reducebloodsugarlevel	7
8	Sesameseed	Seed powder	Antioxidant	4

3.RESULTANDDISCUSSION

3.1. Test Result:

3.1.1. Organoleptic evaluation: Based on appearance, the herbal immune booster appears to be in good shape. It is appropriate for all age groups due to its fine and smooth texture, sweet flavor, and ease of dissolution in water. The powder has a greenish-yellow hue.

Table 2: Organoleptic evaluation

Quality attribute	Result
Appearance	Yellowish green
Texture	Fine smooth
Flavour	Sweet
Odor	Slight

3.1.2. Micromeritics powder characteristic: The particle size of the herbal immunity booster powder ranges between 10- 15micrometers with a surface area of 0.25cm²/g. 30° is the angle of repose. The

bulk density is 0.4g/ml, and the tapped density is 0.5g/ml.

Table 3: Micromeritics powder characteristic

1	Particle size	10-15um
2	Surface area	0.25cm ² /g
3	Angle of repose	30°
4	Bulk density	0.4g/ml
5	Tapped density	0.5g/ml

3.1.3. Physical Evaluation: According to weight, the sample has a 6.5% ash content and a 1.5% moisture content. The developed mixture has a pH of 5.8, making it somewhat acidic. Good flow characteristics are indicated by a compressibility index of 5% to 10%, which gauges the material's flowability.

Table 4: Physical Evaluation

Srno	Test	Result
1	Ash value	6.5%
2	Moisture content	1.5%
3	pH	5.8
4	% compressibility index	5-10%

CONCLUSION

In conclusion, maintaining a robust immune system is critical to shielding our bodies against disease. By leading a healthy lifestyle, you can strengthen your immunity and enhance your health. Allopathic medications can help boost immunity and combat oxidative stress, but they are sometimes expensive and have negative side effects. A natural and promising substitute is provided by Ayurvedic medications. Immune-boosting medications that are safe, effective, and reasonably priced can be made with herbal components. In comparison to some common dietary supplements like Proteine X, a balanced intake of nutrients, including lipids, fiber, carbs, minerals (such as phosphorus, magnesium, manganese, and selenium), and vitamins (such as thiamin, riboflavin, and vitamin K), can offer superior nutrition. According to the study, the ideal dietary supplement might be made by combining probiotics, medicinal herbs, and organic food items. These combinations are even more essential because many individuals don't get enough vitamins, minerals, and other healthy plant ingredients in today's hectic and stressful lives.

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