



## **A Review of Polyherbal Granules**

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### **ABSTRACT**

The current study's objective is to produce herbal granules from *Curcuma longa*, *Tinospora cordifolia*, and *Withania somnifera* leaves. Turmeric effectively utilizes this plant to treat a variety of ailments and issues. After the plant's dried leaf powder was extracted, it underwent a preliminary chemical analysis. Early chemical tests indicate that the extract contains protein, alkaloids, flavonoids, glycosides, and carbohydrates. The synthesized polyherbal granules exhibited great flow properties, including bulk density, tapped density, and a favorable angle of repose. Dietary supplements have not been extensively studied until lately, therefore nothing is known about them. However, within the past 20 years, the use of supplements has increased significantly, sparking consumer interest. A dietary supplement is any vitamin, mineral, auxiliary chemical, biological, or flavoring product added to the diet to enhance human health. Nutritional supplements shouldn't make guarantees that, for instance, they heal heart disease or relieve pain. Nutritionists and health professionals have long maintained that a normal, balanced meal should contain all of the necessary nutrients that a person's body need each day. The current dietary recommendations from health and nutrition organizations encompass more than forty nutrients and are divided into six categories: carbohydrates, lipids, proteins, vitamins, minerals, and water.

Keywords: Polyherbal granules, *Curcuma longa*, *Tinospora cordifolia*, *Withania somnifera*.

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### **1. Introduction:**

#### **1.1. Dietary Supplements**

Until comparatively recently, there was restricted research project on dietary supplements so very little was celebrated concerning them. However, the prevalence of supplement use has redoubled dramatically over the past twenty years, and that they have become a matter of shopper interest. Any vitamin, mineral, auxiliary chemical, biological, or seasoning product added to the diet to improve human health is referred to as a dietary supplement. Supplements are in some circumstances beneficial to human health, according to scientists and medical specialists, but they shouldn't take the place of comprehensive, balanced daily meals of the foods required for a healthy diet. The U.S. Food and Drug Administration (FDA), the primary national authority, emphasized that, unlike medicine, dietary supplements are not intended to treat, diagnose, prevent, or cure illnesses. Dietary supplements should not create claims, like reduces pain or treats cardiovascular disease etc. Nutritionists and health professionals argued for years that folks will get the most important food needs that their body desires day after day from a standard, balanced and regular daily diet. Today's dietary tips from health and nutrition agencies cover over forty nutrients that are unit divided into six categories: carbohydrates, fats, proteins, vitamins, minerals and water.<sup>1,4</sup>

Daily nutrient recommendations area unit together called dietary reference intakes (DRIs). A healthy diet is one that favors real contemporary whole foods that have been sustaining people throughout the millenniums. Whole foods supplies provide the required vitamins, minerals, protein, carbohydrates, fats, and fiber that are essential to good health. In contrast, commercially ready and quick foods are usually lacking nutrients and contain inordinate amounts of sugar, salt, saturated and trans- fats, all of which are associated with the event of diseases. A diet may be mixture of food from the various food teams (vegetables, legumes, fruits, grains, protein foods, meat, and dairy). Variety involves consumption completely different foods from allthe food teams that help to confirm that you receive all the nutrients necessary for a healthy diet.<sup>6</sup> In the last decade national medical authorities, health professionals and nutritionists in developed countries became alert to the widespread and rapid increase of dietary supplements (DS) and excessive consumption by a wide range of the population. The global market is flooded with a variety of dietary supplements that have false therapeutic claims (difficult to test experimentally) and products which can be imported and distributed through the internet advertisements. Like drugs, dietary supplements have risks and facet effects. But sellers aren't required to do research studies in people to prove that dietary supplements are safe. In contrast to medicine, DS are largely self- prescribed with no input from informed medical sources like doctors, nurses, or pharmacists. Medical authorities agree that there's heaps of wrong data within the supplements market.<sup>3</sup>



### 1.2. Polyherbal Granules:

The world's earliest known kind of therapy is herbal medicine, which played an important role in the growth of modern civilization. In herbal medicine, formulations made from plants are used to treat illnesses. The biggest problems with these formulations, however, are caused by the incompleteness of their analyses. Granules are used as a novel method of administering flavouring drugs because they have advantages over tablets and capsules, such as faster disintegration and dissolution, stability over syrups and decoctions, greater patient acceptance due to lower choking risks, and less time and money needed to produce them compared to tablets. Because there are so many diverse chemical components found in the many medicinal plants, creating polyherbal formulations is a difficult work. As a result, the complete herbal medication or preparation is considered as an active drug ingredient.<sup>5</sup>

Overweightness is one of the most prevalent health issues in developing and developed countries and a risk factor for non-communicable diseases. The preferred non-pharmacological treatment for obesity is dieting and physical exercise. However, due to the hard and sedentary routine, it becomes difficult to exercise in a regular manner. Currently, available drugs for obesity treatment are centrally acting and have severe cardiac side effects. Alternatively, medicinal plant-based supplements are being generally used to manage chronic disorders like obesity, diabetes etc, due to very fewer side effects and cost-effective compared to chemically synthesized drugs.

Possible approaches for obesity treatment are a decrease in calorie intake, reduction in fat absorption, an increase of energy expenditure, decrease preadipocytes differentiation, decrease lipogenesis and increase lipolysis. The major problem in obesity treatment is that if the individual mechanism is targeted than the body's homeostasis will equilibrate the condition and drug may not give a proper impact. For example, if appetite suppressant is given than body homeostasis will decrease energy expenditure or through else, try to maintain metabolic equilibrium, because of this majority of drugs are ineffective for treatment.



Figure 2: Polyherbal Image

#### • Benefits:

1 Health Benefits: Emphasize the specific health benefits of each herb and how their combination amplifies these benefits. For instance, mention turmeric's anti-inflammatory properties, Gilroy's immune-boosting effects, and Ashwagandha's stress-relieving qualities.

2 Traditional Use: Discuss the historical or traditional use of these herbs in various cultures or traditional medicine systems. Highlighting their longstanding use can add credibility to the product.

3 Scientific Support: If available, reference scientific studies or research that backs the efficacy of these herbs individually and in combination. This can provide assurance about the product's effectiveness.

4 Dosage and Usage Instructions: Provide clear instructions on how to use the granules, including dosage recommendations and any specific guidance for consumption. This information ensures safe and effective usage.

5 Quality Assurance: Highlight any quality standards or certifications the product adheres to, such as organic certifications, Good Manufacturing Practices (GMP), or third-party testing for purity and potency.

6 Customer Testimonials or Reviews: If applicable, include positive feedback or testimonials from users who have experienced benefits from using these granules. Authentic user experiences can strengthen trust in the product.

7 No Side Effects: If the product is known for minimal side effects or is generally well-tolerated, mention this to reassure potential users.

• **Characteristics:**

1 Synergistic Blend: Polyherbal granules combine the properties of multiple herbs into a single formulation. The synergy between herbs like *Curcuma longa* (turmeric), *Tinospora cordifolia* (Giloy), and *Withania somnifera* (Ashwagandha) creates a more potent and comprehensive health-supporting blend than individual herbs alone.

2 Holistic Health Benefits: Each herb contributes specific health benefits, such as anti-inflammatory properties in turmeric, immune-boosting effects in Giloy, and stress-relief properties in Ashwagandha. Together, they offer holistic support for overall health and wellness.

3 Balanced Formulation: The combination is often formulated to achieve a balance of various active compounds, ensuring that each herb complements the others and maintains a harmonious ratio for maximum efficacy.

4 Enhanced Absorption: Granules may be designed for better absorption compared to capsules or tablets, allowing for quicker assimilation and utilization of the herbal constituents by the body.

5 Convenience: Granules are often easy to consume and can be mixed with water, juice, or taken directly. Their form can make them more palatable for those who find capsules or tablets difficult to swallow.

6 Standardization and Quality Control: Reputable manufacturers often adhere to stringent quality control measures, ensuring standardized concentrations of active compounds for consistency and effectiveness.

7 Natural and Safe: Polyherbal granules typically contain natural ingredients, making them a safe choice for many individuals. However, it's essential to consider individual allergies or interactions with existing medications.

8 Support for Various Health Conditions: These granules might support a range of health conditions, from boosting immunity and reducing inflammation to aiding in stress management and promoting overall vitality.

• **Polyherbal granules Methods:**

1 Extraction Techniques: Each herb undergoes specific extraction processes to obtain its active constituents. Techniques like solvent extraction, steam distillation, or cold pressing are employed to extract the bioactive compounds from the raw herbs.

2 Standardization of Active Ingredients: Manufacturers often standardize the concentrations of active compounds in each herb to ensure consistency and effectiveness across batches. This involves testing and controlling the levels of key compounds like curcuminoids in turmeric or withanolides in Ashwagandha.

3 Combination and Formulation: Once the extracts are obtained, they are carefully combined in specific ratios to achieve a synergistic blend. Formulators consider the compatibility and interactions between different herbs to create a balanced and effective mixture.

4 Granulation Process: The formulation is then processed into granules. This can involve techniques like wet granulation, dry granulation, or direct compression, where the herbal extracts are mixed with excipients to form granules of uniform size and composition.

5 Binding Agents: Binding agents are often added during granulation to ensure the granules hold together and maintain their shape. Natural binders like starches, gums, or cellulose derivatives are commonly used in herbal formulations.

6 Drying and Finishing: After granulation, the mixture is dried to remove excess moisture and create stable granules. The drying process may involve methods like air drying, vacuum drying, or spray drying, depending on the desired characteristics of the final product.

7 Quality Control and Testing: Throughout the production process, stringent quality control measures are implemented. This includes testing for purity, potency, microbial contamination, heavy metals, and other impurities to ensure the safety and efficacy of the final product.

8 Packaging and Storage: Once the granules are produced, they are packaged in airtight containers to protect them from moisture and light degradation. Proper labeling with dosage instructions, expiration dates, and batch numbers is also essential.

• **Advantages:**

1 Synergistic Effects: The combination of multiple herbs creates synergies, enhancing the overall therapeutic effects. The collective action of different herbs can often provide more comprehensive health benefits compared to using individual herbs separately.

2 Holistic Wellness Support: By incorporating various herbs with different properties, polyherbal granules can support multiple bodily systems simultaneously. They often target various health aspects, promoting overall well-being rather than addressing isolated symptoms.

3 Enhanced Bioavailability: The formulation of granules allows for better absorption of active compounds. This improved bioavailability ensures that the body can effectively utilize the beneficial constituents present in the herbs.

4 Convenient Consumption: Granules are easy to consume compared to capsules or tablets, especially for individuals who have difficulty swallowing pills. They can be easily mixed with water, juice, or other beverages for consumption.

5 Customization and Balance: Formulators can tailor the ratios of herbs to achieve a balanced and optimized formula. This customization ensures that each herb contributes to the blend in an appropriate manner, maximizing efficacy.

6 Reduced Side Effects: The balanced combination of herbs may reduce the likelihood of adverse reactions or side effects that could occur when using higher doses of a single herb. This makes polyherbal granules a safer choice for many individuals.

7 Complementary Actions: Different herbs within the formulation can complement each other, mitigating any potential weaknesses or side effects of individual herbs while amplifying their combined benefits.

• **Applications:**

1 Immune Support: These granules often contain herbs known for their immune-boosting properties like *Tinospora cordifolia* (Giloy) and *Curcuma longa* (turmeric). They're used to support the body's natural defense mechanisms against illnesses.

2 Stress Management: *Withania somnifera* (Ashwagandha) is commonly included for its adaptogenic properties, which help the body manage stress and promote relaxation. Polyherbal granules can aid in stress reduction and support overall mental well-being.

3 Anti-Inflammatory Aid: Turmeric (*Curcuma longa*) is rich in curcumin, known for its anti-inflammatory properties. Polyherbal blends containing turmeric can assist in managing inflammation-related conditions.

4 Digestive Health: Some formulations include herbs beneficial for digestive health, aiding in conditions like indigestion, bloating, or supporting gut health.

5 General Wellness and Vitality: Polyherbal granules are often used as a daily supplement to promote overall health and vitality. Their combination of herbs provides a broad spectrum of nutrients and bioactive compounds.

6 Recovery and Well-Being: Athletes or individuals recovering from illness might use these granules to support their recovery process, providing essential nutrients and aiding in rejuvenation.

7 Age-Related Health Concerns: They can be used as a part of preventive healthcare for age-related concerns, offering support for joint health, cognitive function, and overall vitality.

8 Seasonal Wellness Support: During seasonal changes or when individuals feel susceptible to environmental changes, these granules can be used to support the body's adaptability and resilience.

9 Combating Fatigue: Herbal blends like these are often utilized to combat fatigue, boost energy levels, and improve stamina naturally.

10 Complementary Therapy: They may serve as a complementary therapy alongside conventional treatments for certain health conditions, aiding in symptom management or improving overall wellbeing.

11 Traditional and Modern Fusion: These granules often combine traditional knowledge of herbal medicine with modern scientific research, offering a blend that respects age-old wisdom while incorporating contemporary understanding.

12 Well-Studied Formulations: Some polyherbal formulations have undergone scientific research and clinical trials, providing evidence-based support for their efficacy and safety.

• **Importance:**

1 Comprehensive Health Support: Polyherbal granules offer a holistic approach to health, targeting multiple bodily systems simultaneously. Their combination of herbs addresses various aspects of well-being, promoting overall health rather than just alleviating isolated symptoms.

2 Traditional Wisdom and Modern Science Fusion: These formulations often merge ancient knowledge of herbal medicine with contemporary scientific research. They integrate traditional remedies with modern understanding, offering a balanced approach to wellness.

3 Synergistic Effects: The synergy between different herbs in these granules enhances their effectiveness. When combined, herbs often work together to amplify their individual benefits, providing more comprehensive health support than using each herb alone.

4 Customization and Balance: Formulators can tailor the blend to create a balanced formulation, optimizing the ratios of herbs for maximum efficacy. This customization ensures that each herb contributes its unique properties to the overall blend.

5 Natural and Safe Approach: Polyherbal granules typically contain natural ingredients, making them a safe choice for many individuals seeking alternative or complementary health solutions. They often have fewer side effects compared to synthetic medications.

6 Preventive Healthcare: Regular use of these granules can be part of preventive healthcare practices. They aid in maintaining health, supporting the body's natural functions, and potentially reducing the risk of certain health conditions.

7 Improved Bioavailability: Granules can offer better absorption and utilization of the active constituents compared to other forms like capsules or tablets. This enhanced bioavailability ensures that the body can make the most of the herbal blend.

8 Patient-Centered Approach: They offer a patient-centered approach to health, allowing individuals to take an active role in their well-being. The convenience of consumption and diverse health benefits make them accessible to a wide range of users.

9 Supporting Holistic Wellness: By addressing various aspects of health, these granules contribute to a balanced and holistic lifestyle. They can complement dietary and lifestyle choices to promote overall wellness.

10 Cultural and Traditional Significance: Many of these herbs hold cultural and traditional significance in various societies, adding depth and historical relevance to their use in healthcare.

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## 2. CURCUMA LONGA:

Turmeric, derived from the rhizomes of *Curcuma longa*, is a perennial plant having short stem with large oblong leaves, and bears ovate, pyriform or oblong rhizomes, which are often branched and brownish-yellow in color. Accounting for about 78 percent of world turmeric production, India is the largest producer of turmeric. Turmeric or *Curcuma longa* is a flowering plant in the ginger. Family Zingiberaceae.



Figure 3: *Curcuma longa*

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## 3. TINOSPORA CORDIFOLIA:

*Tinospora cordifolia* is a large glabrous, perennial, deciduous, climbing shrub of weak and fleshy stem found throughout India. *Tinospora cordifolia* (common names heart-leaved moonseed, guduchi or giloy, among others) is a herbaceous vine. Family Menispermaceae



Figure 4 : *Tinospora cordifolia*

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## 4. WITHANIA SOMNIFERA:

*Withania somnifera* is a small, woody shrub that grows about two feet in height. It can be found growing in Africa, the Mediterranean, and India. *Withania somnifera*, known commonly as ashwagandha or winter cherry, is an evergreen shrub in the Solanaceae.



Figure 4: Withania somnifera

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## 5. PHARMACOLOGICAL ACTIVITIES OF TINOSPORA CORDIFOLIA:

### 5.1. Antioxidant Activity:

The extract of *Tinospora cordifolia* clearly minimizes the toxicity brought on by free radicals. The plant extract prevents the production of superoxide, hydroxyl radicals, and lipid peroxidation (in-vitro). Plant extract also helps to mitigate some of the toxic side effects of cyclophosphamide in mice, which are manifested by increased levels of liver and serum lipid peroxides, alkaline phosphatase, and glutamine pyruvate transaminase.

### 5.2. Wound Healing Activity:

The wound healing activity of *Tinospora cordifolia* has been reported in albino rats. The result concluded that the plant may be attributed to the phytoconstituents present in it, which may be either due to their individual or additive effect that hastens the process of wound healing.

### 5.3. Anti-Inflammatory Activity:

The stem aqueous extract of *Tinospora cordifolia* exerted a significant anti-inflammatory effect on cotton pellet granuloma and formalin induced arthritis models. Its effect was comparable with Indomethacin. The plant produced significant anti-inflammatory effect in both acute and sub-acute models of inflammation.

### 5.4. Anti-malarial Activity

The effect of aqueous extract of *Tinospora cordifolia* along with chloroquine in the treatment of three cases of hyper reactive malarious splenomegaly (HMS) was studied. The plant extract (500 mg/kg b.w.) added to chloroquine (CQ) base (300 mg/kg b.w.) was administered weekly. The results showed regression of spleen by 37-50% after six Weeks and 45- 69% after six months. Decrease in IgM and increase in Hb also were observed.

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## 6. Pharmacological activities of *Withania somnifera*:

### 6.1. Antioxidant activity:

The brain and nervous system are relatively more vulnerable to radical damage than other tissues because they are rich in lipids and iron, both known to be important in generating reactive oxygen species. Free radical damage of nerve tissue could also be involved in normal aging and neurodegenerative diseases, e.g., epilepsy, schizophrenia, Parkinson's, Alzheimer's, and other diseases. The active principles of WS, sitoindosides VII-X and withaferin A (glycowithanolides), are tested for antioxidant activity using the main free-radical scavenging enzymes, superoxide dismutase (SOD), catalase (CAT), and glutathione peroxidase (GPX) within the rat brain frontal area and striatum.

### 6.2. Anxiety and depression:

Anxiolytic and antidepressant actions of the bioactive WSG, isolated from Roots, in rats were assessed. WSG was administered orally once daily for 5 days and the results were compared by those elicited by the benzodiazepine lorazepam for anxiolytic activity, and by the tricyclic antidepressant, imipramine.

### 6.3. Antibacterial effect:

Both aqueous as also as alcoholic extracts of the plant (root also as leaves) were found to possess strong antibacterial activity against a variety of bacteria, as revealed by in vitro Agar Well Diffusion Method. The methanolic extract was further sub fractionated using various solvents and therefore the butanolic

sub-fraction was possessed maximum inhibitory activity against a spectrum of bacteria including Salmonella development of dependence to opiate as assessed by naloxone precipitation withdrawal on day 10 of testing. The studies revealed that the chronic administration of the WS didn't exhibit any dependence-liability of its own, even upon an abrupt cessation. These findings may have clinical implications without producing tolerance and withdrawal effects on long-term use.

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## 7. Methods

### 7.1. DPPH free radical scavenging activity:

In 1958 Marsden Blois, engaging at Stanford University evidently introduced the DPPH methodology. The model of scavenging the stable DPPH radical model could be a wide used methodology to evaluate inhibitor activities in a relatively short time compared with other methods. The result of antioxidants on DPPH radical scavenging was thought because of their hydrogen donating ability. DPPH could be a stable free radical and accepts an electron or hydrogen radical to become a stable diamagnetic molecule. The nitrogen entered radical 2, 2- diphenyl-1-picrylhydrazyl has been extensively utilized in kinetic studies of hydrogen atom abstractions from carbon, nitrogen, sulfur, and oxygen, particularly from phenols. It is monomeric in solution, air stable, commercially available and strongly colored. This last property permits the course of reaction to be monitored using conventional UV-Vis spectrophotometer. Relating to the pH level, within the original Blois paper it absolutely was recommended that the system should be maintained at a pH in the range 5.0 to 6.5 by using acetate buffers. But this precaution seems to have been abandoned in current practice. So there's an excellent uncertainty in the meaning of pH values in these predominantly organic (methanol or ethanol) media. This solution is kept in the fridge wrapped in foil when not in use, to cut back its degradation (light induced). The solution degrades at a rate of 2-4 % each week, and is remade weekly if necessary or if the absorbance at 515 nm, is considerably modified. Before use it should be taken out from the fridge and allowed to reach the room temperature otherwise the concentration will be higher due to volume contraction. In this present study we have measured antioxidant activity of mixture extracts of *Curcuma longa*, *Tinospora cordifolia*, *Withania somnifera* employing an assay method, such as scavenging activity of DPPH.

### 7.2. Screening of Polyherbal granules for antioxidant activity:

Formulated poly herbal granules were evaluated for its antioxidant action using DPPH radical scavenging method: DPPH assay (2, 2-Diphenyl-1-Picrylhydrazyl): The free radical scavenging activity of extract was determined by using DPPH assay. The decrease in the absorption of the DPPH solution after the addition of an antioxidant was measured at 517nm. Ascorbic acid (50mg/ml) in methanol was used as reference standard.

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## 8. DISCUSSION

Scientists are now investigating the creation of new polyherbal therapies or the utilization of classic polyherbal preparations that have been around for a very long time, like Ayurveda. Moreover, safety assessments including toxicological tests have not been carried out. Time must be allowed for the scientific evaluation of polyherbal formulations employing potential bioactive components, clinical trials, and mechanisms of action. Ayurvedic medications are blends of carefully chosen herbal medications that are created using diverse pharmaceutical techniques to produce a range of dose forms.

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## 9. Conclusion:

Because they are more readily available and have less adverse effects than allopathic therapy, herbs used as dietary supplements play a significant role in treatment. Excipients and flavoring agents were included in the formulation's preparation to increase patient compliance. In addition to having outstanding flow characteristics, the granules break down in the oral cavity in 15 seconds. Compared to the production of tablets, capsules, and syrups, the procedure is less expensive and time-consuming because the wet granulation technique is employed. The results of the aforementioned investigation show that the polyherbal formulation contains flavonoids, alkaloids, carbohydrates, and tannins. The antioxidant screening done by using DPPH method showed that the free radical scavenging effect of PHF at concentration 100µg/ml (i.e. 91.34%) showed maximum % inhibition of free radicals. The effects showed at concentration 25 and 50 µg/ml were found to be more antioxidant potential than reference standard drug. From the above study we can conclude that poly herbal formulation possesses promising Antioxidant activity which can be considered as base for further pharmacological evaluation. Hence, this formulation can serve as an ideal candidate for commercialization on large scale and an inexpensive therapy as compared to currently. The present study was done on *Curcuma long* (rhizome), *Tinospora cordifolia* (leaves), *Withania somnifera* (roots). The powder of above plant parts were extracted by solvents. The poly herbal granules formulated from the above extract will be beneficial for human being as dietary supplement.

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## 11. FUTURE PERSPECTIVES:

The information above makes it evident that plants are frequently used to treat a wide range of illnesses, many of which have traditional and pharmacological uses that are well-documented. The chart for biological application also includes information on the various plant sections and their chemical compositions. In conclusion, it can be applied to the creation of innovative medication delivery systems as well as treatment strategies. Screening and bioassay are essential for its application in many contexts, and we also need to gather enough information about the chemical ingredients and the structure-activity relationship studies that are required to investigate its further effects. There has been a noticeable increase in the general use of herbal remedies.

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