Review Article

Comprehensive review on polyherbal formulations

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Abstract

A key element of traditional medical systems like Ayurveda, Siddha, Unani, and Traditional Chinese Medicine are polyherbal formulations (PHFs). PHFs combine two or more herbs in an effort to improve therapeutic efficacy, lower toxicity, and target various biochemical pathways in a synergistic manner. The historical context, justification, phytochemical basis, pharmacological activities, formulation science, quality control, toxicity assessment, clinical studies, difficulties, regulatory strategies, and potential future developments of polyherbal formulations are all thoroughly examined in this review. To ensure better comprehension, tables summarising phytoconstituents, commercially available PHFs, analytical techniques, and figure-based diagrams showing synergistic mechanisms and formulation steps are included. Students, researchers, and professionals involved in phytomedicine and herbal pharmaceutics can use this article as a comprehensive academic resource. Advances in analytical chemistry and systems biology, which enable researchers to better understand the complex interactions between plant metabolites, are another factor contributing to the growing scientific interest in polyherbal formulations. The ways in which synergistic networks within PHFs may modulate intricate physiological pathways are starting to become clear thanks to contemporary techniques like metabolomics, network pharmacology, molecular docking, and high-resolution chromatography. In addition to validating conventional therapeutic claims, these tools assist in identifying lead compounds and combinational principles that may guide the development of next-generation herbal drugs.In order to guarantee quality, consistency, and patient safety, harmonised regulatory frameworks, standardised manufacturing procedures, and strong pharmacovigilance systems are all necessary as herbal markets grow internationally. Despite these developments, a number of issues still exist, such as raw material variability, a dearth of large-scale clinical trials, and the difficulty of demonstrating synergy using traditional reductionist models. Interdisciplinary cooperation between botanists, pharmacognosists, clinicians, chemists, and regulatory scientists will be necessary to close these gaps. All things considered, PHFs continue to be an important area of research in both traditional and integrative medicine, providing insightful information about multi-target therapeutic approaches while highlighting the significance of evidence-based standardisation and responsible clinical application.

Keywords-Traditional medicine, Polyherbal formulation, Analytical chemistry, Therapeutic effects, Botanists.

Introduction

One of the first therapeutic approaches in herbal medicine is polyherbal formulations. Additionally, these medications, which blend multiple herbs for greater safety and effectiveness, are a crucial component of different herbal approaches. PHFs improve physiological processes, address imbalances, and have multitargeted therapeutic effects. PHFs provide a more comprehensive mechanism of action than single-herb formulations because contemporary research has shown that numerous diseases, including diabetes, obesity, cardiovascular disorders, and neurological conditions, involve multiple metabolic pathways. In contrast to isolated plant extracts, polyherbal formulations are thought to produce a wider pharmacodynamic coverage and fewer side effects, making them a strategic therapeutic approach in traditional medicine.[1,2] In particular, for chronic, multifactorial disorders that cannot be successfully treated with single-target interventions, this holistic concept is consistent with contemporary understandings of disease complexity. According to recent research, phytochemicals in PHFs may influence inflammation, oxidative stress, glucose metabolism, lipid homeostasis, and neurochemical signalling in an additive or synergistic manner. Because of these interactions, PHFs can simultaneously affect a variety of biochemical pathways, which may be advantageous in diseases like metabolic syndrome, neurodegeneration, and cardiovascular dysfunction. Additionally, the inclusion of detoxifying, adaptogenic, or supportive herbs in a formulation can improve bioavailability, stabilise active ingredients, and support overall therapeutic balance.[3, 4]

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History

Ayurveda

For more than 5,000 years, Ayurveda has relied heavily on polyherbal formulations. Thousands of multi-herb combinations are described in traditional Ayurvedic texts like the Charaka Samhita, Sushruta Samhita, and Ashtanga Hridaya in order to bring the three doshas—Pitta, Kapha, and Vata—back into balance.[5,6] Combining herbs was thought by ancient doctors to increase therapeutic potency, reduce toxicity, and treat complicated illnesses more successfully than using just one herb. This tradition gave rise to formulations such as Dashmoola, Chyawanprash, and Triphala. Through empirical application, Ayurvedic practitioners developed polyherbal principles over centuries, creating a scientific basis for synergistic herbal therapy that still has an impact on contemporary phytomedicine.Ayurveda employs polyherbal blends like these and places an emphasis on holistic healing. eg-Triphala, Chyawanprash,Dashmoola,Liv52,etc.[7-9]

Siddha and Unani System

Siddha System

Polyherbal formulations have long been used in the Siddha medical system, one of the oldest healing traditions in India. Siddha, which has its roots in Dravidian culture and is credited to the ancient Siddhars, emphasises keeping the body's three humors—Vatha, Pitha, and Kapha—in balance. For centuries, polyherbal remedies like Kudineer, Chooranam, Mathirai, and Thailam have been used to treat respiratory conditions, metabolic disorders, and chronic illnesses. To increase therapeutic action and lessen toxicity, Siddha

practitioners mix metals, minerals, and herbs in exact amounts. Over time, Siddha's vast pharmacopoeia of synergistic multi-herb formulations was refined through experience and empirical knowledge.[11-15]

Unani System

Polyherbal formulations are highly valued in the Unani system, which is based on the Greco-Arabic medical traditions of Hippocrates, Galen, and Avicenna. In order to treat digestive problems, liver diseases, fevers, and reproductive disorders, Unani doctors have traditionally used multi-herb combinations called Majoon, Arq, Safoof, and Jawarisht, which are based on the idea of balancing the four humors—blood, phlegm, yellow bile, and black bile. The purpose of polyherbal blends was to reduce negative reactions, enhance temperament (Mizaj), and produce synergistic effects.[16-18]

Classification of Polyherbal Formulation

Based on Composition:
Herbal-only
Herbo-mineral
Herbo-metallic
Based on Dosage Form
Powder / Churna
Decoction / Kwath
Paste / Avaleha
Tablets / Capsules
Oils

Based on Therapeutic Action

Antidiabetic
Cardioprotective
Neuroprotective
Anti-inflammatory
Digestive

Based on Traditional Systems

Ayurveda
Siddha
Unani
Traditional Chinese Medicine

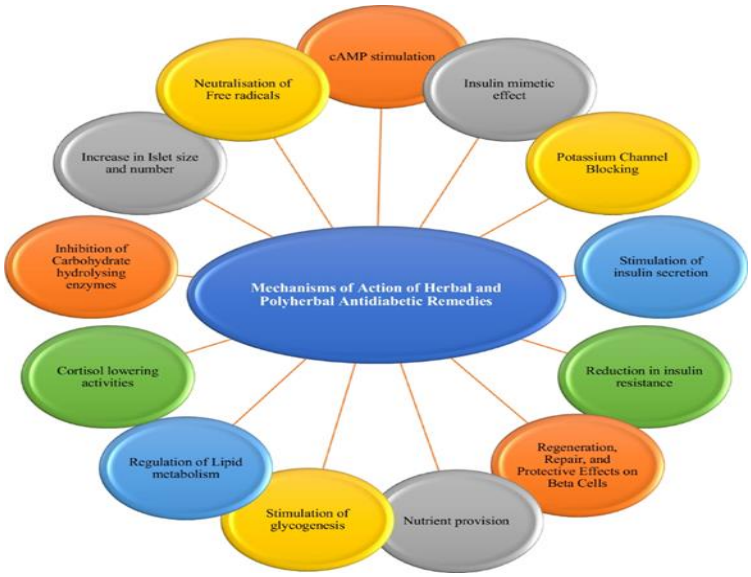

Fig.:-1 Based on Therapeutic Action (Antidiabetic activity)

Features of Polyherbal Formulation

Composition of Multiple Herbs:
contain a combination of two or more herbs to target multiple pathways and improve therapeutic efficacy.
Combined Action:
Together, the herbs have synergistic or additive effects that increase potency while lowering adverse effects.
Multiple-Targeted Treatments:
can simultaneously alter several biochemical pathways, which makes them appropriate for complicated or long-term illnesses.
Enhanced Safety Profile:
When compared to high doses of a single herb, a combination of herbs can lessen toxicity.
Holistic Approach:
Rather than just treating symptoms, try to improve overall health, boost immunity, and restore physiological balance.
Factors affecting Polyherbal Formulation:
Raw Material Quality
The composition and effectiveness of phytochemicals can be greatly influenced by botanical identity, species, plant part used, geographic origin, cultivation methods, and harvesting season.

Methods of Processing

The stability and bioavailability of active ingredients can be impacted by processes such as drying, grinding, extraction, decoction, or fermentation.
Composition of the Formulation
Synergistic effects and therapeutic results are determined by the selection of herbs, their ratios, and the presence of supportive/adjuvant herbs (Yogavahi).

Conditions of Storage

Microbial contamination, chemical stability, and shelf life can all be impacted by temperature, humidity, light exposure, and packaging material.
Dosage Form
Forms such as powder, decoction, paste, tablet, capsule, or oil can affect patient compliance, bioavailability, and absorption [19-22]

Advantages of Polyherbal Formulation:

Increasing immunity
Preventing seasonal infections
Health of the respiratory system (cough, asthma, bronchitis)
Anti-aging characteristics
Cognitive support and anti-stress
Improvement of digestion
cardiovascular assistance
Tonic for general health[23]

Disadvantages of Polyherbal Formulation

Complicated Composition:

It can be challenging to determine which component of a variety of herbs is causing positive or negative reactions.

Difficulties with Standardisation:-

Inconsistent quality and potency can result from variations in plant species, raw materials, or processing techniques.

Potential Interactions Between Herbs:

Efficacy or safety may be unexpectedly changed by antagonistic or synergistic interactions.

Possible Toxicity:

Combining several herbs can raise the risk of negative effects if not properly monitored because some herbs may contain toxic compounds.

Difficult Optimisation of Dosage:

It is difficult to determine the appropriate dosage for each component and for various patient populations.

Types of Polyherbal Formulations

Based on Dosage Form

Powders (Churna)

Decoctions (Kwath/Kashayam)

Pastes (Avaleha/Lehya)

Tablets and Capsules

Oils (Taila)

Juices (Swarasa)

II. Based on Composition

Formulations Made Only of Herbs

Formulations of Herbo-minerals

Formulations of Herbo-metals

III. Based on Traditional medicines

Formulations from the Traditional System

Formulations of Siddha

Formulations of Unani

TCM, or traditional Chinese medicine

Polyherbal Formulation(Chyawanprash)

Definition

Chyawanprash is a traditional, nutrient-rich Ayurvedic health supplement with a jam-like consistency, known for its rejuvenating properties and wide range of health benefits. In Ayurveda, it is categorised as a Rasayana, an anti-aging formula designed to maintain strength and revitalise the body.[23]

Types of Chyawanprash

Table 2: Types of Chyavanprash with its key ingredients and associated utilization

Types	Key ingredients	Characteristics	Uses
Classical Chyawanprash	Amla, ghee, sesame oil, honey, classical Ayurvedic herbs	Thick, dark paste; traditional taste; follows ancient formulas	Purists, therapeutic use, Ayurvedic practitioners
Sugar-Based / Conventional	Amla, herbs, refined sugar or jaggery	Sweet, balanced taste; widely available; long shelf life	General use, families, daily consumption
Sugar-Free / Low-Sugar	Amla, herbs, natural sweeteners (stevia, sorbitol, etc.)	Less sweet, lighter texture; low glycemic impact	Diabetics, fitness-conscious users
Jaggery-Based	Amla, herbs, jaggery	Earthy flavor; more traditional and less processed	Health-conscious users avoiding refined sugar
Herbal/Botanical Variants	Classical base + added herbs (Ashwagandha, Shatavari, Tulsi, Giloy, etc.)	Targeted benefits; slight variations in taste	Stress relief, immunity boost, women's health, etc.
Regional/Spiced Variants	Classical base + extra spices	Enhanced aroma; region-specific taste	People preferring strong or unique spice profiles
Amla-Rich/High-Potency	Higher concentration of amla and antioxidants	Tangier taste; dense nutrient profile	Users seeking stronger immunity support
Organic Chyawanprash	Certified organic herbs, organic sweeteners	No synthetic chemicals; premium product	Natural/organic lifestyle users

The significance of Ayurveda

Chyawanprash is prized in Ayurveda for its Rasayana qualities, which included:

bolster the immune system

Boost vitality and endurance

Boost digestive and respiratory health

Postpone ageing and increase longevity

Keep the three doshas—Pitta, Kapha, and Vata—in balance.

History of Chyawanprash

Classical Ayurvedic texts like the Charaka Samhita and Sushruta Samhita mention Chyawanprash. Legend has it that the Ashwini Kumaras, the twin Ayurvedic doctors, helped the sage Chyawan formulate it to restore his youth and vitality. Traditional preparations in herbal powders, decoctions, and pastes gave way to contemporary, commercially produced semisolid forms over the course of centuries. Its long-lasting appeal is a reflection of both its significant cultural value in India and around the world, as well as its scientifically proven health benefits.The institutionalisation of Ayurveda during the mediaeval and early modern eras coincided with the rise in popularity of Chyawanprash in recent centuries. In addition to promoting regional variations that used locally accessible botanicals, the emergence of Ayurvedic schools and academic commentary contributed to the preservation of the traditional recipe. Traditional formulations, such as Chyawanprash, were more thoroughly documented in pharmacopoeias and medical handbooks during the colonial era due to interest in indigenous medical systems. Its transition from a home remedy to a product produced by newly established Ayurvedic pharmacies also began during this time. By the middle of the 20th century, Chyawanprash was one of the flagship formulations promoted for overall wellness as India focused on traditional knowledge systems in its nation-building endeavours. This helped with nationwide distribution, branding, and large-scale commercial production. With Ayurvedic companies exporting standardised versions to foreign markets and positioning it within the global health-food and supplement industry, globalisation in the late 20th and early 21st centuries further accelerated its reach. Chyawanprash, an ancient recipe that has been passed down through oral tradition, canonical texts, and successive generations of practitioners, is a symbol of continuity today. Its transformation from a legendary rejuvenating concoction to a popular wellness item highlights the dynamic interaction between custom, culture, business, and contemporary science.

Conclusion

By combining multiple herbs for increased efficacy and decreased toxicity, polyherbal formulations (PHFs), one of the oldest and most adaptable methods in traditional medicine, provide multi-targeted therapeutic effects. Ayurvedic, Siddha, and Unani systems have long acknowledged the benefits of polyherbal blends in promoting longevity, preventing illness, and restoring physiological balance. The traditional Ayurvedic Rasayana Chyawanprash, which has anti-inflammatory, immunomodulatory, antioxidant, and rejuvenating properties, is a prime example of

PHFs. Its function in immunity, respiratory health, and general well-being is supported by scientific research, including in vitro, animal, and clinical studies. Quality and safety are guaranteed by standardisation using microbiological, physicochemical, and organoleptic parameters. Low-sugar formulations, nano-encapsulation, and AI-driven optimisation are examples of future developments that could improve the effectiveness, acceptability, and integration of PHFs into contemporary healthcare. The development of PHFs in contemporary research demonstrates their increasing significance in integrative medicine. A greater comprehension of their phytochemical complexity and the synergistic interactions that underpin their therapeutic actions has been made possible by developments in analytical techniques like HPTLC, LC-MS, GC-MS, and metabolomics. Additionally, the mapping of herb-compound-target relationships is increasingly being done using systems biology and network pharmacology models, which provide scientific frameworks for understanding conventional formulations. Ongoing research attempts to close these gaps through better cultivation techniques, digital authentication tools, and improved quality-control protocols, but challenges like raw-material variability, standardisation issues, and a lack of large-scale clinical trials still exist. If PHFs are backed by thorough scientific validation and responsible regulatory oversight, they could become more important in personalised and integrative medicine as interest in natural and preventive healthcare grows worldwide.

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