ROLE OF PHYTOCHEMICALS IN THE FIELD OF CHEMICAL ENGINEERING

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***ABSTRACt*-India is a country of biodiversity. It is a well known finding that variety of plants as well as animals play important role to our life, including health also. The importance of plants with special reference to herbs with medicinal value has been studied and their role in chemical engineering has been analyzed.It was found that due to increasing global market as 20 billion for phytochemicals,scope is very vast. By the use of analytical methods and co-relating them with newer engineering techniques, growth would be achieved for country. This growth can contribute to both process and product development based on rich biological heritage of India.**

Key Words- Phytochemicals,Chemical Engineering, Global market.

INTRODUCTION

What are Phytochemicals?

The word phytochemical ,is derived from phyto or plant. The study of phytochemicals involves understanding the chemical composition of plants used in medicines. The secondary metabolites are produced by plant and also responsible for defense purpose. Medicinally used and deadly poisons are the starting and end point effects of phytochemicals.A number of phytochemicals isolated from plant material are used in the pharmaceutical drug industry today.

Historical Importance: Traditional systems of medicines

The traditional systems of medicines are Ayurveda, Unani, Siddha, Western Herbal Medicine, Traditional Chinese Medicine and Homeopathy.

In the early days physicians were not aware of the chemical constituents in the plants however they did have knowledge of active principle responsible for therapeutic activity .In Charaka-Samitha, the word, vira¸ is similar to word ,**potency**. Drug have been classified according to the pharmochemical activities, but comprehensive account of mechanism of action is missing

Ayurveda is the ancient healing system of India is flourished in the Vedic era in India

The classical texts of Ayurveda, CharakaSamhita and SushrutaSamhita were written around 100 B.C. The AyurvedicMateriaMedica includes 600 medicinal plants along with therapy.

Phytochemicals in Ayurveda

In the Vedicera, the ancient healing system of India Ayurveda was flourished, around 1000B.C.The AyurvedicMateriaMedica includes 600 medicinal plants along withtherapeutics.Tulsi,Turmeric,fenugreek,ginger,garlic are an integral part of Ayurvedicformulations, which may be single or multi component**.**

Traditional Forms of Drugs

Before the availability of synthetic drugs, humans were completely dependent on medicinal herbs for treatment and curing diseases. The drugs were used

in the form of expressed juice,powder,decoction or infusion.

Details of some Herbs used commonly in Ayurveda-

Sr.	**Name ofherb**	**Botanical Name**	**Uses**
1	Tulsi	*Ocimum sanctum*	Skin diseases,snakebites, helminthiasis
2	Haldi	*Curcuma longa*	Cardiovascular diseases,alzheimers disease,skin treatments
3	Ginger	*Zinziberofficinale*	Stimulate digestion,antipyretic for fevers and common cold,prevent nausea and vomiting
4	Fenugreek	*Trigonellafoenumgraecum*	As spice,blood cholesterol control,cure of constipation
5	Garlic	*Allium sativum*	Treatment of high blood pressure,skin and fungal infections

FormsofDrugsandComposition

Before the availability of synthetic drugs, humans were completely dependent on medicinal herbs for prevention and treatment of disease. The drugs wereused in the form of juice, powder, decoction of infusion etc. Although formulations mentioned in ancient texts are difficult ot understand in terms of scientific parameters, some of them are still reputed for their curative values. Ancient healers who developed formulations based on medicinal herbs were probably not aware of the chemical composition of these herbs. The work on *Terminaliachebula* (myrobalan) mentioned in CharakaSamhita is quiet authentic and modern studies have ravealed that the puragative activity mentioned in Ayurveda is justified by the isolation of chebullic acid, the active constituent of myrobalar.

Herbs vs Extracts

Sterneur first isolated morphine from *Papaversomniferum* (opium poppy) showed the medical profession that certain phytochemicals produced in plant cells are responsible for pharmacological activity other alkaloids isolated from opium poppy were investigated for their pharmacological activities. Codeine showed anti jussive activity and papaverineantispasmodic activity. The opium based extracts have been utilized forvarious pharmacological activities, and a number ofalkaloidsdistributed in the plant have different pharmacological activities.

Validation of Herbal Drugs

Scientific validation of herbal drugs always has been questioned, but with recent advance and publications of clinical trials, the researchers and the public are viewing herbal products with more respect. In the commercial market medicinal herbs are used as raw drugs, extracts or tinctures. There has been a dramatic rise in the sale of herbal products like *Allium sativaum, Hypericumperforatum, Spirulina, Echinacea angustifolia, Ginkgo biloba and Silybummarianum*. Before any herbal medicine is screened for testing, phytochemical investigations are essential. Today standardized extracts are used in herbal drug industry their standard is based on marker compounds which may or which may not have pharmacological activity.

Type of Phytochemicals

A brief account of type of the phoytochemicals distributed in plant flora is given below-

1. Alkaloids
2. Bitter principles
3. Phenolic compounds
4. Diarylheptanoids
5. Flavonoids
6. Furanocoumarins
7. Furochoromones
8. Glycoside
9. Resins
10. Saponins
11. tannins

Scope:

According to one estimate only 20% of the plant flora has been screened for drugs .keeping in view the vast treasure of medical herbs one can expect phytochemical to play a significant role as modern science has limited option for diseases like diabetes mellitus, rheumatoid arthritis, Alzheimer's disease . The identification and isolation of physiochemical is an ongoingprocess, herbal medicine is expected to play critical role in the future healthcare system .The it is not only related wit medical chemistry, but also bright future for chemical engineering also.

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Tulsi(*Ocimum sanctum)*

Garlic(*Allium sativum)*

Ginger(*Zinziberofficinale)*

Fenugreek(*Trigonellafoenumgraecum)*

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