

# Development and Formulation of Polyherbal Immune Booster powder: A Review

Gagandeep<sup>1</sup>, Anjali Sahu<sup>2</sup>, Dr. Gyanesh Kumar Sahu<sup>2</sup>, Dr. Chanchal deep Kaur<sup>1</sup>

<sup>1</sup>Rungta Institute of Pharmaceutical Sciences, Bhilai

<sup>2</sup>Rungta Institution of Pharmaceutical Sciences and Research

## Abstract:

People are getting sick often because of the way they live. This is making their immune systems weak. At the time some germs are becoming resistant to medicine. So we need to find ways to boost our immune systems that are safe and natural. Some people use herbs to help them feel better. This is called polyherbalism<sup>1</sup>. It can be good because it uses different herbs together. The problem is that these herbal mixtures are not made with the same care, as other medicines. They need to be made in a way that doctors and scientists trust. The present study aimed to develop, formulate, and evaluate a polyherbal immune booster powder using a combination of traditionally recognized medicinal plants, specifically selected for their synergistic immunomodulatory properties<sup>2</sup>. The developed polyherbal powder provides a stable, standardized, and palatable alternative to synthetic immunomodulators. This study establishes a scientific basis for the use of this formulation as a prophylactic measure to enhance host immunity, bridging the gap between traditional Ayurvedic wisdom and modern pharmaceutical technology<sup>3</sup>.

**Keywords:** Polyherbal Formulation, Immunomodulator, Standardization, Phytochemicals, Synergy, Powder Dosage Form.

## 1. Introduction:

### 1.1 Immune System

The immune system is a highly complex and dynamic network of cells, tissues, organs, and Our body has a lot of things that work together to keep us safe from things like germs and other foreign stuff. These things are like a team that helps defend the body. The body uses processes to defend itself. Biochemical processes are important to keep the body safe, from pathogens and foreign things. When these biochemical processes work together they can really help the body. The body needs these processes to defend itself against infectious pathogens and foreign things. Our body has lots of substances<sup>2</sup>. Sometimes we have abnormal cellular changes. The physiological system plays an important role in keeping our body healthy and working properly. Our physiological system is really important for maintaining our health and it does a great job in keeping our physiological system in good shape<sup>1,3</sup>. Our physiological system is vital, for our body. homeostasis by identifying and neutralizing harmful agents such as bacteria, viruses, fungi, parasites, The immune system is really important for our body. It does a lot more than just protect us from things like infections and toxins. The immune system also helps fix damaged tissues. This means the immune system plays a role, in keeping our body healthy and strong and it does this by protecting us from infections and it helps with tissue repair too<sup>3</sup>. surveillance against tumour cells, and regulation of inflammatory responses. Our body has ways to defend itself against things. The immune defence mechanisms of the body are basically divided into two parts: innate immunity and adaptive immunity. The immune defence mechanisms of the body are what keep us safe from harm<sup>4</sup>.

The immune defence mechanisms of the body can be thought of as our body's protection system. The immune defence mechanisms of the body are very important, to our health. We need the defence mechanisms of the body to fight off bad germs and sickness. The immune defence mechanisms of the body are made up of different things that work together to keep us well. Our body has a defence system. Adaptive immunity is one part of it<sup>5,6</sup>. The other part is called immunity. Innate immunity is like the body's shield, against bad things. It includes barriers that help keep us safe. barriers (skin, mucous membranes), chemical mediators, and cellular components such as Our body has cells like macrophages, neutrophils and natural killer cells. These macrophages, neutrophils and natural killer cells help us a lot. They give macrophages, neutrophils and natural killer cells a way to protect us fast when we need it. This protection from

macrophages, neutrophils and natural killer cells is not specific to one thing it is protection, against things that can harm us<sup>1,7,5</sup>.

When bad things like invading organisms get into our body it is a problem. In contrast our adaptive immunity takes a while to kick in but it is really good, at finding the exact bad guys it needs to fight. This thing involves lymphocytes. Lymphocytes are like B cells and T cells. These B cells and T cells generate responses that're specific to certain antigens. The B cells and T cells are really good at doing this because they can tell what antigens are bad for the body. The B cells and T cells help keep the body safe, from these antigens. immunological memory, enabling stronger and quicker responses upon subsequent exposures to the same pathogen<sup>8</sup>.

Our body's immune system works well when many different things work together. This includes things like the cells in our body and the different parts of our system. The immune system is, like a team. It needs all the players to work together to keep us healthy. The immune system relies on the system itself to do its job. Nutrition, genetics, environmental conditions, stress levels, and overall health status. The immune system has some weaknesses that can make a person more likely to get infections<sup>8,9</sup>. This can also lead to problems. The immune system is like a body's defence. When it has deficiencies in immune function it cannot work properly. This is why people with deficiencies, in function can get sick easily and have chronic issues. inflammation, autoimmune disorders, and other health complications<sup>9</sup>. Modern lifestyles, characterized by stress, pollution, and nutritional inadequacies, have contributed to a growing global interest in strategies to enhance and support immune health<sup>10</sup>.

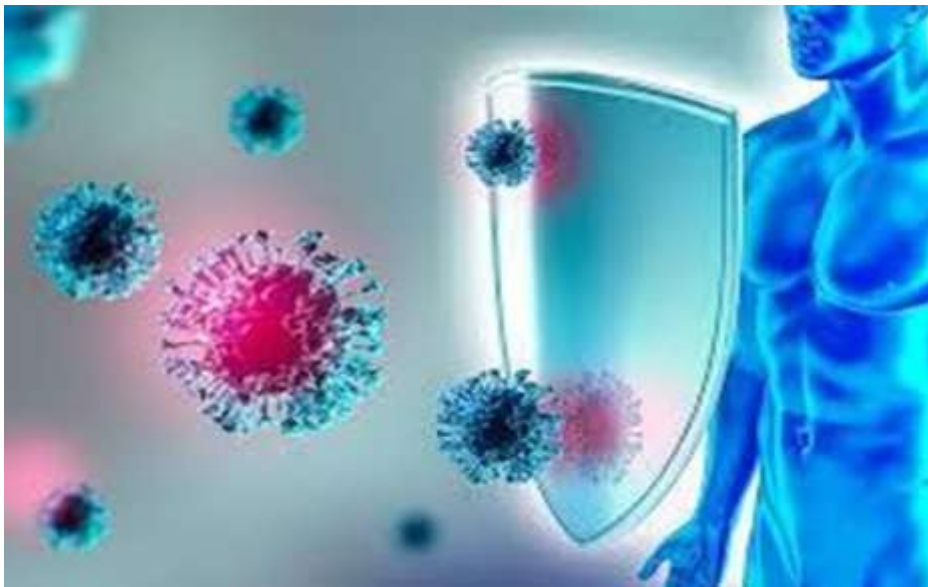


Fig 1- Immunity

## 1.2 Importance of Immune System:

1. The immune system is the body's way to keep itself safe it protects the body from bad things like germs and viruses that can make the body sick the immune system is really important, for keeping the body healthy the immune system does a great job of defending the body against harmful things. pathogens such as bacteria, viruses, fungi, parasites, and toxins<sup>11</sup>.
2. The body has a system that keeps everything inside it in order. The body stays stable and balanced by keeping the internal environment of the body in a good state, which is really important for the body to function properly and this is what the body does to maintain internal homeostasis of the body. removing damaged, dead, or abnormal cells<sup>11</sup>.
3. The immune system helps our body control infections and it also regulates inflammation. The body can deal with these infections and the immune system is very important, for this process because the immune system is what helps the body stay healthy. preventing excessive inflammatory damage<sup>12</sup>.
4. It is very important for fixing tissue and helping the body heal. The protein supports getting better after you get hurt get sick. The protein is crucial, for tissue repair and healing and also physical stress<sup>12</sup>.
5. The immune system is like a watchdog that helps find and get rid of cells like cancer cells or cells that have changed in some way which really helps reduce the risk of cancer. The immune surveillance is very important because it helps keep an eye on the cells, in our body and makes sure they are not turning into cancer cells. This immune surveillance is what helps our body stay healthy by finding and eliminating those mutated cells and tumor formation<sup>13</sup>.

6. Having an immune system is really good because it helps the body fight off bad things like infections so the immune system is not overwhelmed as often and that means the body gets sick less frequently with infections and severity of diseases<sup>13</sup>.
7. When you have immunity it can cause you to get chronic illnesses it takes you a long time to recover you get infections over and over again and your immunity is really reduced. Weak immunity is a problem because it makes you more likely to get sick and weak immunity can make it hard for you to fight off infections. Weak immunity is something that can affect anyone. It is important to take care of your weak immunity quality of life<sup>11</sup>.
8. The immune system is really good, at adapting and this is the reason why vaccination works because it teaches the immune system to recognize the bad guys and the immune system is what gets trained when we get vaccinated so the immune system can fight off the bad stuff and long-term protection<sup>10</sup>.
9. Herbal and polyherbal formulations are becoming really important because Herbal and polyherbal formulations are a natural way to do things. People, like Herbal and polyherbal formulations because they are made from things that come from nature. immunomodulatory effects without major side effects<sup>13</sup>.



Fig 2- Immune Boost

### 1.3 Immune Booster Powder:

The human immune system is really important because it helps keep our body safe from things, like germs, environmental stressors, and various pathological conditions<sup>5</sup>. In recent years, there has been a growing global interest in strengthening immunity through natural, plant-based supplements due to their safety, accessibility, and minimal side effects. Herbal medicines, rooted deeply in traditional systems such as Ayurveda and Siddha and folk practices have been widely recognized for their ability to help our bodies fight off diseases. These things like Ayurveda and Siddha and folk practices are really good at helping us stay healthy. Ayurveda and folk practices and Siddha are very useful, for keeping our system strong<sup>6</sup>.

Antioxidant and restorative properties are really good for us. Our modern lifestyles can cause problems because we do not get all the nutrients that our bodies need. Antioxidant properties can help with this. They are very important, for our health. Restorative properties are also good. They can help our bodies recover from the effects of modern lifestyles. increased stress levels, and weakened immunity<sup>10</sup>, the need for effective, natural immune-boosting The work on formulations has really picked up speed. Formulations are getting a lot of attention now. The focus, on formulations has intensified. When we talk about formulations we are talking about things that combine a lot of different medicinal plants. These polyherbal formulations are known to work well together. The idea is that polyherbal formulations can do more than what each plant can do on its own<sup>13</sup>.

This is what we mean by formulations having a special kind of effect where the whole thing is better, than the sum of its parts and that is why people like to use polyherbal formulations. The therapeutic effects of these things are better when they are combined compared to when you use one herb. This working together of the herbs makes them easier for the body to use. The therapeutic effects of herbs are really good because of this synergy. The synergy of the herbs enhances the bioavailability of the effects<sup>12</sup>. broadens the spectrum of activity, and often results in improved clinical efficacy. Several herbs such as *Withania somnifera* (Ashwagandha), *Ocimum sanctum* (Tulsi), *Zingiber officinale* (Ginger), Turmeric, which is also known as *Curcuma longa* and Amla, which is also called *Emblica officinalis* and some

other things like these have been. Found to be good, by science. The scientists have done a lot of work to see if Turmeric and Amla really work. They have been studying Turmeric and Amla for a time now. for their potent immunomodulatory and antioxidant effects<sup>5,6,8</sup>.

The development of an immune booster powder has a lot of good things about it like it is easy to use. This polyherbal immune booster powder is something that people can take to help their system. The polyherbal immune booster powder is a thing because it is not hard to take. The polyherbal immune booster powder is made with a lot of herbs that are good for the immune system. This makes the polyherbal immune booster powder a popular choice for people who want to stay healthy. The polyherbal immune booster powder is easy to find and easy to take which is why a lot of people, like it. formulation, stability, longer shelf life, and suitability for individuals of various age groups. It also aligns with the growing preference for nutraceuticals and herbal supplements over synthetic immune We need to be careful when we are working with enhancers<sup>13</sup>. It is really important that we formulate and evaluate them carefully. This is the way to make sure that the enhancers are consistent and that they actually work as they should. We have to make sure that the enhancers do what they are supposed to do, which is to enhance things like the enhancers we are talking about. safety, palatability, and compliance with quality standards. This study is about creating a mix of herbs which we call a polyherbal. The people doing this study want to make sure they do everything in an organized way. They will develop the polyherbal figure out the way to make it and then test it to see how well it works. The main goal is to learn more, about the polyherbal. immune booster powder using scientifically selected herbs with proven immunomodulatory potential<sup>14</sup>.

The work involves figuring out what the raw materials are and making sure they are real. It also includes making sure the plant is set up in a way. The plant standardization is a part of the work. The raw materials need to be identified and authenticated so that the plant can run smoothly. ingredients, optimization of formulation composition, and assessment of physicochemical, organoleptic, and functional properties. By integrating traditional knowledge with modern scientific<sup>12,13</sup>. This research is trying to create a polyherbal that's safe for people to use and it really works. The polyherbal needs to be validated so we know it is effective. The goal of this research is to develop a polyherbal using certain methodologies. The polyherbal has to be safe and effective. immune booster that can contribute to improved human health and immunity<sup>15</sup>.

## 2. Herbal ingredients used in immune booster powder:

### 2.1 Cinnamon (*Cinnamomum verum*)



Fig-Cinnamon

**Family:** lauraceae

**Common name:** dalchini

**Part used:** bark

**Chemical constituents:**

- Cinnamaldehyde
- Eugenol
- Coumarin

- Flavonoids and tannins

**Therapeutic properties:**

- Antioxidant
- Anti-inflammatory
- Antimicrobial
- Immunomodulatory

**Pharmacological action:**

- Cinnamon enhances immune function by reducing oxidative stress, inhibiting microbial growth, and supporting healthy inflammatory responses.

## 2.2 *Glycyrrhiza glabra* (Mulethi)



Fig- Mulethi

Family: Fabaceae

Common name: Licorice

Part used: Root

Chemical constituents:

- Glycyrrhizin
- Saponins
- Coumarins
- Flavonoids

Therapeutic properties:

- Antitussive & expectorant
- Anti-inflammatory
- Antiviral
- Immunostimulant

Pharmacological action:

- Mulethi enhances antibody production, supports respiratory immunity, and provides soothing effects on throat and lungs.

### 2.3 *Emblica officinalis* (Amla)



Fig-Amla

Family: Phyllanthaceae

Common name: Indian Gooseberry

Part used: Fruit

Chemical constituents:

- Vitamin C
- Emblicanin A & B
- Gallic acid, ellagic acid
- Polyphenols and flavonoids

Therapeutic properties:

- Antioxidant
- Anti-inflammatory
- Rejuvenating
- Immunomodulator

Pharmacological action:

- Amla improves immune cell activity and protects against oxidative damage, contributing significantly to immunity enhancement.

### 2.4 *Withania somnifera* (Ashwagandha)



Fig- Ashwagandha

Family: Solanaceae

Common name: Indian Ginseng

Part used: Root

Chemical constituents:

- Withanolides
- Alkaloids
- Steroids
- Saponins

Therapeutic properties:

- Anti-inflammatory
- Adaptogenic
- Anti-stress
- Immunomodulator

Pharmacological action:

- Ashwagandha boosts immunity by increasing resistance to stress, improving energy levels, and enhancing immune cell function.

## 2.5 *Ocimum sanctum* (Tulsi)



Fig- Tulsi

Family: Lamiaceae

Common name: holy basil

Part used: leaves

Chemical constituents:

- Eugenol
- Rosmarinic acid
- Ursolic acid
- flavonoids

Therapeutic properties:

- Anti-inflammatory
- Antiviral & antibacterial
- Immunostimulant
- Antioxidants

Pharmacological action:

- Tulsi promotes immune regulation, protects against respiratory infections, and reduces inflammation.

## 2.6 *Curcuma longa* (Turmeric)



Fig-Turmeric

Family: zingiberaceae

Common name: Haldi

Part used: rhizomes

Chemical constituents:

- Curcumin
- Curcuminoid
- Flavonoids
- Volatile oil

Therapeutic properties:

- Anti-inflammatory
- Antimicrobial
- Immunomodulatory
- Antioxidants

Pharmacological action:

- Turmeric enhances the immune response by modulating cytokines, reducing inflammation, and supporting antioxidant defense systems.

## 2.7 *Zingiber officinale* (Ginger)



Fig- Ginger

Family: Zingiberaceae

Common name: Adrak

Part used: Rhizomes

Chemical constituents:

- Gingerols
- Shogaols
- Essential oils
- Polyphenols

Therapeutic properties:

- Anti-inflammatory
- Immunostimulant
- Antioxidants
- Digestive stimulant

Pharmacological action:

- Ginger supports immunity by improving digestion, reducing inflammation, and protecting cells from oxidative damage.

## 2.7 *Piper nigrum* (Black Pepper)



Fig-Black Piper

Family: Piperaceae

Common name: Kali mirch

Part used: Fruit

Chemical constituents:

- Piperine
- Essential oils
- Alkaloids
- Flavonoids

Therapeutic properties:

- Antimicrobial
- Immunomodulatory
- Antioxidants
- Bioavailability enhancer

Pharmacological action:

- Black pepper enhances the absorption of curcumin and other phytochemicals, boosting the overall effectiveness of the polyherbal formulation.

## 2.8 Honey (*Apis mellifera*)



Fig- Honey

Common name: Madhu

Part used: Natural secretion produced by honeybees

Chemical constituents:

- Sugars (fructose, glucose)
- Enzymes and amino acids
- Organic acids
- Phenolic compounds and flavonoids

Therapeutic properties:

- Antioxidant
- Antimicrobial
- Immunomodulatory
- Demulcent

Pharmacological action:

- Honey supports the immune system by providing antioxidants, promoting wound healing, soothing the respiratory tract, and inhibiting microbial growth.

**Conclusion:**

The research was a success and it led to the creation of a special kind of medicine that helps boost our immune system. This medicine is made from a combination of herbs like [Insert Herb 1] [Insert Herb 2] and [Insert Herb 3]. What is really interesting is that when these herbs are combined, they work together in a powerful way. The good things in these herbs, like [Insert Herb 1] [Insert Herb 2] and [Insert Herb 3] help our system in a way that is more effective than if we used each herb on its own. The immune booster that was developed is an immune booster and it brings together the old traditional knowledge of herbs and the new modern ways of making medicine. The tests that looked at the chemical properties of the formulation showed that it is stable and has a lot of good things in it like flavonoids. The results of the laboratory tests also showed that the formulation can really help make the immune system stronger, which is a reason to use it to help prevent people from getting sick. The formulation is full of secondary metabolites like flavonoids, which are good, for people. Ultimately, this study offers a safe, effective, and reproducible framework for a natural immune-boosting supplement, contributing a valuable evidence-based alternative to the growing global demand for holistic wellness solutions.

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