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CHEMOTAXONOMICAL AND PHARMACOLOGICAL REVIEW ON MEDICINAL PLANTS IN TEMPERATE REGION

Sasikala M[a,b], Sundara Ganapathy R[b], Karpakavalli M[a] and Mohan S[a]
[a]Karpagam College of Pharmacy, Coimbatore-641032, Tamil Nadu, India
[b]Faculty of Pharmacy, Karpagam Academy of Higher Education, Karpagam University, Coimbatore-641021, Tamil Nadu, India.
Email: sasikalampharm@gmail.com

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Abstract:

Introduction: Medicinal plants are considered as rich resources of ingredients which can be used in drug development pharmacopoeial, non- pharmacopoeial or synthetic drugs. Over the past two decades, there has been a tremendous increase in the use of herbal medicine. The rise of chemotaxonomy is mainly due to the advancement in analytical techniques for chemical analysis that can detect even trace amount of chemical compounds. In plants, the more popular families that have been studied through chemotaxonomy are Malvaceae, Ranunculaceae, Magnoliaceae, Polygonaceae, and Solanaceae. **Aim:** The fundamental advances of this study are to focus on common families of medicinal plants exists in temperate regions throughout the world. The reason for getting aware about the families is to recognize the categories of each and every plant coming in that family, to realize the specialized phytochemical constituents existence and to study the specific pharmacological activities commonly exhibited by the particular plants in the respective family. **Study:** It is pointed on common 50 families of medicinal plants and the review of their common phytoconstituents and pharmacological effects have been conducted referring many reputed articles. **Conclusion:** From this review, one can conclude that the research activities under what class of herbals would be carried out, which part of study is to be improved, about the choice of phytoconstituents for the herbal drug development and about the trading of particular group of herbals. The findings of chemotaxonomic studies are helpful to taxonomist, phytochemists and pharmacologists to solve selected taxonomical problems.

Keywords: Chemotaxonomy, Pharmacology, Temperate, Family, Medicinal, Herbals.

Introduction:

Plant taxonomy is most valuable in the search for new industrial /medicinal plants and chemical characteristics of plants. The rise of chemotaxonomy is mainly due to the advancement in analytical techniques for chemical analysis

that can detect even trace amount of chemical compounds. In plants, the more popular families that have been studied through chemotaxonomy are Malvaceae, Ranunculaceae, Magnoliaceae, Polygonaceae, and Solanaceae [1-2].

Pharmacology is the branch of medicine and biology concerned with the study of drug action, where a drug can be broadly defined as any man-made, natural, or endogenous (from within body) molecule which exerts a biochemical and/or physiological effect on the cell, tissue, organ, or organism. Pharmacognosy is a branch of pharmacology dealing especially with the composition, use, and development of medicinal substances of biological origin and especially medicinal substances obtained from plants [3].

The plant chemicals are classified as primary or secondary metabolites. Primary metabolites are widely distributed in nature, occurring in one form or another in virtually all organisms. In higher plants such compounds are often concentrated in seeds and vegetative storage organs and are needed for physiological development because of their role in basic cell metabolism e.g. vegetable oils, fatty acids, carbohydrates etc. Plants generally produce many secondary metabolites which are biosynthetically derived from primary metabolites and constitute an important source of microbicides, pesticides and many pharmaceutical drugs e.g. steroids, quinines, alkaloids, terpenoids and flavonoids [4].

Ethnobotany, the study of traditional human uses of plants, is recognized as an effective way to discover future medicines. In 2001, researchers identified 122 compounds used in modern medicine which were derived from traditional plant sources; 80% of these have had a traditional use identical or related to the current use of the active elements of the plant.

Some of the pharmaceuticals currently available to physicians are derived from plants that have a long history of use as herbal remedies, including aspirin, digoxin, quinine, and opium [5].

In geography, temperate or tepid latitudes of Earth lie between the tropics and the Polar Regions. The temperatures in these regions are generally relatively moderate, rather than extremely hot or cold and the changes between summer and winter are also usually moderate.

The North Temperate Zone extends from the Tropic of Cancer (approximately 23.5° north latitude) to the Arctic Circle (approximately 66.5° north latitude). The South Temperate Zone extends from the Tropic of Capricorn (approximately 23.5° south latitude) to the Antarctic Circle (at approximately 66.5° south latitude). In some climate classifications, the temperate zone is often broken down into several smaller zones based on latitude. These include humid subtropical climate, Mediterranean climate, and oceanic [6].

Investigation on 50 Common Families of Medicinal Plants in Temperate Region:

S.No.	Family	Group of Plants	Specific Phytoconstituent/s of the respective family	Specific Pharmacological Activities of the respective family
1.	Alliaceae	Onion	Sulphur containing compounds	Cytotoxic and cardio protective effects [7].
2.	Amaranthaceae	Amaranth	Saponins	Hepatoprotective and antiviral [8].
3.	Amaryllidaceae	Amaryllis	Alkaloids	Anti cancer [9].
4.	Anacardiaceae	Cashew	Polyphenols	Antiviral, cardiotonic, hypotensive [10].
5.	Apiaceae	Carrot and Ginseng	Terpenoids	Antisnake and antimalarial [11].
6.	Apocynaceae	Milkweed & Dogbane	Alkaloids and glycosides	Antihypertensive and cardiotonic [12].
7.	Araceae	Arum	Alkaloids	Antimalarial
8.	Arecaceae	Palm	Tannins and alkaloids	Anthelmintic and antiepileptic [13].
9.	Asphodelaceae	Aloe	Vitamins and saponins	Antiacne and protection of skin from uv a & uv b rays [14].
10.	Asteraceae	Aster & Sunflower	Volatile oils and coumarins	Antihiv and spasmolytic [15].
11.	Betulaceae	Birch	Glycosides	Antimalarial [16].
12.	Brassicaceae	Mustard	Glucosinolates	Anticarcinogenic [17].
13.	Boraginaceae	Borage	Alkaloids and terpenoids	Antiplatelet and contraceptive [18].
14.	Bromeliaceae	Bromeliad	Flavonoids	NSAIDs [19].
15.	Cactaceae	Cactus	Saponins	Antiviral
16.	Campanulaceae	Bluebell	Alkaloids, polysaccharides,triterpenoids and organic acids	Antitumour and antiaging [20].
17.	Caryophyllaceae	Carnation & pink	Alkaloids, glycosides and carotenoids	Food spice [21].

18.	Cucurbitaceae	Cucumber	Glycosides, terpenoids, saponins, tannins, steroids, carotenoids and resins	AntiHIV, abortificient, cardiotonic and antitubercular [22].
19.	Cupressaceae	Cedar	Polysaccharides and tannins	Action against warts and antiulcer [23].
20.	Cyperaceae	Sedge	Volatile oils and tannins	Sedative and antispasmodic [24].
21.	Equisetaceae	Horsetail	Glycosides	Antitubercular [25].
22.	Ericaceae	Blueberry	Grayanoids and diterpenoids	Highly toxic and astringent [26].
23.	Euphorbiaceae	Spurge	Tannins, alkaloids, steroids and glycosides	Small pox, jaundice, syphilis and HIV/AIDS. [27].
24.	Fabaceae	Bean	Triterpenoids	Antiinflammatory [28].
25.	Fagaceae	Oak	Tannic Acid	Antioxidant [29].
26.	Geraniaceae	Geranium	Essential oils	Antitubercular [30].
27.	Iridaceae	Iris	Carotenoids and vitamins	Antispasmodic [31].
28.	Juglandaceae	Walnut	Cardiac glycosides and tannins	Anticancer [32].
29.	Juncaceae	Rush	Phenolic acids and phenanthrenes	Antiviral and anti-inflammatory [33].
30.	Lamiaceae	Mint	Cardiac glycosides and flavonoids	Anticarcinogenic and Antidiabetic [34].
31.	Lauraceae	Laurel	Essential oils	Antidiabetic and antihyperlipidemic [35].
32.	Liliaceae	Lily	Steroidal saponins	Galactogogue, antitussive and antisecretory [36].
33.	Magnoliaceae	Magnolia	Magnolol and magnoflorine	To treat sleeplessness, restlessness and weight gain [37].
34.	Malvaceae	Cotton	Flavonoids	Aphrodisiac, anti diabetic, nervine tonic and diuretic [38].
35.	Moraceae	Mulberry	Glycosides and	To treat conjunctivitis,

			triterpenoids	antidiabetic, antiepileptic and hypocholesterolemic [39].
36.	Myrtaceae	Myrtle	Tannins, triterpenes and flavonoids	To treat infantile rotaviral enteritis [40].
37.	Oleaceae	Olive and jasmine	Glycosides, secoiridoid, flavonoids and poly unsaturated fatty acids	ANS stimulating effect [41].
38.	Orchidaceae	Orchid	alkaloids and phenanthrenes	Diuretic [42].
39.	Orobanchaceae	Broom Rape	Caffeic acid and oraposide	antiparkinsonian and antihypertensive [43].
40.	Pinaceae	Pine	Volatile oils	To treat piles, cough and ulcer and as disinfectant [44].
41.	Plantaginaceae	Plantain	Caffeic acid and vitamin C	Laxative, hypolipidemic and hypoglycaemic [45-47].
42.	Poaceae	Grass	Tannins, alkaloids, flavonoids and terpenoids	Antiflu, antimalarial, anxiolytic and cosmetic [48].
43.	Polygonaceae	Buckwheat	Salicylic acid, flavopiridol, combretastatins and roscovitine	antiangiogenic, antiischaemic, platelet aggregation inhibitory and antiinflammatory activities [49].
44.	Ranunculaceae	Buttercup	Flavonoids and diterpenoid alkaloid	Antirheumatism and rubefacient [50].
45.	Rosaceae	Rose & apple	Terpenoids	Antiinflammatory and antidiabetic [51-53].
46.	Rutaceae	Rue or citrus	Phenolic and vitamins	Antioxidative property, cures piles, allays heat of the body, thirst, inflammation and itching [54].

47.	Rubiaceae	Coffee	Alkaloids, glycosides, tannins, falvonoids, saponins and reducing sugars	CNS stimulant and membrane stabilizing activity [55].
48.	Salicaceae	Willow	Tannins and sterols	Antiamnesic and antiasthmatic [56].
49.	Scrophulariaceae	Mullein and Figwort	Phenolics, flavonoids, terpenoids, alkaloids, steroids, amino acids	Used in treating pestilent fever, dysentery, and in elephantiasis [57].
50.	Solanaceae	Tomato, Pepper & Potato	Potent alkaloids	Anticholinergic [58].

Summary and Conclusion:

The fundamental advances of this study are to focus on common families of medicinal plants exists in temperate regions throughout the world. The reason for getting aware about the families is to recognize the categories of each and every plant coming in that family, to realize the specialized phytochemical constituents existence and to study the specific pharmacological activities commonly exhibited by the particular plants in the respective family. It is pointed on common 50 families of medicinal plants and the review of their common phytoconstituents and pharmacological effects have been conducted referring many reputed articles. From this review, one can conclude that the research activities under what class of herbals would be carried out, which part of study is to be improved, about the choice of phytoconstituents for the herbal drug development and about the trading of particular group of herbals. The findings of chemotaxonomic studies are helpful to taxonomist, phytochemists and pharmacologists to solve selected taxonomical problems.

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