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Pharmacognostic evaluation of novel medicinal plant for therapeutic purpose

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Abstract : Pharmacognosy is the systematic and scientific study of drugs.Several hundred plant and herb species that have potential as novel antiviral agents have been studied, with surprisingly little overlap. This mainly useful to find adulteration in product.the chip ,sporous , harmful chemicals are placed in genue drug to increase profit,that leads to adulteration. So , Such studies will help in authentication of the plants and ensures reproducible quality of herbal products which will lead to safety and efficacy of natural products. All the parameters to be evaluated in pharmacognostic study such as organoleptic characters, macroscopic study, microscopic study, powder study, physico chemical analysis (moisture content, loss on drying, ash values, extractive values), phytochemical analysis, fluorescence analysis are enlisted along with their importance. In the end 65 plants whose pharmacognostic studies.

IndexTerms **- Novel medicinal plant, Therapeutic purpose, Phytochemical analysis, Standardization.**

I. INTRODUCTION

Medicinal plants are used with the intention of maintaining health, to be administered for a specific condition, or both, whether in modern medicine or in traditional medicine. The Food and Agriculture Organization estimated in 2002 that over 50,000 medicinal plants are used across the world.Some of the plants have been found to possess significant antibacterial, antifungal, anticancer, antidiuretic, anti-inflammatory and anti-diabetic properties. Plant derived drugs are used to cure mental illness, skin diseases, tuberculosis, diabetes, jaundice, hypertension and cancer.The medicinal plants are rich in secondary metabolites and essential oils of therapeutic importance. The important advantages claimed for therapeutic uses of medicinal plants in different ailments are their safety besides being economical, effective and their easy availability.Herbal plants are often used as a natural remedy to cure various health problems including tuberculosis, cancer, diabetes mellitus, heart diseases, wound healing, asthma, pharyngitis, hypertension etc. Now-a-days there is a renewed interest in drugs of natural origin simply because they are Considered as green medicine and green medicine is always supposed to be safe. Another factor Which emphasizes this attention is the incidences of harmful nature of synthetic drugs which are Regarded as harmful to human beings and environment. scoping review is a type of knowledge synthesis that uses a systematic and iterative approach to identify and synthesize an existing or emerging body of literature on a given topic. The main aim of a scoping review is to provide an overview of published literature in order to identify key trends, approaches used to study a topic or gaps in an area of interest.

Fig 1 Various Plants & Plant Products

II. PHARMACOGNOSTIC EVALUATION METHODS:

1. Organoleptic characters

Organoleptic evaluation can be done by means of sense organs, Which provide the simplest as well as quickest means to establish The identity and purity to ensure quality of a particular drug. Organoleptic characters such as shape, size, colour, odour, taste And fracture of stem bark, leaf structure like margin, apex, baseSurface, venation and inflorescence, etc are evaluated.

2. Microscopic study

The microscopic study is the anatomical study which is done by Taking appropriate section of the plant parts under study. Each Distinguishing character can be noted down, some of which are Retained in the powder study also. Some of the chemicals which Are used in obtaining clear sections are phloroglucinol, chloral Hydrate, safranine, methyl orange, etc.

3. Powder study

Powder study is similar to microscopic study except here dried Powder is taken instead of section of the plant. All the reagents Used are also same like above.

4. Physico-chemical analysis

The parameters which are studied are moisture content, loss on Drying, total ash, acid-insoluble ash, alcohol and water-soluble Extractive values, petroleum ether soluble extractive value, ethyl Acetate soluble extractive value, acetone soluble extractive value, Etc. Ash values are used to determine quality and purity of crude drug. It indicates presence ofvarious impurities like carbonate, oxalate And silicate. The water soluble ash is used to estimate the amount Of inorganic compound present in drugs. The acid insoluble ash Consist mainly silica and indicate contamination with earthy Material. Moisture content of drugs should be at minimal level to Discourage the growth of bacteria, yeast or fungi during storage.Estimation of extractivevalues determines the amount of the Active constituents in a given amount of plant material when Extracted with a particular solvent. The extractions of any crude Drug with a particular solvent yield a solution containing different Phytoconstituents. The compositions of these phytoconstituents Depend upon the nature of the drug and the solvent used. It Gives an indication whether the crude drug is exhausted or no.

5. Phytochemical analysis

The crude powder and/or crude drugs extracted in different Solvents are tested for various phytoconstituents present in them By standard procedures. They are generally tested for the Presence of alkaloids, flavonoids, tannins, phenols, cardiac Glycosides, triterpenes, steroids and saponins.

6. Fluorescence analysis

A small quantity of dry plant powder is placed on grease free Clean microscopic slide and 1-2 drops of freshly prepared reagent Solution is added, mixed by gentle tilting the slide and wait for Few minutes. Then the slide is placed inside the UV chamber and Observe the colour in visible light, short (254 nm) and long (365 Nm) ultra violet radiations. The colour observed by application of Different reagents in different radiations is recorded. Generally The colour change is noted in reagents like Powder + 1 N NaOH (aq), Powder + 1 N NaOH (alc), Powder + Ammonia, Powder + Picric acid, Powder + Petroleum ether, Powder + 50% HCl, Powder + 50% H_2SO_4, Powder + Ethyl acetate, Powder + Ethyl Alcohol, Powder + Methanol, etc.Some constituents show fluorescence in the visible range in Daylight. The ultra violet light produces fluorescence in many Natural products which do not visibly fluoresce in daylight. If Substance themselves are not fluorescent, they may often be Converted into fluorescent derivatives or decomposition products By applying different reagents. Hence crude drugs are often Assessed qualitatively in this way and it is an important parameter For pharmacognostic evaluation of crude drugsThus the process of standardization can be achieved by stepwise Pharmacognostic studies as stated above. These studies help in Identification and authentication of the plant material. Such Information can act as reference information for correct Identification of particular plant and also will be useful in making A monograph of the plant. Further, it will act as a tool to detect Adulterants and substituent and will help in maintaining theQuality, reproducibility and efficacy of natural drugs. A list of 55 medicinal plants, their family and part used for These 55 plants Belong to 39 different families and each one of them is Medicinally important and many of them are traditionally used in One form or another. The therapeutic part of the plant may be any Part of the plant i.e. leaf, seed, stem, stem bark, root, root bark,Flower, rhizome, peel or fruit rind, tuber, etc.

III. ALOES

Introduction: Aloes is a genius containing over 500 species of flowering succulent plants (store water in their enlarged fleshy leaves, steam or roots). The most widely known species is **Aloe Vera** or "True aloe", so called because it is cultivated as the standard source for medical and pharmaceutical purpose. Other species, such as **Aloe ferox** also cultivated for similar applications.

Fig 2 Aloe vera

Synonyms: Aloe, Musabbar, Lolesara(in kannada)

Biological source: Aloes is obtained from the dried juice of the leaves of •Aloe barbadensis Miller, known as Curacao aloes, (Aloe vera). •Aloe perryi Baker, known as Socotrine aloes. •Aloe ferox Miller and hybrids of this species with Aloe africana Miller and Aloe spicata Baker, known as Cape aloes, belonging to family Liliaceae.
Family: Asphodelaceac. (In past, it has been assigned to broadly circumscribed family Liliaceae)
Geographical Source: Aloes is the indigenous to eastern and southern Africa and grown in Cape colony, Zanzibar and islans of Socotra,. It is also cultivated in Caribbean island, Europe and many part of india, including North West Himalayan region.
Morphology: All the 4 commercial forms are compared below here for their morphological characters.
Curacao aloe (Aloe Vera) : These are distinguished by their Transparency. It occurs as Opaque mass. It is waxy and some what resinous. Colour: Yellowish brown to chocolate brown. Odour: strong odour resembles with Iodoform. Taste: Bitter and Unpleasant. It is short stemmed plant growing to 60-100cm tall, spreading by offsets.
Cape aloe: It is vitreous form. Occurs as olive brown masses. It breaks with Glassy fracture. Colour: Dark brown to greenish brown. Odour: Characteristics, sour Taste: Bitter and unpleasant.
Socotrine aloe: Masses of different shapes and sizes Colour: Yellow brown to dark brown. Irregular and porous surface. Taste: Bitter. Odour: unpleasant. It is totally soluble in 60% alcohol.
Zinzibar aloe: Opaque, more firm than Socotrine. Colour; Liver Brown. It is smooth as wax. Odour: pleasant. Taste: Bitter.
Active Constituents: Active components with its properties: Aloe vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids. Vitamins: It contains vitamins A (beta-carotene), C and E, which are antioxidants. It also contains vitamin B12, folic acid, and choline

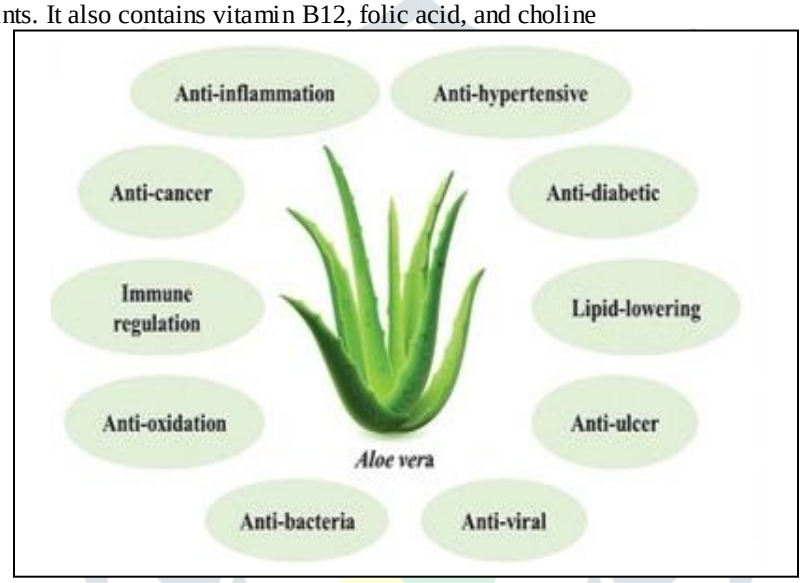

Fig 3 Pharmacological Activities of Aloe Vera

Physicochemical Properties of Aloe: Active components with its properties: Aloe vera contains 75 potentially active constituents: vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids and amino acids. Vitamins: It contains vitamins A (beta-carotene), C and E, which are antioxidants. It also contains vitamin B12, folic acid, and choline.

IV. TURMERIC

Synonyms: Saffron Indian; haldi (Hindi); Curcuma; Rhizoma cur-cumae.
Biological Source: Turmeric is the dried rhizome of Curcuma longa Linn. (syn. C.domestica Valeton)., belonging to family Zingiberaceae.
Geographical Source: The plant is a native to southern Asia and is cultivated extensively in temperate regions. It is grown on a larger scale in India, China, East Indies, Pakistan, and Malaya.

Fig 5 Pharmacological Activities of Turmeric

Cultivation: Turmeric plant is a perennial herb, 60–90 cm high with a short stem and tufted leaves; the rhizomes, which are short and thick, constitute the turmeric of commerce. The crop requires a hot and moist climate, a liberal water supply and a well-drained soil. It thrives on any soil-loamy or alluvial, but the soil should be loose and friable. The field should be well prepared by ploughing and turning over to a depth of about 30 cm and liberally manured with farmyard and green manures. Sets or fingers of the previous crop with one or two buds are planted 7 cm deep at distance of 30–37 cm from April to August. The crop is ready for harvesting in about 9–10 months when the lower leaves turn yellow. The rhizomes are carefully dug up with hard picks, washed, and dried.

Characteristics: The primary rhizomes are ovate or pear-shaped, oblong or pyriform or cylindrical, and often short branched. The rhizomes are known as 'bulb' or 'round' turmeric. The sec-ondary, more cylindrical, lateral branched, tapering on both ends, rhizomes are 4–7 cm long and 1–1.5 cm wide and called as 'fingers'. The bulbous and finger-shaped parts are separated and the long fingers are broken into convenient bits. They are freed from adhering dirt and fibrous roots and subjected to curing and polishing process. The curing consists of cooking the rhizomes along with few leaves in water until they become soft. The cooked rhizomes are cooled, dried in open air with intermittent turning over, and rubbed on a rough surface. Colour is deep yellow to orange, with root scar and encircling ridge-like rings or annulations, the latter from the scar of leaf base. Fracture is horny and the cut surface is waxy and resinous in appearance. Outer surface is deep yellow to brown and longitudinally wrinkled. Taste is aromatic, pungent and bitter; odour is distinct

Microscopy:

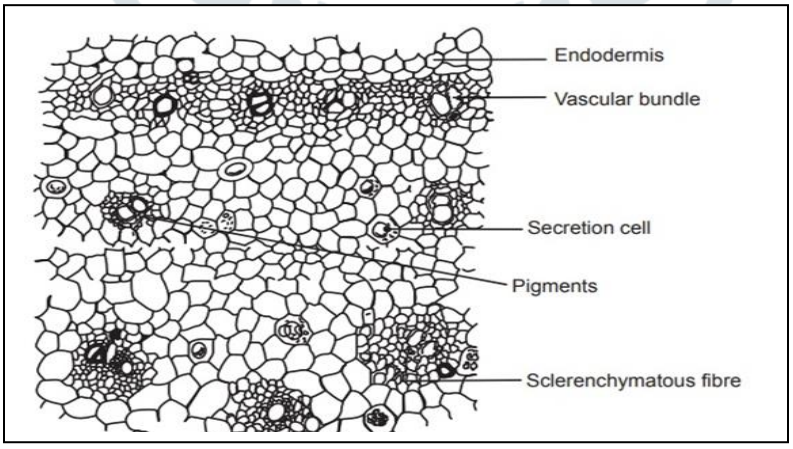

Fig 6 Microscopic Evaluation of Turmeric

The transverse section of the rhizome is characterized by the presence of mostly thin-walled rounded parenchyma cells, scattered vascular bundles, definite endodermis, few layers of cork developed under the epidermis, and scattered oleoresin cells with brownish contents. The epidermis is consisted of thick-walled cells, cubical in shape, of various dimensions. The cork cambium is developed from the sub-epidermal layers and even after the development of the cork, the epidermis is retained. Cork is generally composed of four to six layers of thin-walled brick-shaped parenchymatous cells. The parenchyma of the pith and cortex contains grains altered to a paste, in which sometimes long lens shaped unaltered starch grains of 4–15 µm diameter are found. Oil cells have suberised walls and contain either orange-yellow globules of a volatile oil or amorphous resinous masses. Cortical vascular bundles are scattered and are of a collateral type. The vascular bundles in the pith region are mostly scattered and they form discontinuous ring just under the endodermis. The vessels have mainly spiral thickenings and only a few have reticulate and annular structure.

Chemical Constituents: Turmeric contains yellow colouring matter called as curcuminoids (5%) and essential oil (6%). The chief constituent of the colouring matter is curcumin I (60%) in addition with small quantities of curcumin III, curcumin II and

dihydrocurcumin. The volatile oil contains mono- and sesquiterpenes like zingiberene (25%), α-phellandrene, sabinene, turmerone, arturmerone, borneol, and cineole. Choleretic action of the essential oil is attributed to β-tolylmethyl carbinol.
The volatile oil also contains α- and β-pinene, camphene, limonene, terpinene, terpinolene, caryophyllene, linalool, isoborneol, camphor, eugenol, curdione, curzerenone, curlone, AR-curcumenes, β-curcumene, γ-curcumene. A- and β-turmerones, and curzerenone.

Adulteration: The genuine drug Is adulterated with the rhizomes of Acorus calamus.

Challenges Associated with novel medicinal plants:

External challenges: External quality problems mainly include contamination, adulteration, and misidentification. These problems might cause serious harms to patient.

Internal challenges: Any health effects of herbal medicines are caused by pharmacologically active phytochemicals contained in these medicines. External quality issues are complex, internal ones, however, can be even more challenging.

Solutions: International organizations, governments, and researchers are working towards addressing this plethora of issues and potential problems.

V. CONCLUSION:

The analysis of crude drugs is an essential between traditional healing practices and modern medicine. These natural substances have been a part of human healthcare for thousands of years, offering valuable therapeutic compounds for various ailments.

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