

Concomitant Use of Local Herbal Cornucopia in Providing Relief from Respiratory Disorders

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Abstract

In recent years, non-traditional herbal formulations have become more popular. The problem is that most nations have not done a good job of incorporating these preparations into their contemporary medical systems. This is because there is not enough research to prove its safety and effectiveness over the long run. Other significant limitations include an absence of a predetermined pharmacovigilance strategy for herbal medications and a dearth of legitimate monographs on impurity profiling, standardization techniques, guidelines for fixed-dose combinations, and more. Few problems with traditional herbal remedies have been resolved in recent years. The problems with non-classical contemporary formulations, however, have not been resolved. As such, this brief study aims to illuminate the key difficulties associated with these formulations and provide some professional commentary on how to address them.

Keywords: *Pharmacovigilance, Herbal, Monographs, Formulation, Monographs.*

INTRODUCTION

Most of the world's population has relied on medicines derived from natural sources for the prevention and treatment of numerous terrible diseases ever since recorded history began. Despite many advances, modern medicine still does not meet the requirements of individuals from all economic backgrounds. As they cannot afford conventional medical care, the

poor who live in rural areas rely heavily on herbal remedies (Prakash, 2017)¹. In addition, the reduced risk of adverse effects and lower cost of traditional medicines have contributed to their increased use around the globe. It is projected that by the end of 2023, the global market for medicines will be worth \$ 111 billion, expanding at a CAGR of 7.2% between 2017 and 2023 (Global Herbal Medicine Market Research Report - Forecast to 2023)².

Despite increasing popularity, these drugs are not routinely prescribed. However in many Western nations, they are utilized in addition to standard care. This is caused by the fact that contemporary medicine and traditional practices are not cohesively integrated, as well as by the absence of a clear regulatory framework and quality assurance measures.

Traditional medicine also suffers greatly from not having sufficient formal standardized methods or sufficient proof of safety and effectiveness. Although the World Health Organization (WHO) has released a new strategy for traditional medicine from 2014-2023, several member states still struggle due to a lack of research data. Thus, this study is meant to offer light on the ongoing difficulties of standardizing various herbal treatments, with a focus on nonclassical proprietary herbal formulations (Yadav, Dixit, 2008)3.

Herbal remedies considered "classic" are those whose preparation follows the guidelines laid down in ancient medical tomes like the CharakaSamhita, Sushruta Samhita, Bhaishajyaratnavali, and ShanghanLun (classical Chinese medical treatise) (Pandit, Kanjilal, Awasthi, Chaudhary, 2017)4. Classical herbal formulations are standardised by their producers according to official monographs' recommendations, which are based on a set formula (Prakash, 2017)1.

AYUSH form of medication

S. No.	Medical Practices	Derivations
1	Ayurveda	Tablets, capsules, syrups, solution based
2	Siddha	Minerals and metals - Uppu, Pashanam, Uparasam, Ratnas and Uparatnas, Loham, Gandhakam, and Gandhakam
3	Unani	Animal and plant

		derivatives
4	Yoga	Asanas
5	Homeopathy	Tinctures and diluted extracts of varying potencies

Non-classical or proprietary formulations, on the other hand, are made according to the manufacturer's own recipe; their contents and additions are not always documented in the canonical sources. Most proprietary herbal remedies are made up of a wide variety of different ingredients. Several of these compounds are included in various official monographs, although there is little information available on their chemical fingerprints or chromatographic parameters. The current herbal formulation does not have pure chemical-like analytical limitations for its active ingredients (Global Herbal Medicine Market Research Report - Forecast to 2023). This is owing to the fact that the raw materials themselves are not uniform in terms of the concentrations of their active ingredients, which might vary depending on factors such as the age and origin of the medicinal plant, as well as cultivation and processing techniques. The vast majority of these formulas include several ingredients.

AIMS AND OBJECTIVES

Understanding the use of local herbs in providing relief from respiratory disorders.

METHODS AND MATERIALS

The lists of local herbs have been prepared and then observed at chemists outlets for popularity of usage in providing relief for respiratory disorders.

Practice of Home Remedies in India

Alternative medical practices such as Ayurveda, Siddha, and Unani have been used in India since ancient times. Although the underlying principles of therapy across all three approaches are similar, formulations and approaches to standardization vary. Tablets,

capsules, syrups, and solutions are only few of the forms of contemporary dosage forms used in Ayurveda. In a similar vein, several Siddha medicines rely on minerals and metals. Uppu, Pashanam, Uparasam, Ratnas and Uparatnas, Loham, Gandhakam, and Gandhakam are the broad headings under which these medications are grouped. Drugs of animal and plant origin with a similar profile to Ayurveda medications are also part of the Siddha school of treatment. Siddha Pharmacopeia of India does not, however, set limits for the allowable amount of contaminants, heavy metals, and poisons in contemporary Siddha formulations. There is a need for Siddha formulations to be standardized, however this presents a barrier. Several Siddha medicines are comparable to Ayurveda ones, therefore they may be standardized in the same way. The Unani medical method was first brought to India about the year 1350.

The Unani Pharmacopoeia of India was compiled by the Indian government's Ministry of AYUSH. Fifty traditional Unani medications and their standardization methods, as well as restrictions on heavy metal content, are all included in this official monograph. Unfortunately, the published monographs fell short in covering the contemporary issues of good manufacturing practise for herbal medications (Zhang, 2018)5.

Excipients are employed in contemporary herbal formulations in addition to active compounds to improve the formulations' "palatability, bio-absorption, and shelf life. Additives such diluents, binder or adhesives, lubricants, glidants, disintegrants, superdisintegrants", colorants, sweeteners, coating material, plasticizers, and so on are needed for solid dosage forms. Solvents, co-solvents, buffers, antimicrobial preservatives, thickening agents, cleaning fluids, humectants, emulsifiers, sweetening agents, moisturisers, and flavors are also needed for liquid and semi-liquid formulations. These fillers come from

both natural and manmade sources. Both sorts of excipients may be found in non-traditional, contemporary herbal preparations. Formulations often become unstable due to a lack of predictors including additions. Because of this, it is essential to conduct a compatibility assessment of the chemicals in the formulation to guarantee the highest possible standard of finished product.

Presence of Impurities and Functionality Break-Ups

Herbal formulations are tainted with impurities during their production, sometimes on purpose with synthetic medications. Heavy metals, aflatoxins, pesticides, and solvent residues are additional potential contaminants during plant material extraction and fractionation. Most official monographs, however, are missing crucial details like the maximum allowable residual solvent concentration in certain plant extracts. Degradation of the herbal mixture might create impurities, which must be carefully monitored. Stability studies of herbal mixtures were seldom attempted until recently. Therefore, detailed guidelines are needed specifically for stability research on herbal medications.

Most non-classical herbal products on the market today are made using proprietary formulas. These formulations often include unintended contaminants from both recognized and unknown adulterants. There are no comprehensive guidelines or monographs for regulating the presence of these adulterants in these preparations. Among the most important factors to consider when assessing the efficacy of these formulations are investigations of their safety and long-term effectiveness. The quality of the preparations may be largely controlled by performing checks on the legitimacy of the source material from which the medicine is being extracted, the purity of the extract, and a chemical analysis of the completed formulation. Government organizations in poor and undeveloped nations also need to address

the problem of a lack of advanced testing facilities for herbal medicines (Chawla et al, 2013)6. An important difficulty a producer has is the absence of a chemical identifier for the different components contained in the mixture. So, it seems that a few government-led laws for the simple availability of varied marker chemicals opens a larger route for standardization of these cutting-edge herbal treatments. In order to ensure the consistency and reliability of non-classical herbal remedies, a fixed dosage combination should be established. There is a need for more in-depth monographs on the topic of the allowable levels of microorganisms and aflatoxin in various herbal components. The formulas are not subject to severe quality control regulations. It's very uncommon for these remedies to spread across communities by word of mouth and be distributed outside of the oversight of a medical professional.

Herbal remedies are helpful to people because they include phytochemical components with therapeutic effects. These compounds are produced by plants, including fruits, vegetables, grains, legumes, and other useful plants. Cancer-causing cells may be stunted in their development by some plants. With the use of nanotechnology, phytochemical substances are extracted from plants and used in pharmaceuticals. Integrative and indigenous medicine often include the use of herbal remedies, which have been in use to treat a wide range of conditions since at least the Middle Ages. Herbal pharmaceuticals have gained popularity in the scientific community in recent decades due to the fact that many commonly used treatments have their origins in plants. The minimal negative effects on human health, relative safety, and lower cost of herbal treatments make them more popular. Natural goods are recognized as the most successful discovery in modern medicine due to their high quality as a source of bioactive molecules.

Findings on Herbal Pharmacological Presence in the Household

"Therapeutic approaches that have been around since long before the advent and distribution of contemporary medicines" is a common definition of herbal medicine. "Much study has been devoted to herbal medicine, a branch of the medical sciences that makes use of medicinal plants as a form of therapy. Most communicable and non-communicable ailments, such as cancer and diabetes", may now be treated just as well with herbal medications developed from old herbaceous remedies. The current pharmacopoeia owes a great deal to herbal treatments, which served as its foundation. As they are safer and have fewer side effects, herbal medications are a popular alternative to conventional drugs. Eighty-five percent or more of the global population relied on herbal remedies to manage conditions such as acne, eczema, viral infections, fungal infections, diabetes, and allergic responses. Despite their *in vivo* potency, they are seldom used in clinical practice due to difficulties such as poor solubility, low absorption, and excessive dosing. They have the potential to become integral parts of everyday medical practice if utilized properly. So, "the dosage of herbs needed for pharmacological action is decreased, but the convenience and low cost of these traditional remedies make them more appealing as an alternative for contemporary pharmaceuticals. Silver nanoparticles (AgNPs) derived from Tulsi leaf extract have been widely documented to have medicinal effects. Curcumin, quercetin, resveratrol, piperine, gallic acid, epigallocatechin-2-gallate, and ferulic acid are only few of the herbs used to treat neurological illnesses."

"Nanogels have showed considerable promise for the delivery of a broad variety of drugs to different organs in the body because to their great responsiveness *in vivo*, high drug loading capacity, efficient absorption, and cellular like properties." In order to treat skin issues, aloe

vera has been used for centuries, and it is now widely accepted as a safe and effective natural remedy. This article details how to construct a formulation out of pharmaceutically acceptable components; utilizing co-emulsifiers has been proven to increase drug penetration and permeability, and using nanogels in conjunction with co-emulsifiers has been shown to increase cutaneous delivery characteristics.

Herbal Nanoparticles for Treatment Therapy

The use of Ayurveda nanomedicines in cancer treatment has the potential to revolutionize the ways in which cancer is treated, diagnosed, and detected by allowing for individualized drug delivery with increased therapeutic efficiency and less unwanted effects. Tumors that are resistant to chemotherapeutic drugs have emerged as a major health problem because of the overuse of these treatments. So, it is extremely advantageous to discover natural chemicals that target and multiply signalling pathways and growth inhibition. It is undeniable that medications with both minimal toxicity to healthy tissues and strong therapeutic effectiveness are needed for cancer therapy. All of these benefits are guaranteed by the use of nanogel technology.

Herbal water tablets containing nanoparticles may be used to filter water and make it suitable for human consumption in impoverished areas. The Brahmi (*Bacopamonniera*) extract on this tablet's small ceramic disc filled with silver or copper nanoparticles allows it to purify water for up to six months when put inside a water container. Nanotablets containing herbal medicines are utilised for regulated and targeted distribution. As of now, scientists are looking into whether or not nanotablets coated with ayurvedic bhasmas have an anticancer impact.

Nanoparticles are used in the preparations known as "bhasma." It comes as a surprise to many experts that India has a medical system

that dates back 5,000 years. The Ayurvedic bhasmas have been used for centuries to treat a wide range of illnesses using nanotechnology. Two common characteristics of Ayurveda bhasmas are their "Rasayana" (immune modulation and anti-aging property) and "yogavahi" (drug carrying capacity and focused medication delivery).

Curcumin has been studied more than any other natural compound and has seen widespread application. Curcumin is the most often used natural component in cancer studies. "Inverse miniemulsion alginate aldehyde gelatin nanogels provide superior encapsulation of curcumin. Curcumin-acetone nanogel precipitation yields crosslinked polymer networks with more efficient encapsulation. The hydroxyl group of curcumin interacts with unreacted hydroxyl functionalities in the alginate aldehyde, leading to improved encapsulation through end-end hydrogen bonding. Nanogel encapsulation of curcumin increases drug loading efficiency to effectiveness index values for buccal delivery by increasing solubility." It was found that the encapsulation stability of the herbal nanogel should be unaffected by the addition of a large quantity of medication. Nanogel stability in vivo is also important for a successful delivery vehicle system. Studies reveal that crosslinked polymeric nanogels have better stable properties than non-crosslinked polymeric nanogels. They work best when all of its key components work together. Herbal medicines with the highest potency tend to have a poor absorption and a high systemic clearance due to the presence of insoluble components. The nanogel components of these medicines are one way to get around these limitations. Here we highlight a few of the many nanogels available that are infused with herbal remedies.

For example, in Ayurveda, the leaves of the *Eupatorium adenophorum* (Asteraceae) plant are used for their antibacterial, analgesic, and lesion-healing properties. The leaves of *E.*

adenophorum were extracted using methanol (1% w/w), and this extract was then mixed into a carbopol 934 gel by Negi and colleagues. In a rat model of carrageenan-induced paw edema, the produced greenish herbal gels showed strong anti-inflammatory effectiveness.

Cleodendron infortunatum leaf concoctions have been used historically to treat bronchitis, asthma, fever, skin diseases, and epilepsy. "By utilising the synthetic polymer carbopol 940, Das et al. transformed the leaf extract into a nanogel. The 2.5% extract gel effectively reduced inflammation without irritating the skin. A gel made from methanolic Albizia lebeck extracts has been found to have anti-inflammatory and analgesic properties, as shown by the work. Compared to carbopol 934 and other combinations, the penetration of the sodium alginate and carboxy-methyl cellulose nanogel was much higher investigated the anti-inflammatory effects of a nanogel containing a root extract. Before being converted into a gel using a paraffin wax foundation, aqueous root extract was enclosed in silver nanoparticles." The gel proved successful in preventing the bovine serum albumin from denaturing due to heat. The study authors claim that a non-irritating nanogel comprising "Sesbania grandiflora leaf (ethyl acetate extract), Carbopol 934, and sodium CMC" may be used to treat various skin inflammations.

The anti-hemorrhoid and anti-inflammatory effects of Lantana camara leaves. Two different extract strengths (2.5 and 5.0%) were employed with Carbopol 934 to create gels. In terms of physicochemical properties, that the extract gel at 2.5% was preferable to the extract gel at 5%.

Nevertheless, ethanolic preparations of Butea frondosa stem bark contain anti-inflammatory and pain relieving properties. After 8 hours, discovered diffusion and permeation percentages of 92.37 and 98.29, respectively, using a gel formulation they made with carbopol 934 and DMSO.

A semisolid dose was created by combining "Boswellia serrata (kundur) extracts with Withania somnifera extracts. Boswellia serrata (pentacyclic triterpenes) is anti-inflammatory and anti-arthritic" because it inhibits 5-lipoxygenase. Withania somnifera includes the anti-inflammatory and anti-arthritic compound withaferin A, a cell-permeable steroidal lactone.

Chewing on the leaves or petals of the plant known as Spilanthes acmella (Akkalkara) may lead to numbness in the tongue and gums. It's used to treat pain and as an anti-proliferation drug. The effectiveness of a muco-adhesive gel containing ethanosomes and the herbal extract for the treatment of pain, tooth decay, and buccal ulcers was studied.

"Common uses for aloe barbadensis include treating fungal infections, boosting immunity (by increasing activation of B-cells and other defence mechanisms), and speeding up the cascade process (various levels related to recovery, including wound reduction by contracting and returning to normalized physiological functional barriers). The nanogel combination of aloe vera and carbopol 934 was shown to induce wound contraction in rats with skin excision wounds by Khan et al. The presence of mannose-6-phosphate in the leaf extracts contributes to this capacity." Evidence suggests that mannose increases fibroblast activity and collagen synthesis.

Cassia alata Linn. was employed by Misal et al. to develop a nanogel that improved the efficacy of the botanicals against cancer, proliferation, infection of the skin, and the cascade effect. In addition to its antiviral, antifungal, antibacterial, antiulcer, and wound-healing capabilities, Cynodon dactylon Pers. The polyherbal gel was shown to have a greater anti-inflammatory impact than the separate gels in reducing carrageenan-induced edema in rat paws.

Challenges and Opportunities for the Future

Nanogels are a useful, new, and effective method of delivering medications that solves the limitations of both conventional and contemporary approaches to healing, such as unwanted side effects and brittleness. Research after research claims to have uncovered novel polymeric processes and mechanistic perspectives with promising therapeutic applications and nanogel design investigations. New research in nanogels and nanotechnology suggests that they may be useful in the treatment of ocular problems, the delivery of medicines via the nose, and the dosing of women through the vaginal route. Nanogels made from all-natural pharmaceuticals are now a multimillion dollar industry within the thriving pharmaceutical sector. While natural therapies have shown promise in preliminary research, many barriers remain. Recent studies show that nanogels may have promising future uses in the medical field. Poly(4-vinyl phenyl boronic acid-co-2-(dimethylamino) ethyl acrylate) nanogels containing silver nanoparticles loaded with insulin, for instance, have previously been produced for the treatment of diabetes. The WHO predicts that by 2020, 80 percent of the global population would utilize herbal medications to treat their health problems. Many still look for additional medical practices like alternative medicine, despite the lucrative market for allopathic medications. The therapeutic use of herbal medicines has significantly reduced as a result of widespread shifts in public opinion on a variety of fronts, including the economy, politics, and social mores. Nanogel compositions provide a promising foundation for enhancing herbal properties. Herbal nanogels are a cutting-edge pharmaceutical technology that transforms naturally occurring substances into potent drugs for the treatment of illnesses including cancer, skin conditions, diabetes, and others. As compared to orally administered medications, this has a less negative impact on patients' adherence while

using herbal remedies. Although there are many natural medicinal solutions available, not all of them have been shown to be risk-free. Some are quite dangerous and may cause negative interactions with other drugs.

CONCLUSIONS

As nanotechnology has developed over the last several decades, nanocarriers have progressed and become more important in the field of biomedicine. In vivo behaviour, nanocarrier toxicity, and industrial scale manufacturing are only a few of the significant barriers that nanomedicine must overcome before it can be widely used in the battle against new coronaviruses. "Because of their ability to entrap drugs, nanocarriers are utilised as carriers of conventional chemotherapeutic drugs and as platforms for combinational treatment, multifunctional diagnostics, and theranostics." The EPR effect has been utilized to passively target nanocarriers, whereas ligand modification of nanoplatform surfaces has been employed for active targeting, and stimuli-responsive nanocarriers have been used for site-specific and time-controlled drug delivery techniques. Nanogels have been shown to be better in simplifying this delivery system while also removing the drawbacks of earlier methods. Examples from the delivery of drugs and genes, smart new process, responsive materials, or coupled as a therapeutic approach highlight the enormous potential of functional nanogels as novel polymeric platforms for biomedicine.

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