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Understanding phytochemistry of homoeopathic medicines in relation to modern therapeutics with Compositae family

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Abstract
Homoeopathic system medicine can be explained as a symptoms-based method of treatment, these symptoms are nothing but symptoms of various sources of Homoeopathic remedies which are produced when administered on healthy human beings. The therapeutic effects of the plants species used in homoeopathy have never been subjected to systemic analysis. This article focuses on, Active principles are the specific chemical constituents of plants responsible for their characteristic pharmacological and therapeutic actions. In Homoeopathy, majority of Homoeopathic remedies are derived from plant sources, where recognition of the active compounds provides scientific validation to traditional symptom-based prescribing. Among various plant families, the Compositae family holds a prominent place, contributing several important remedies such as *Arnica montana*, Bellisperennis, Chamomilla, and Eupatorium perfoliatum etc & Despite their extensive use in clinical practice, the therapeutic actions of these remedies have not been systematically analyzed in terms of modern pharmacology. Phytochemistry, the study of chemical constituents of plants, bridges this gap by identifying active principles, understanding the constituents of plants helps us identifying active compounds their mechanisms of action, and facilitating standardization, quality control, and drug discovery. Understanding phytochemistry of Homoeopathic medicines by integrating phytochemical profile of Compositae family transforms "plants as remedies" into precisely understood, safe, & effective modern therapeutics bridging traditional wisdom with modern scientific standards.

Keywords: Phytochemistry, activeprinciples, compositae family (asteraceae), homoeopathic medicines, moderntherapeutics, plant secondary metabolites, bridging traditional and modern medicine

Introduction
The idea of Homoeopathy came to Samuel Hahnemann, the physician who developed the Homoeopathic system, during his translation of a medical treatise into German. In trying to verify Cullen's [William Cullen's is author of A treatise of MateriaMedica (1789)] theory that Cinchona, which has a bitter taste, could cure malaria, Hahnemann used cinchona and started experiencing malaria-like symptoms, such as fever, spasms, and chills. Hahnemann was stuck by the similarity of Cinchona's effects to those of malaria. With this knowledge, he theorized that cinchona cures malaria because it's capable of generating symptoms similar to those seen in malarial patients. When Cinchona is administered, it overcomes the malarial symptoms, and the diseased condition is no longer present. Additional scientific work has demonstrated that cinchona contains quinine, a compound that kills the malaria-causing parasite Plasmodium falciparum, hence curing malaria and providing the essence of the underlying active principles of the Homoeopathic system. This has made a foundation for the concept of active principle in later days

Active principle & its importance
Anything to be considered medicinal, it must contain certain chemical substances developed by it, which give therapeutic quality to the respective product. These are called "Active substances". And although medicinal plants have been used for thousands of years to improve human health, only recently we have these active elements, which underlie the origin of the therapeutic actions of plants, been isolated and studied. Phytochemistry deals with active principles; both of these concepts go hand in hand. The active principles of a drug are the potent constituents of the drug that is individual to the drug and are responsible

for pharmacodynamics action of drug. The active principles from the medicinal plants are what give the quality of the product. They determine its purgative, emollient, expectorant, choleretic, carminative, antidiabetic, purgative, laxative, etc. The role of active principles can be played by a single substance or a complex of substances. Active principles are the scientific foundation of both Modern Pharmacology and Homoeopathic MateriaMedica. They ensure effectiveness, safety, reproducibility, and global acceptance of medical systems.

Table 1: Classification of active principles

Class of active principles	Nature of active principle	Example (Homoeopathic sources)	Therapeutic action /uses
Alkaloids	Nitrogen-containing organic compounds, usually bitter and physiologically active	Atropine (Belladonna), Quinine (Cinchona), Strychnine (Nux vomica)	CNS stimulant, antimalarial, antispasmodic
Glycosides	Compounds that yield sugar and aglycone upon hydrolysis	Digitoxin (Digitalis), Salicin (Willow), Amygdalin (Amygdalus)	Cardiotonic, analgesic, antipyretic
Tannins	Polyphenolic compounds with astringent taste	Catechu, Hamamelis	Astringent, antimicrobial
Resins	Solid/semi-solid sticky plant exudates	Podophyllin (Podophyllum), Guaiacum resin	Anticancer, anti-inflammatory
Volatile Oil (Essential oils)	Aromatic oils that evaporate easily	Menthol (Mentha), Thymol (Thymus), Eugenol (Clove)	Antiseptic, carminative, stimulant
Fixed oils &Fats	Non-volatile, greasy oils from plants	Castor oil, Olive oil	Laxative, nutritive
Gums & Mucilages	Plant exudates forming gels with water	Acacia gum, Aloe mucilage	Demulcent, soothing
Terpens & Steriods	Hydrocarbons with diverse actions	Curcumin (Turmeric), Diosgenin (Dioscorea)	Anti-inflammatory, hormonal precursor
Flavonoids	Plant pigments with antioxidant activity	Rutin, Quercetin (Calendula, Arnica)	Antioxidant, capillary protection
Saponins	Glycosides with soap-like foaming action	Glycyrrhizin (Liquorice), Diosgenin	Expectorant, anti-inflammatory

Concept of active principles in modern therapeutics

The concept of active principles in Modern Pharmacology refers to the chemically defined constituents of medicinal substances that are directly responsible for their therapeutic action. Unlike traditional systems, which often employ the drugs in their physiological form, modern therapeutics emphasizes the identification, isolation, and standardization of these active molecules to ensure reproducibility, safety, and efficacy. Each pharmacological effect is attributed to a specific constituent that interacts with receptors, enzymes, or biochemical pathways in the human body. For example, morphine from *Papaver somniferum* exerts analgesic action, quinine from Cinchona possesses antimalarial properties, and digoxin from Digitalis purpurea acts as a potent cardiotonic. Many synthetic and semi-synthetic drugs used today are developed on the basis of such natural active principles, such as acetylsalicylic acid (aspirin) derived from salicin of Salix alba and etoposide derived from podophyllotoxin of Podophyllum peltatum. Thus, active principles form the scientific foundation of modern therapeutics, bridging traditional knowledge with evidence-based medicine, and guiding rational drug development, standardization, and clinical application.

Compositae family

The Asteraceae is an economically important family, providing products such as cooking oils, lettuce, sunflower seeds, artichokes, sweetening agents, coffee substitutes and herbal tea's. Several genera are of horticultural importance, including pot Marigold, Calendula officinalis, Echinacea (cone flowers), various daisies, fleabane, chrysanthemums, dahlias, zinnias, and heleniums. Asteraceae are important in herbal medicine, including Grindelia, Yarrow, and many others. A number of species are considered invasive, including, most notably in North America, dandelion, which was originally introduced by European settlers who used the young leaves as a salad green. In folk medicine, these plants from compositae family were used for shock, traumas, bruises, liver and blood dyscrasia, nervous conditions, spasms, respiratory catarrah, sepsis, and worms. The regional affinities of the compositae are the sensorium, mind, brain, nervous system, respiratory system, immune system and vital organs such as heart, lungs, liver, spleen, kidneys, digestive organs, gall bladder, stomach, circulation, blood. blood vessels

The Compositae (Asteraceae) family has been chosen for this study owing to its vast diversity, rich phytochemical profile, and significant role in both Homoeopathy and Modern therapeutics. Being one of the largest families of flowering plants, it comprises species known to contain bioactive constituents such as sesquiterpene lactones, flavonoids, volatile oils, and glycosides, which exhibit a wide range of pharmacological actions. Several prominent Homoeopathic medicines, including *Arnica montana*, *Calendula officinalis*, *Chamomilla recutita*, Echinacea, Millefolium, and Bellisperennis, belong to this family and are widely prescribed for trauma, inflammation, infections, heamorrhage, and digestive disorders. These same plants have also been scientifically validated in Modern pharmacology for their anti-inflammatory, immunostimulant, hepatoprotective, and wound-healing properties. Thus, the Compositae family serves as an ideal model to explore the phytochemistry of Homoeopathic drugs in relation to modern therapeutics, offering a meaningful bridge between traditional practice and contemporary scientific evidence.

Compositae group	Remedy	Active principle (S)	Uses in homoeopathy	Uses in modern therapeutics
Trauma, Injury& wound healing	*Arnica montana*	Helenalin, Dihydrohelenalin	Trauma, shock, bruises, "sore and lame"	Anti-inflammatory, analgesic, topical for bruises & sprains
	Bellis perennis	Bellisarine, Quercetin	Deep trauma, surgical trauma, pelvic congestion	Wound healing, uterine tonic
	Millefolium (Achillea)	Apigenin, Achilleine	Hemorrhage from injuries, hemoptysis, epistaxis	Hemostatic, wound healing
	Calendula officinalis	Oleanolic acid, Quercetin, Lutein	Lacerated wounds, prevents suppuration, healing	Antiseptic, antimicrobial, promotes wound healing
	Abrotanum (Southernwood)	Absinthin, Santonin (traces)	Marasmus, diarrhea, metastasis of complaints	Stimulant, digestive tonic
Nervous/Spasmodic	Chamomilla	Chamazulene, Bisabolol, Apigenin	Irritability, child colic, oversensitive to pain	Antispasmodic, sedative, anti-inflammatory
	Cina	Santonin	Worm complaints, convulsions, irritability	Anthelmintic
	Artemisia vulgaris	Thujone, Cineole	Epileptic fits, menstrual irregularities	Antimalarial relatives, antispasmodic
Fever & Bone Pain	*Eupatorium perfoliatum*	Eupatorin, Quercetin	Influenza with "bone-breaking" pains	Antipyretic, used in viral fevers
	Eupatorium purpureum	Euparin	Renal colic, urinary irritation	Diuretic, anti-urolithiatic
Digestive & Hepatic	*Taraxacum officinale*	Taraxacin, Inulin	Gastric disorders, mapped tongue, liver issues	Hepatoprotective, cholagogue, diuretic
	Carduusmarianus (Silybum)	Silymarin (Silibinin, Silychristin, Silydianin)	Liver affections, portal congestion, jaundice	Hepatoprotective, antioxidant
	Cynarascolymus (Artichoke)	Cynarin, Chlorogenic acid	Gallstones, indigestion	Lowers cholesterol, hepatoprotective
Immunity & Septic States	*Echinacea angustifolia*	Echinacoside, Cichoric acid	Low vitality, septic states, boils	Immunostimulant, boosts WBCs
	Parthenium hysterophorus	Parthenin	Allergic skin eruptions, dermatitis	Anti-inflammatory, but also allergenic
Skin & Mucous Membranes	Lactucavirosa (Wild lettuce)	Lactucin, Lactucopicrin	Insomnia, restlessness, cough	Mild sedative, analgesic, cough suppressant
Others (Miscellaneous)	*Solidago virgaurea*	Rutin, Kaempferol, Quercetin	Kidney and bladder disorders	Diuretic, anti-inflammatory
	Senecio aureus	Senecionine (pyrrolizidine alkaloid)	Menstrual irregularities	Emmenagogue, hepatotoxic in crude form

Conclusion

In the present era, the recognition of active principles has become essential in Homoeopathy, as they provide a scientific basis for understanding the sphere of action of remedies and help correlate traditional concepts with modern evidence. Phytochemical studies allow a deeper insight into the molecular mechanisms behind the curative action of medicines, thereby enhancing their credibility in contemporary practice. Within this framework, the Compositae family holds special importance, being rich in sesquiterpene lactones, flavonoids, and tannins that contribute to anti-inflammatory, analgesic, hepatoprotective, and immunomodulatory effects. Homoeopathic remedies derived from this family, such as Arnica montana, Chamomilla, and Calendula, not only exhibit clinical efficacy but also find support from Modern pharmacological research. Thus, integrating phytochemical knowledge of the Compositae family bridges Homoeopathy and Modern pharmacology, reinforcing the scientific foundation of Homoeopathic therapeutics while opening new avenues for evidence-based validation and future drug discovery.

Conflict of Interest

Not available

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