



Combining Herbs For Enhanced Efficiency: A Conceptual Guide To Polyherbal Formulation

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Abstract:

A new idea that is becoming popular is the use of polyherbal formulations as a powerful, safe, and effective alternative to conventional treatment. A key component of traditional herbal medicine is polypharmacy, sometimes referred to as polyherbalism, which is the combination of several medicinal herbs to increase therapeutic efficacy. To achieve the intended therapeutic effects, a single plant cannot contain enough active phytochemical components. Adding different herbs in a certain ratio to polyherbal and herbo-mineral compositions improves their medicinal impact and reduces their toxicity. Traditional medicine makes use of entire plants or plant mixtures rather than isolated plant parts. Several advantages not found in single herb mixtures are produced by the synergistic effects of polyherbalism. In several diseases, polyherbal formulations exhibit good therapeutic efficacy at safe, high doses.

Key words: Polyherbal formulation, Ayurvedic herbs, Herbs with interaction.

Introduction:

Nearly 80% of people worldwide still use traditional or Ayurvedic treatments to maintain their health, according to WHO projections. In addition to being renowned for its significant biodiversity centers, which include approximately 45,000 herbal plant species. The goal of Ayurveda, an Indian medical system, is to cure human illnesses without causing needless suffering. Of these, About Fifteen thousand therapeutic plants have been shown to treat a wide range of human conditions, with one or more herbs being used to totally eradicate illness.

Ayurveda is an ancient Indian medical system that has been practiced for over 5,000 years. It places a strong emphasis on using herbal treatments and following dietary guidelines to prevent and treat illness. Evidence from the literature supports the use of herbal therapy for a number of illnesses, such as skin diseases, immunological and liver issues, diabetic wounds, and memory loss. Patients with chronic illnesses like cancer, diabetes, asthma, and kidney disease are especially likely to use herbal medicines. Herbs also aid in the creation of different cosmetics and the attractiveness of the body by offering a very effective and palatable substitute for artificial ingredients.¹

For thousands of years, people have used the traditional medicinal system known as Ayurvedic medicine, or Ayurveda. With centuries of custom, this ancient Vedic knowledge has endured and flourished, ranking it among the most ancient medical sciences. The "Mother of All Curative," The roots of Ayurveda can be found in India. Drawing inspiration from the Sanskrit terms "Ayur" (life) and "Veda" (knowledge or science). The literal translation of "Ayurveda" is "the science of life." restoring harmony and balance to the mind, body, and spirit is the fundamental goal of Ayurveda.

An individual's distinct constitution is ascertained by Ayurveda based on Air, fire, water, earth, and aether are the five elements and three humours (Vata, Pitta, and Kapha). This balance helps ward off illness.^{2,3,4}

The complementing and/or potentiating properties of two or more herbal constituents make polyherbal treatments frequently more successful than solo medications. Because a lesser dosage of administration is required, combining two or more herbal extracts together results in improved pharmacological activity, faster alleviation, decreased side effects, and better therapeutic efficiency as compared to conventional medicine. Because polyherbal medicines are highly effective, readily available, low toxicity, and environmentally friendly, they are now widely used and preferred worldwide. Additionally, they reduce the time required for therapy or the expense of particular antibacterial and anti-inflammatory drugs, which minimizes prescription costs.⁵

Advantages:

Herbal medicine presents numerous benefits, including:

- Enhanced patient tolerance and acceptance.
- Affordable and accessible treatment options, eliminating the need for prescriptions.
- A sustainable source of medicinal plants, ensuring a consistent supply of cost-effective remedies for the growing global population.
- Regulation of hormonal balance and metabolic processes.
- Natural healing properties, promoting overall well-being.
- Prolonged use of herbal medicines has demonstrated safety and efficacy, with potential immune system fortification.⁶
- Enhanced efficacy through synergistic combinations.
- Multiple active constituents that amplify each other's effects, achieving enhanced therapeutic outcomes.
- Diverse active principles in plant-based pharmaceuticals interact in complex ways, including synergism, potentiation, agonism, and antagonism.
- Multi-component formulations achieve superior therapeutic results
- Lower doses of herbal preparations are required to attain desired pharmacological effects due to synergistic interactions.
- Enhanced convenience for patients, eliminating the need to take multiple herbal supplements simultaneously, leading to improved compliance and better therapeutic outcomes.
- Comprehensive treatment approach, as polyherbal formulations contain a diverse range of compounds that target various aspects of a disease state, providing a complete course of treatment.
- By simplifying treatment regimens and addressing multiple facets of a disease, polyherbal formulations can lead to improved patient outcomes and enhanced overall well-being.⁷⁻¹²
- Enhanced affordability and cost-effectiveness.
- Sustainable origin from renewable sources, reducing environmental impact.
- Potential therapeutic benefits in addressing hormonal imbalances and metabolic disorders.
- These advantages make herbal formulations an attractive option for patients seeking natural and effective treatments for various health conditions.¹³⁻¹⁶

Disadvantages of Ayurvedic Polyherbal Formulations (PHFs):

- Quality Control Issues: Risk of contamination and variable quality due to inadequate manufacturing processes.
- Lack of Communication: Patients' failure to inform medical practitioners about concurrent treatments can lead to adverse interactions.
- Unawareness of Drug-Herb Interactions: Ayurvedic practitioners' limited knowledge about potential interactions can result in harmful combinations.
- Inadequate Regulation: Insufficient oversight and regulation can lead to unsafe products and practices.
- Myth of Absolute Safety: The misconception that Ayurvedic PHFs are always safe can lead to complacency and neglect of potential risks.
- Adverse Effects from Improper Use: Ayurvedic medicines can have harmful effects if prepared or used incorrectly.

- Drug-Herb Interactions: Concurrent use with allopathic drugs can lead to pharmacological or toxicological interactions, causing adverse effects.
- Health Risks from Unmonitored Interactions: Unrecognized drug-herb interactions can deteriorate health and cause harm.
- Limited Awareness of Herb-Drug Interactions: The use of herbs that interact with drugs can lead to adverse effects, highlighting the need for education and awareness.
- By understanding these disadvantages, we can take steps to mitigate them and ensure the safe and effective use of Ayurvedic PHFs.¹⁷⁻²⁰

WHO's Guidelines for Standardized Herbal Formulations of High Quality

1. Control of Internal Management:

- Control of preparing plant materials for herbal crude drugs
- Control of final product

2. Stability and Evaluation of Shelf-Life:

- Product stability and shelf life evaluation.

3. Toxicological Studies and Safety Protocols:

- Evaluation of toxicological research
- Assessment of safety procedures

4. Evaluation of Efficacy:

- Evaluation of ethnomedical information
- Biological activity evaluation

5. Standardization of Bioactive Compounds:

- Standardization based on active constituents or major phytochemicals
- Use of chromatographic techniques
- HPLC (High Performance Liquid Chromatography)
- GC (Gas Chromatography)
- TLC (Thin Layer Chromatography).

Challenges in Herbal Formulation:

1. Objective Assessment of Safety and Efficacy: Accurately evaluating toxicological, epidemiological, and herbal component verification is a significant challenge.
2. Communication of Uncertainty: Effectively conveying uncertainty and evaluating multiple drug-drug interactions poses a challenge.
3. Standardized Documentation: Ensuring pharmacological, toxicological, and clinical standard documentation is a key challenge.
4. Pharmacovigilance Studies: Conducting thorough pharmacovigilance studies to monitor safety is essential.
5. Risk management: It's critical to put into practice efficient risk management techniques.

6. Conducting Clinical Trials: Constraining clinical trials to ensure safety and efficacy is a challenge.
7. Standardization of Herbal Drugs: Standardizing herbal drugs to ensure consistency and quality is a significant challenge.
8. Safety and Efficacy Assessment: Accurately assessing safety and efficacy is an ongoing challenge in herbal formulation.

These difficulties show how difficult it is to guarantee the efficacy, safety, and quality of herbal mixtures.²¹⁻²²

Polyherbal formulations over single herbal formulations:

Polyherbal formulations offer several advantages over single herbal formulations. They provide enhanced therapeutic efficacy, pharmacodynamic and pharmacokinetic synergism, and optimized herb-herb interactions, leading to improved therapeutic effects. Additionally, polyherbal combinations address complex diseases and variable treatment responses through a multifaceted approach, improving patient compliance and simplifying treatment regimens. With a superior risk-benefit ratio, Polyherbal formulations are a recommended option for attaining the best therapeutic results because they are safe at high dosages and effective at low ones.²³

The detailed differences of single vs polyherbal formulation is described below the table: no 1

Table : 1 Single vs Polyherbal formulation²⁴

Characteristics	Single herbal formulation	Polyherbal formulation
Number of Herbs	One	Two or more
Therapeutic Approach	Targets a single symptom or disease	Addresses multiple symptoms or diseases
Synergism	No synergistic effects	Benefits from pharmacodynamic and pharmacokinetic synergism
Dose Requirements	Higher dose requirements	Reduced dose requirement
Patient Convenience	Multiple formulations may be required	Simplified treatment regimen
Compliance	Reduced compliance	Improved compliance
Adverse Effects	Increased risk of adverse effects	Minimized adverse effects
Therapeutic Outcomes	Limited therapeutic outcomes	Enhanced therapeutic outcomes
Traditional Use	Less common in traditional medicine	Common in traditional medicine (e.g., Ayurveda)

Reasons for Compounding a Polyherbal Formulation:

1. Synergistic Therapeutic Effect: Combining herbs with different phytoconstituents can enhance and potentiate therapeutic effects.
2. Broad Therapeutic Range: Because of their wide therapeutic range, polyherbal formulations provide an excellent risk-benefit ratio.
3. Widening Therapeutic Window: Adding herbs can widen the therapeutic window, enhancing efficacy.
4. Treatment of Severe Ailments: Polyherbal formulations are necessary when single-herb therapy fails to treat severe or acute conditions.
5. Neutralizing Toxic Effects: Combining herbs with opposite properties can neutralize toxic effects and reduce excessive potency.
6. Counteracting Harmful Effects: Adding herbs can counteract harmful effects of other herbs in the formulation.

7. Improving Duration of Action: Other herbs have the potential to improve or prolong the primary herb's duration of action.
8. Masking Unpleasant Taste: Herbs can be added to mask unpleasant tastes in herbal formulations.
9. Reducing Side Effects: Polyherbal formulations tend to have fewer side effects compared to allopathic medications.
10. Fast Onset of Action: Additional herbs can be added to speed up the onset of action.²⁵

Table: 2 Marketed polyherbal formulations based on disease

S.no	Disease	Name of the polyherbal formulation	Composition	Pharmacological activity	References
1	Allergy	KOB03	<i>Scutellariae Radix</i> , <i>Osteici Radix</i> , <i>Saposhnikoviae Radix</i> , <i>Astragali Radix</i> , and <i>Atractylodis RhizomaAlba</i>	Anti-allergic activity	26
2	Arthritis	Arthosansar	<i>Eranda [Ricinus communis Linn.]</i> , <i>Shunti [Zingiber officinale]</i> , <i>Sallaki [Boswellia serrata Roxb]</i> , <i>Rasna [Pluchea lanternolata]</i> , <i>Guggulu [Commiphora wightii Arn]</i> , <i>Shilajit (a sticky substance present in the rocks of some mountainous areas of the world)</i> , and <i>Aswagandha [Withani somnifera Linn]</i>	Anti-arthritis activity	27
		Majoon suranjan	<i>The Ipomoea turpethum</i> , <i>Apium graveolens</i> , <i>Capparis spinosa</i> , <i>Terminalia chebula</i> , and <i>Lawsonia inermis</i> <i>Foeniculum vulgare</i> <i>Colchicum luteum</i> , <i>Cassia angustifolia</i> , <i>Convulvulus scammony</i> , <i>Zingiber officinalis</i> , <i>Origanum vulgare</i> , <i>Plumbago zelanicum</i> , <i>Verbascum thapus</i> , <i>Ricinus communis oil</i> , <i>Piper</i>	Anti-arthritis activity	28,29

			<i>nigrum, Coriandrum sativum, Rosa damascus, and Pyrethrum indicum</i>		
		Artha cure	<i>Aconitum ferox, Syzgium aromaticum, Cuscuta reflexa, Allium sativum, Strychnos nux vomica, and Myristica fragrans</i>	Anti-arthritis activity	30
3	Cancer	Zyflamend	<i>Curcuma longa, Rosmarinus officinalis, Scutellaria baicalensis, Copis chinensis, Polygonum cuspidatum, Berberis vulgaris, Origanum vulgar, Zingiber officinale, Camellia sinensis,</i>	Prostate-cancer	31
		Varunadi Ghritha	<i>Strobilanthes, Ciliates, The asparagus racemosus, Plumbago zeylanica, Chenomorp ha fragrances, The Marmelos Aegle Bracteolate Aristolochia, The Pongamia glabra Aerua Lanata, Crataeva religiosa, Solanum melongena, Integrifolia Holoptelia, Terminalia chebula, Moringa olifera, Premna corymbosa, Bipinnata Desmostachya, Anacardium Semicarpus.</i>	Head and neck cancer	32
4	Diabetes Mellitus	Diabrid	<i>Gymnema sylverive, Momordica charantia, Eugenia jambolona, Trigonella graceium</i>	Anti- diabetic activity	33
		Okudiabet	<i>Bark from Alstonia congensis, fruit extract from Xylophia</i>	Anti-diabetic	34

			<i>aethiopica, and Stachytarpheta angustifolia</i>		
		Joshanda	<i>Glycyrrhiza glabra, Onosma bracteatum, and Zizyphus jujusa</i>	Anti-diabetic, anti-bacterial activity	35
		Diarun plus	<i>Salacia reticulate, Gymnema sylvestre, Emblica officialis, Trigonella foenum graecum, Momordica charantia, Eugenia jambolana, and Curcuma longa</i>	Anti-diabetic activity	36
		Ayurslim	<i>Trigonella foenum graecum, Terminalia chebula, Gymnema sylvestre, Garcinia camogia, and Commiphora wightii</i>	Anti-diabetic activity	37
5	Diaaroea ,Malaria	Daouri	<i>Paullina pinnata, Phorira lanceolata, Odina acida, Khaya senegdensis, and Pteleopsis suberosa</i>	Anti-diarroheal activity,anti- malarial.	38
6	Dysentery	Kutajarishta	<i>draksha (Vitis vinifera), kashmarya (Gmelina Arborea), kutaja (Holarrhena antidysenterica), guda (jaggery), jala (water), madhuka pushpa (Madhuka indica), and dhatakipushpa (Woodfordia fruticosa).</i>	Antidiarrheal activity Immunostimulatory ,anti-parasitic activity ,antimotility effect, antisecretory effect, analgesic effect, anti-inflammatory ,action antibacterial activity	39
7	GIT problems	Ajmodadi churna	<i>Terminalia chebula, Plumbago zeylanica, Cedrus deodara, and P. longum (stems), Trachyspermum ammi, Piper nigrum, Piper longum, Argyreia nervosa, Zingiber officinale, Anethum, and Embelia ribes and Anethum raveolens</i>	carminative and an antispasmodic, and also restores the digestive functions	40

8	Hyperlipidemia	Dihar	<i>Syncytium cummi</i> , <i>Momordica chrantia</i> , <i>Embellica officinalis</i> , <i>Gymnema sylvestre</i> , <i>Entrostemma littarate</i> , <i>Azadirachia Indica</i> , <i>Tinospera cordifolia</i> <i>Curcuma oblonga</i>	Anti-hyperlipidemic ,anti- diabetic ,antioxidant.	41
9	Hypertension and ischemic heart disease	Triglize	<i>zeylanica plumbago</i> , <i>Terminalia chebula</i> , <i>Trachyspermum ammi</i> , <i>P. longum (stems)</i> , <i>Piper longum</i> , <i>Piper nigrum</i> , and <i>Cedrus deodara</i> <i>Embelia ribes</i> , <i>Zingiber officinale</i> , <i>Atehum raveolens</i> , and <i>Argyreia nervosa</i>	To treat hypertension ,ischemic heart disease	42,43
10	Infections	Praneem	<i>Mentha citrata</i> oil and <i>Sapindus mukerosi</i> 's purified saponins, as well as <i>Azadirachta indica (neem)</i>	Vaginal microbicides	44,45
11	Inflammation	DHU001	<i>Mentha arvensis</i> , <i>Glycyrrhiza uralensis</i> , <i>Schisandra chinensis</i> , <i>Liriope spicata</i> , <i>Ficus carica</i> , and <i>Zingiber officinale</i>	Anti-inflammatory activity	46
		Wu-Zi-Yan- Zong	<i>Chinensis Cuscuta Barbarum</i> Lam. <i>L. Rubus Plantago asiatica</i> Chingii Turkcz. Hu. <i>Shizandra chinensis</i> Maximum Baill L. <i>The brevicornu epimedia</i>	Anti-inflammatory activity	47
12	Jaundice	Vidakana choornam	<i>Embellia ribes</i> , <i>Moringa oleifra</i> , <i>Piper longum</i>	To treat jaundice and liver disorders	48
13	Post menopause	Ovoutoline	<i>Asparagus racemosus</i> , <i>Tinospora cordifolia</i> , <i>Symplocos racemosa</i> , <i>Glycyrrhiza glabra</i> , <i>Valeriana walchii</i> , and	Post menopausal symptoms	49

			<i>Holarrhena antidysenterica</i>		
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Drug-herb interaction:

More than 6000 drugs in the "Ayurvedic Formulary" are known to intentionally contain at least one metal, with lead and mercury being the most often used, according to drug experts. These dangerous compounds are known to be potent hepatotoxic, neurotoxic, hematotoxic, and nephrotoxic agents.⁵⁰

Over the past ten years, allegations of toxicity from utilizing Ayurvedic herbs have surfaced, and it has been discovered that many Ayurvedic Rasausadhies contain metals.⁵¹⁻⁵³

The CDC, the Centre for Disease Control, has warned that some Ayurvedic medications contain harmful levels of lead, posing health risks to pregnant women and their unborn children.

1. Lead exposure during pregnancy can harm fetal development.
2. Ayurvedic medications may contain high levels of lead, mercury, or arsenic.
3. Kasthoushadhies, being metal-free herbal preparations, offer a safer alternative.⁵⁴ Here are the following possible herb drug interaction given in the table no :3

Table: 3 Examples of possible drug-herb interaction⁵⁵

PHF contains Ayurvedic herbs.	Potential interactions between drugs and herbs
Ginkgo (Gingko biloba), garlic (Allium sativum), and ginger (Zingiber officinale)	Increase bleeding risk by interacting with warfarin and NSAIDs, primarily by inhibiting platelet aggregation. Insufficient generation of coagulation mediators antagonistic effects of platelet activating factor
Using Hypericum perforatum, or St. John's wort, is used to treat depression.	Trigger the hepatic microsomal enzyme cytochrome P 450, which increases the metabolism of a number of drugs, such as digoxin and theophylline, and decreases their efficacy.
Oat bran, pectin, or lovastatin.	Reduced ability to absorb lovastatin In the intestines, lovastatin may be bound or trapped by pectin or bran Fibers.
Meadowsweet (For anti-inflammatory properties, use Fili pendula ulmaria.	Displace medications that are strongly protein bound, such warfarin and carbamazepine, making their side effects worse.

Future prospects:

- Medicinal plants are treasure troves of natural bioactive substances of therapeutic potency that are utilized in the creation of different medication formulations.
- Polyherbal compositions' numerous advantages have garnered significant research attention, yet a systematic approach is crucial to fully harness their potential.

- Polyherbal preparations exhibit high efficacy, increased acceptance, personalized medicine, synergistic effects, new drug discovery, cost-effective, sustainability, cosmeceuticals and nutraceuticals, evidence-based research, globalization and standardization.
- Systematic research is necessary to unlock their full potential
- Multifaceted benefits of polyherbal formulations warrant further exploration.

Conclusion:

In the Indian traditional system of medicine, substances of natural origin whether whole plants, parts of plants, animal parts, or minerals are used either alone or in combination. The scientific advancement carries with it the improvement in polyherbal formulations, through the study of various phytoconstituents and discovery of useful herbs combinations which work synergistically to produce desirable effect.

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