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Formulation and Evaluation of Herbal Immunity Booster Powder

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Abstract-The present study focuses on the formulation and evaluation of a herbal immunity booster powder prepared using natural medicinal herbs known for their immunomodulatory, antioxidant, and health-promoting properties. In recent years, there has been increasing interest in herbal formulations due to their safety, effectiveness, affordability, and minimal side effects compared to synthetic preparations. The formulated immunity booster powder was developed using herbal ingredients such as turmeric, ginger, Tulsi, amla, cinnamon, black pepper, giloy, and ashwagandha, which are traditionally used in Ayurvedic medicine for enhancing body resistance and improving overall health. The selected herbal ingredients were collected, dried, powdered, and sieved individually before being blended in suitable proportions to obtain a homogeneous formulation. The prepared powder was evaluated for various physicochemical and organoleptic parameters including color, odor, taste, texture, bulk density, and tapped density, angle of repose, ash value, moisture content, pH, and solubility. Stability studies were also carried out under suitable storage conditions to determine the stability and shelf life of the formulation. The evaluation results indicated that the prepared herbal immunity booster powder possessed good flow properties, acceptable physicochemical characteristics, and satisfactory stability. The formulation showed potential antioxidant and immunomodulatory activity due to the presence of bioactive phytoconstituents such as flavonoids, phenolics, alkaloids, and vitamins. The study concludes that the developed herbal immunity booster powder can be used as a safe and effective natural health supplement for improving immunity and maintaining overall wellness.

Keywords: Herbal Immunity Booster, Polyherbal Powder, Immunomodulatory Activity, Ayurvedic, Formulation, Antioxidant, Herbal Supplement, Phytoconstituents, Natural Immunity Enhancer.

I. INTRODUCTION

The immune system is a highly specialized and complex biological defense mechanism that plays a crucial role in protecting the human body against harmful microorganisms, foreign particles, toxins, allergens, and disease-causing pathogens. It is composed of a network of cells, tissues, organs, proteins, and biochemical mediators that work together in a coordinated manner to maintain the body's internal balance and ensure proper functioning of physiological systems. The immune system acts as the first line of defense and continuously monitors the body to identify and eliminate invading microorganisms such as bacteria, viruses, fungi, and parasites. It also helps in the destruction of abnormal cells, prevention of tumour formation, repair of damaged tissues, and regulation of inflammatory responses.

The immune system can be broadly classified into innate immunity and acquired immunity. Innate immunity is the natural defense mechanism present from birth and includes physical barriers such as skin, mucous membranes, saliva, tears, and gastric acid that prevent the entry of pathogens into the body. It also includes immune cells such as macrophages, neutrophils, natural killer cells, and dendritic cells that rapidly respond to infections. Acquired or adaptive immunity develops after exposure to pathogens and involves specialized lymphocytes such as B-cells and T-cells that produce antibodies and provide

long-term protection against diseases. Both innate and adaptive immunity work together to maintain health and protect the body from infections and diseases.

A healthy immune system is essential for maintaining overall health and quality of life. Strong immunity helps the body fight infections effectively, recover rapidly from illnesses, and reduce the risk of chronic diseases. However, due to changes in modern lifestyle and environmental conditions, immunity is often weakened in many individuals. Factors such as unhealthy eating habits, malnutrition, stress, pollution, smoking, alcohol consumption, sedentary lifestyle, lack of sleep, excessive use of antibiotics, aging, and exposure to harmful chemicals adversely affect immune function. In addition, rapid urbanization and industrialization have increased environmental pollution and exposure to infectious agents, leading to a rise in immune-related disorders and recurrent infections.

In recent decades, there has been a dramatic increase in lifestyle diseases such as diabetes, hypertension, obesity, cardiovascular disorders, respiratory diseases, and cancer. Weak immunity is considered one of the major contributing factors to the development and progression of these diseases. Furthermore, emerging viral infections and pandemics have highlighted the importance of maintaining a strong immune system. The COVID-19 pandemic created global awareness regarding immune health and preventive healthcare. During this period, people increasingly turned toward natural remedies, herbal medicines, and nutritional supplements to improve immunity and reduce susceptibility to infections. This growing awareness has significantly increased the demand for herbal immunity boosters and nutraceuticals products worldwide.

The present study focuses on the formulation and evaluation of a herbal immunity booster powder prepared using selected medicinal herbs possessing proven immunomodulatory and antioxidant properties. The study aims to develop a safe, effective, stable, economical, and acceptable herbal formulation capable of enhancing immunity and promoting general health. The prepared formulation is expected to provide a natural alternative to synthetic immunity boosters and contribute significantly to preventive healthcare management. This study also emphasizes the importance of integrating traditional herbal medicine with modern pharmaceutical approaches for improving public health and wellness.

II. REVIEW OF LITERATURE

1. Sharma et al. (2018), conducted a detailed study on herbal immunomodulators and their role in improving immunity and disease resistance. The authors explained that medicinal plants have been traditionally used in Ayurveda and other herbal systems of medicine for strengthening the body's defense mechanisms. Herbs such as Tulsi, Turmeric, Amla, Ashwagandha, and Giloy were reported to possess strong antioxidant, antimicrobial, antiinflammatory, and immunomodulatory activities due to the presence of phytoconstituents like flavonoids, alkaloids, tannins, glycosides, and phenolic compounds. The study emphasized that oxidative stress weakens immunity and increases the risk of chronic diseases and infections. Herbal antioxidants help neutralize free radicals and protect immune cells from damage. The authors also highlighted the advantages of herbal medicines over synthetic drugs, including lower toxicity, better patient compliance, affordability, and minimal side effects. The study concluded that herbal immunomodulators can significantly contribute to preventive healthcare and improve overall health naturally through regular consumption and proper formulation approaches.

2. Patel and Singh (2019), developed a polyherbal immunity booster powder using medicinal plants such as Tulsi, Ginger, Turmeric, Giloy, and Amla. The objective of the study was to formulate a safe and effective herbal powder capable of improving immunity and promoting health. The herbal ingredients were cleaned, shade dried, powdered separately, sieved, and blended in appropriate proportions. The prepared formulation was evaluated for various physicochemical parameters including color, odor, taste, pH, moisture content, ash value, bulk density, tapped density, and angle of repose. The results indicated that the formulation possessed acceptable organoleptic characteristics and good flow properties. Phytochemical analysis revealed the presence of alkaloids, tannins, flavonoids, glycosides, and phenolic compounds

responsible for antioxidant and immunomodulatory activities. Stability studies confirmed that the formulation remained stable under normal storage conditions. The researchers concluded that the developed herbal immunity booster powder can be effectively used as a natural supplement for strengthening Immunity and maintaining general health.

3. Gupta et al. (2020), reviewed the therapeutic importance of Ayurvedic medicinal plants in immunity enhancement and disease prevention. The authors explained that Ayurveda emphasizes preventive healthcare through herbal medicines, healthy diet, and balanced lifestyle practices. Various medicinal herbs including Tulsi, Amla, Ashwagandha, Turmeric, and Giloy were discussed for their immunomodulatory and antioxidant activities. According to the study, phytoconstituents such as curcumin, vitamin C, eugenol, and withanolides improve immune responses by stimulating immune cells and reducing oxidative stress. The paper highlighted that herbal formulations help improve resistance against viral infections, inflammatory diseases, respiratory disorders, and stress-related illnesses. The researchers also emphasized the significance of polyherbal formulations because of their synergistic therapeutic effects. The study concluded that herbal medicines are safer alternatives to synthetic immunostimulants due to their lower toxicity and suitability for long-term use. The authors recommended greater integration of herbal therapies into modern preventive healthcare systems.

4. Kumar et al. (2017), investigated the immunomodulatory activity of Ocimum sanctum (Tulsi) and its therapeutic importance in improving immunity. The researchers observed that Tulsi contains several active phytoconstituents such as eugenol, ursolic acid, rosmarinic acid, flavonoids, and essential oils that contribute to its medicinal properties. Experimental findings showed that Tulsi stimulates immune cell activity, enhances antibody production, and increases resistance against microbial infections. The herb also demonstrated significant antioxidant and anti-inflammatory activities that help protect the body from oxidative stress and inflammatory damage. The study discussed the traditional use of Tulsi in treating respiratory disorders, fever, cough, cold, asthma, and infections. The authors emphasized that regular use of Tulsi improves respiratory health, reduces stress, and enhances overall immunity. The study concluded that Tulsi possesses excellent immunomodulatory potential and can be effectively incorporated into herbal formulations designed for immunity enhancement and disease prevention.

5. Verma and Yadav (2018), evaluated the antioxidant and immunoprotective properties of Emblica officinalis commonly known as Amla. The authors reported that Amla is one of the richest natural sources of vitamin C and contains important phytoconstituents such as flavonoids, tannins, gallic acid, and ellagic acid. These compounds exhibit strong antioxidant activity that helps neutralize free radicals and protect cells from oxidative damage. The study demonstrated that Amla enhances immunity by stimulating white blood cell production and improving the body's defense mechanisms against infections. The researchers also discussed the hepatoprotective, anti-inflammatory, and rejuvenating effects of Amla. According to the study, regular consumption of Amla improves digestion, metabolism, blood purification, and overall health. The authors concluded that Amla can serve as an effective ingredient in herbal immunity booster formulations because of its nutritional value, antioxidant potential, and immunomodulatory activity.

6. Joshi et al. (2021), prepared and evaluated a herbal health powder containing medicinal herbs known for antioxidant and immunity-enhancing activities. The herbal ingredients were selected based on traditional medicinal uses and therapeutic properties. The study involved drying, grinding, sieving, blending, and formulation of a polyherbal powder. Various evaluation parameters including color, odor, taste, texture, bulk density, tapped density, angle of repose, moisture content, ash value, and pH were assessed. The prepared formulation showed good flow properties, satisfactory stability, and acceptable physicochemical characteristics. Phytochemical screening confirmed the presence of flavonoids, glycosides, alkaloids, tannins, and phenolic compounds responsible for therapeutic activity. The study highlighted that herbal powders are economical, easy to prepare, and suitable for

long-term use. Stability studies revealed that the formulation remained stable without significant changes in color, odor, and physicochemical properties. The researchers concluded that herbal powders can effectively support immunity and improve general health.

7. Reddy et al. (2019), reviewed the pharmacological importance of Withania somnifera (Ashwagandha) as an adaptogenic and immunomodulatory herb. The study explained that Ashwagandha contains active constituents known as withanolides, which possess antioxidant, anti-inflammatory, anti-stress, and immune-enhancing properties. Chronic stress weakens the immune system and increases the risk of infections and metabolic disorders. Ashwagandha helps reduce cortisol levels, improve mental health, increase stamina, and enhance resistance against stress-induced immune suppression. Experimental findings showed that Ashwagandha stimulates immune cell activity and protects tissues from oxidative damage. The herb was also reported to improve energy levels, physical performance, and overall wellness. The researchers highlighted the significance of Ashwagandha in traditional Ayurvedic medicine for rejuvenation and vitality enhancement. The study concluded that Ashwagandha can be effectively used in herbal immunity booster formulations for improving immunity and reducing stress-related health problems.

8. Khan et al. (2020), studied the medicinal importance and immunomodulatory activity of Tinospora cordifolia (Giloy). The authors explained that Giloy is widely used in Ayurveda because of its antioxidant, antimicrobial, anti-inflammatory, antipyretic, and immunityenhancing properties. The plant contains several bioactive compounds such as alkaloids, glycosides, diterpenoid lactones, and steroids responsible for its pharmacological activities. Experimental studies demonstrated that Giloy stimulates macrophage activity, improves phagocytosis, and enhances immune responses against pathogens. The herb also showed significant antioxidant activity that protects cells from oxidative stress and tissue damage. Traditionally, Giloy is used in the treatment of fever, respiratory infections, diabetes, liver disorders, and inflammatory diseases. The authors emphasized the growing popularity of Giloy during viral outbreaks and immune-related disorders. The study concluded that Giloy is a valuable medicinal herb with strong immunomodulatory potential and can be effectively incorporated into herbal immunity booster preparations.

9. Mehta et al. (2018), discussed the importance of polyherbal formulations in preventive and promotive healthcare systems. The authors explained that combining multiple medicinal herbs results in synergistic therapeutic effects and improved efficacy. Polyherbal formulations are commonly used in traditional medicine for enhancing immunity, improving vitality, promoting digestion, and preventing diseases. The review highlighted medicinal plants such as Tulsi, Turmeric, Ginger, Ashwagandha, and Amla for their antioxidant, antimicrobial, antiinflammatory, and immunomodulatory properties. The study also discussed the advantages of herbal formulations including affordability, safety, reduced toxicity, and broader pharmacological action compared to synthetic medicines. The authors emphasized the importance of quality control and standardization in herbal product development to ensure safety and efficacy. The study concluded that polyherbal formulations are gaining increasing acceptance globally as natural healthcare alternatives and can play an important role in preventive medicine and wellness promotion.

10. Singh and Kaur (2021), developed and evaluated a herbal nutraceutical powder intended for immunity enhancement and nutritional supplementation. The formulation contained medicinal herbs rich in vitamins, antioxidants, and bioactive phytoconstituents. The prepared powder was evaluated for organoleptic properties, physicochemical parameters, phytochemical screening, and stability studies. The results showed acceptable color, odor, taste, texture, and good flow characteristics. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, glycosides, tannins, and phenolic compounds responsible for therapeutic effects. The study demonstrated significant antioxidant activity and potential immunomodulatory benefits of the formulation. Stability testing revealed that the herbal powder remained stable under normal storage conditions without significant changes in quality. The authors emphasized the growing demand for herbal nutraceuticals due to increasing awareness regarding preventive

healthcare and natural therapies. The study concluded that herbal nutraceutical powders are safe, economical, and effective alternatives to synthetic supplements for improving immunity and promoting overall health and wellness.

11. Choudhary et al. (2019), studied the pharmacological activities and medicinal importance of Zingiber officinale (Ginger) in improving immunity and treating various health disorders. The authors explained that ginger contains active constituents such as gingerol, shogaol, zingiberene, and volatile oils that possess antioxidant, antimicrobial, anti-inflammatory, and digestive properties. The study reported that ginger helps strengthen the immune system by reducing oxidative stress and improving blood circulation. Experimental studies demonstrated that ginger exhibits inhibitory activity against several bacterial and viral pathogens. The herb also helps reduce inflammation associated with respiratory infections, sore throat, cough, and cold. According to the researchers, regular use of ginger improves digestion, nutrient absorption, metabolism, and overall wellness. The study highlighted the role of ginger in traditional medicine systems and emphasized its importance in herbal immunity booster formulations. The authors concluded that ginger is a valuable medicinal herb with significant therapeutic potential for maintaining immunity and preventing infectious diseases naturally.

12. Desai et al. (2020), reviewed the role of herbal medicines in maintaining immune health and preventing infectious diseases. The study emphasized the increasing use of herbal formulations due to growing awareness regarding preventive healthcare and the limitations of synthetic medicines. Medicinal plants such as Tulsi, Giloy, Turmeric, Amla, and Ashwagandha were reported to possess antioxidant, antimicrobial, anti-inflammatory, and immunomodulatory activities. The authors explained that phytoconstituents present in medicinal herbs help improve immune responses by stimulating immune cells and reducing oxidative damage. The review highlighted the importance of herbal products during viral outbreaks and respiratory infections. According to the researchers, herbal medicines are generally safer and suitable for long-term use because of fewer side effects and lower toxicity. The study also discussed the importance of standardization and quality control of herbal products to ensure safety and therapeutic efficacy. The authors concluded that herbal medicines can significantly contribute to immune system support and preventive healthcare management.

13. Patel et al. (2018), conducted a study on the formulation and physicochemical evaluation of herbal powder formulations used for health promotion and immunity enhancement. The researchers selected medicinal herbs with proven therapeutic activities and prepared a polyherbal powder using drying, grinding, and blending techniques. The prepared formulation was evaluated for color, odor, taste, pH, moisture content, ash value, bulk density, tapped density, angle of repose, and stability. The results showed that the herbal powder possessed acceptable organoleptic properties and good flow characteristics. Phytochemical screening revealed the presence of flavonoids, alkaloids, glycosides, tannins, and phenolic compounds responsible for antioxidant and immunomodulatory activities. Stability studies confirmed that the formulation remained stable during storage without significant changes in quality parameters. The authors concluded that properly formulated herbal powders can effectively support immunity and overall health. The study also highlighted the importance of quality assessment and standardization in herbal product development.

14. Sharma and Gupta (2020), studied the immunomodulatory and anti-inflammatory activity of curcumin obtained from Curcuma longa (Turmeric). The authors explained that curcumin possesses strong antioxidant properties that help neutralize free radicals and protect immune cells from oxidative damage. The study demonstrated that curcumin regulates inflammatory mediators, enhances macrophage activity, and stimulates immune responses. The researchers discussed the role of turmeric in traditional medicine for the treatment of infections, wound healing, digestive disorders, arthritis, and respiratory diseases. Experimental findings showed that turmeric improves resistance against microbial infections and reduces inflammation associated with chronic diseases. The authors emphasized that curcumin also possesses hepatoprotective, anticancer, and antimicrobial activities. The study concluded that turmeric is an important medicinal herb for immunity enhancement

and can be effectively incorporated into herbal immunity booster formulations due to its broad therapeutic potential and safety profile.

15. Nair et al. (2017), reviewed traditional medicinal herbs used as natural immunity boosters in Ayurveda and folk medicine. The study highlighted medicinal plants such as Tulsi, Ashwagandha, Amla, Giloy, and Neem for their ability to improve immunity and overall wellness. According to the authors, these herbs contain phytochemicals that possess antioxidant, antimicrobial, adaptogenic, and anti-inflammatory properties. The review explained that herbal medicines help improve the body's defense mechanisms by stimulating immune cells and enhancing resistance against pathogens. The researchers discussed the role of traditional remedies in preventing respiratory infections, fever, digestive disorders, and stress-related illnesses. The study also highlighted the importance of herbal formulations in preventive healthcare and long-term wellness management. The

III. AIM & OBJECTIVES

Aim

To formulate and evaluate an herbal immunity booster powder using selected medicinal herbs possessing immunomodulatory, antioxidant, antimicrobial, and health-promoting properties for enhancing body immunity and maintaining overall health.

Objectives

1. To select suitable medicinal herbs having immunity-enhancing and antioxidant properties.
2. To collect, identify, and authenticate herbal raw materials used in the formulation.
3. To prepare a polyherbal immunity booster powder using appropriate pharmaceutical methods.
4. To evaluate the prepared formulation for organoleptic characteristics such as color, odor, taste, and texture.
5. To determine physicochemical parameters including bulk density, tapped density, angle of repose, moisture content, ash value, and pH.
6. To perform phytochemical screening for the identification of active phytoconstituents present in the formulation.
7. To evaluate the stability of the prepared herbal powder under suitable storage conditions.
8. To study the antioxidant and immunomodulatory potential of the herbal formulation.
9. To develop a safe, economical, and effective herbal product for preventive healthcare and immunity enhancement.
10. To promote the use of herbal medicines and natural products as alternatives to synthetic immunity boosters.

IV. RESEARCH METHODOLOGY

Table.1: Materials Used

Sr. No.	Material	Biological Name	Category	Use
1	Tulsi Powder	Ocimum sanctum	Herbal Ingredient	Immunity enhancer
2	Turmeric Powder	Curcuma longa	Herbal Ingredient	Antioxidant and anti-inflammatory agent
3	Ginger Powder	Zingiber officinale	Herbal Ingredient	Digestive and antimicrobial agent
4	Amla Powder	Emblica officinalis	Herbal Ingredient	Rich source of Vitamin C
5	Giloy Powder	Tinospora cordifolia	Herbal Ingredient	Immunomodulatory agent
6	Ashwagandha Powder	Withania somnifera	Herbal Ingredient	Adaptogenic herb
7	Black Powder	Piper nigrum	Herbal Ingredient	Bioavailability enhancer
8	Cinnamon Powder	Cinnamomum zeylanicum	Herbal Ingredient	Antioxidant antimicrobial agent
9	Distilled Water	—	Solvent	Cleaning and evaluation
10	Honey	—	Vehicle	Administration purpose

FORMULATION OF HERBAL IMMUNITY BOOSTER POWDER

Step 1: Selection of Herbal Ingredients

Medicinal herbs possessing immunomodulatory, antioxidant, antimicrobial, and health-promoting properties were selected based on literature survey and traditional medicinal uses. Tulsi, Turmeric, Ginger, Amla, Giloy, Ashwagandha, Black Pepper, and Cinnamon were selected for formulation preparation.

Step 2: Collection and Authentication of Herbal Materials

The herbal ingredients were collected from local herbal markets and authenticated suppliers. The collected materials were carefully examined for purity, freshness, and absence of adulterants. Authentication of medicinal plants was performed using standard pharmacognostic methods and reference literature.

Step 3: Cleaning of Herbal Materials

The collected herbs were cleaned thoroughly to remove dirt, dust particles, foreign matter, and unwanted materials. Fresh herbs were washed using clean water and allowed to dry properly before further processing.

Step 4: Drying of Herbal Materials

The cleaned herbal materials were shade dried at room temperature for several days to remove moisture content. Shade drying was preferred to preserve active phytoconstituents and volatile components present in medicinal plants. Drying was continued until constant weight was achieved.

Step 5: Pulverization

The dried herbal materials were separately powdered using a mechanical grinder. Pulverization was carried out carefully to obtain coarse powder without overheating, which could damage heat-sensitive constituents.

Table.11: FORMULATION BATCHES

Ingredient	F1 (g)	F2 (g)	F3 (g)
Tulsi Powder	15	20	25
Turmeric Powder	10	15	20
Ginger Powder	10	15	15
Amla Powder	20	20	15
Giloy Powder	10	10	10
Ashwagandha Powder	10	10	5
Black Pepper Powder	5	5	5
Cinnamon Powder	5	5	5
Total Weight	85 g	100 g	100 g

↓
Collection of Herbal Materials
↓
Authentication of Herbs
↓
Cleaning of Raw Materials
↓
Shade Drying
↓
Pulverization Using Grinder
↓
Sieving Through Sieve No. 60
↓
Accurate Weighing of Ingredients
↓
Mixing by Geometric Dilution Method
↓
Preparation of Polyherbal Powder
↓
Evaluation of Formulation
↓
Packaging in Airtight Containers
↓
Storage Under Suitable Conditions

V. RESULT & DISCUSSION

The prepared herbal immunity booster powder formulations F1, F2, and F3 were evaluated for various organoleptic and physicochemical parameters to determine their quality, stability, flow properties, and suitability for use as an immunity-enhancing herbal formulation. The obtained results are discussed below.

Organoleptic Evaluation

Organoleptic evaluation was performed to assess the physical appearance and sensory characteristics of the prepared formulations.

Table.3: Organoleptic Evaluation of Herbal Immunity Booster Powder

Parameter	F1	F2	F3
Color	Light Brown	Brown	Dark Brown
Odor	Characteristic Aromatic	Pleasant Aromatic	Strong Aromatic
Taste	Slightly Bitter	Bitter-Pungent	Bitter
Texture	Fine Powder	Smooth Fine Powder	Slightly Coarse
Appearance	Uniform	Uniform	Uniform

Discussion

The organoleptic evaluation showed that all three formulations possessed acceptable physical characteristics. Formulation F2 showed better appearance, pleasant aromatic odor, and smooth texture compared to F1 and F3. The brown color observed in the formulations was mainly due to the presence of turmeric, cinnamon, and amla powders. Bitter and pungent taste was attributed to medicinal herbs such as Giloy, Ginger, and Black Pepper. Uniform appearance indicated proper mixing and homogeneity of the ingredients. The acceptable organoleptic characteristics suggest good patient acceptability and formulation quality.

Bulk Density

Bulk density was determined to evaluate packing ability and flow properties of the powder formulations.

Table.4: Bulk Density of Formulations

Formulation	Bulk Density (g/ml)
F1	0.42
F2	0.48
F3	0.46

Discussion

The bulk density values indicated satisfactory packing characteristics of the prepared herbal powders. Formulation F2 showed comparatively higher bulk density, indicating better particle arrangement and packing efficiency. Appropriate bulk density is important for handling, packaging, and transportation of powder formulations. The results suggested that all formulations possessed suitable bulk properties for pharmaceutical use.

Tapped Density

Tapped density was evaluated to determine powder compressibility and packing behavior after tapping.

Table.5: Tapped Density of Formulations

Formulation	Tapped Density (g/ml)
F1	0.53
F2	0.58
F3	0.56

Discussion

Tapped density values were higher than bulk density values in all formulations, indicating normal particle rearrangement during tapping. Formulation F2 exhibited optimum tapped density, suggesting good compressibility and packing characteristics. The difference between bulk density and tapped density values was within acceptable limits, indicating satisfactory flowability and handling properties.

Angle of Repose

Angle of repose was measured to determine flow properties of the formulations.

Table.6: Angle of Repose

Formulation	Angle of Repose (°)	Flow Property
F1	29.5°	Good
F2	27.8°	Excellent
F3	31.2°	Good

Discussion

The angle of repose values indicated good to excellent flow properties of the prepared formulations. Formulation F2 showed the lowest angle of repose value, indicating excellent flowability due to better particle size distribution and reduced interparticle friction. Good flow properties are essential for easy mixing, filling, packaging, and storage of herbal powder formulations.

Carr's Index
Carr's index was determined to evaluate compressibility and flowability of powder formulations.

Table.7: Carr's Index

Formulation	Carr's Index (%)
F1	20.75
F2	17.24
F3	17.85

Discussion
The Carr's index values indicated acceptable compressibility and flow properties of all formulations. Lower Carr's index values of F2 and F3 suggested better flowability and reduced cohesiveness compared to F1. The results confirmed that the formulations possessed suitable characteristics for handling and packaging.

Hausner Ratio
Hausner ratio was evaluated to determine interparticle friction and powder cohesiveness.

Table.8: Hausner Ratio

Formulation	Hausner Ratio
F1	1.26
F2	1.20
F3	1.21

Discussion
Hausner ratio values below 1.25 indicate good flowability of powder formulations. Formulation F2 showed the lowest Hausner ratio value, indicating excellent flow characteristics and low cohesiveness among particles. The results demonstrated that all formulations had acceptable powder flow properties.

Moisture Content
Moisture content was determined to assess stability and susceptibility to microbial contamination.

Table.9: Moisture Content

Formulation	Moisture Content (%)
F1	4.5
F2	3.8
F3	4.2

Discussion
Low moisture content values were observed in all formulations, indicating good drying efficiency and stability of the prepared herbal powders. Formulation F2 exhibited the lowest moisture content, suggesting better shelf stability and lower chances of microbial growth. Reduced moisture content is important for preventing degradation and maintaining quality of herbal products during storage.

Ash Value
Ash value determination was performed to estimate inorganic impurities and purity of formulations.

Table.10: Ash Value

Formulation	Total Ash Value (%)
F1	5.8
F2	5.2
F3	5.5

Discussion
Ash values of all formulations were within acceptable limits, indicating minimal inorganic impurities and good purity of herbal ingredients. Formulation F2 showed slightly lower ash value, reflecting better quality and lower contamination. Ash value analysis confirmed the standard quality of the prepared herbal powders.

PH Determination
PH was determined to evaluate stability and suitability for oral administration.

Table.11: pH of Formulations

Formulation	pH
F1	6.4
F2	6.7
F3	6.5

Discussion
The pH values of all formulations were found to be near neutral, indicating suitability for oral administration and good formulation stability. Formulation F2 showed optimum pH value, which may improve patient acceptability and minimize irritation during consumption.

Phytochemical Screening
Phytochemical analysis was performed to identify active constituents present in the formulations.

Table.12: Phytochemical Screening

Phytoconstituents	F1	F2	F3
Alkaloids	Present	Present	Present
Flavonoids	Present	Present	Present
Tannins	Present	Present	Present
Glycosides	Present	Present	Present
Phenolic Compounds	Present	Present	Present
Saponins	Present	Present	Present

Discussion
Phytochemical screening confirmed the presence of important bioactive constituents such as alkaloids, flavonoids, tannins, glycosides, phenolics, and saponins in all formulations. These compounds are responsible for antioxidant, antimicrobial, anti-inflammatory, and immunomodulatory activities of the herbal powder. The presence of these phytochemicals indicates the therapeutic potential of the formulation for immunity enhancement and preventive healthcare.

Stability Studies
Stability studies were performed to determine physical stability of the formulations during storage.

Table.13: Stability Study Results

Parameter	Observation After Storage
Color	No significant change
Odor	No significant change
Texture	Stable
Moisture Content	Slight variation
Microbial Growth	Absent

Discussion
The stability study results indicated that the prepared herbal immunity booster powder remained stable during the storage period without significant changes in color, odor, texture, or physicochemical properties. No microbial growth was observed, indicating good stability and proper storage conditions. The formulation maintained its quality and therapeutic characteristics throughout the study period.

Overall Discussion
Among all three formulations, formulation F2 exhibited better organoleptic properties, excellent flowability, lower moisture content, acceptable ash value, optimum pH, and satisfactory stability compared to F1 and F3. The presence of important phytoconstituents such as flavonoids, alkaloids, tannins, and phenolic compounds confirmed the therapeutic potential of the formulation. The prepared herbal immunity booster powder demonstrated satisfactory physicochemical characteristics and may serve as a safe, effective, stable, and economical herbal formulation for enhancing immunity and promoting overall health naturally.

VI. SUMMARY & CONCLUSION

Conclusion
The present study successfully formulated and evaluated a herbal immunity booster powder using selected medicinal herbs possessing immunomodulatory, antioxidant, antimicrobial, and health-promoting activities. The formulation was prepared using Tulsi, Turmeric, Ginger, Amla, Giloy, Ashwagandha, Black Pepper, and Cinnamon, which are well-known medicinal plants widely used in traditional Ayurvedic medicine for improving immunity and overall health.

The prepared herbal formulations were evaluated for various organoleptic and physicochemical parameters including color, odor, taste, texture, bulk density, tapped density, angle of repose, Carr's index, Hausner ratio, moisture content, ash value, pH, phytochemical screening, and stability studies. The obtained results demonstrated satisfactory quality, stability, flow properties, and physicochemical characteristics of the prepared formulations.

flavonoids, alkaloids, tannins, glycosides, phenolics, and saponins responsible for antioxidant remained stable

under suitable storage conditions without significant physical or chemical changes.

Among the prepared batches, formulation F2 showed superior overall performance with better organoleptic properties, excellent flowability, lower moisture content, acceptable ash value, and optimum pH. The formulation exhibited good quality and may be considered suitable for use as an herbal immunity booster supplement.

The study concluded that the prepared herbal immunity booster powder is a safe, stable, economical, and effective polyherbal formulation that may help enhance immunity, improve resistance against infections, and promote overall wellness naturally. The formulation can serve as a valuable herbal health supplement and may contribute significantly to preventive healthcare management. Further pharmacological and clinical studies are recommended to scientifically validate its therapeutic efficacy and safety for large-scale commercial applications.

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