

## Natural Products As Health Protectors



### Engineering

KEYWORDS :

**PRAVEENA NADELLA**

ASST.PROFRSSOR, DADI INSTITUTE OF ENGINEERING & TECHNOLOGY

**DINESH NADELLA**

ASST.PROFESSOR, VIZAG INSTITUTE OF ENGINEERING & TECHNOLOGY

### ABSTRACT

*The natural products have played a significant role not only in the health care and prevention of diseases but also in the preparation of cosmetics. As an example the oldest natural product 'mandrake' was prescribed for pain relief, turmeric for blood clotting. Similarly the roots of the endive plant were used for treatment of gall bladder disorders, and raw garlic was prescribed for circulatory disorders. Though there were no experimental proofs in the olden days, the natural products did miracles to save the lives. As these products are found efficient to control genetic disorders without any side effects, they caught the attention of the research scientists to know further. Today the drugs that are used in the treatment of Anti-HIV and Anti-Tumour are of plant origin. Thus my paper discusses the various benefits of medicines that are derived from the plant. These drugs are non-toxic and have less protein binding which results in faster action to control the disease. My paper also exhibits the classification of various drugs derived from the different parts of the plant.*

#### 1.1 INTRODUCTION AND THE EARLIEST KNOWN MEDICINES TO HUMAN

For thousands of years natural products have played a very important role in healthcare and prevention of diseases. The ancient civilizations of the Chinese, Indians and NorthAfricans provide written evidence for the use of natural sources for curing various diseases.

For instance, mandrake was prescribed for pain relief, turmeric possesses blood clotting properties, roots of the endive plant were used for treatment of gall bladder disorders, and raw garlic was prescribed for circulatory disorders. These are still being used in several countries as alternative medicines. However, it was not until the nineteenth century that scientists isolated active components from various medicinal plants. Friedrich Sertürner isolated morphine from *Papaver somniferum* in 1806, and since then natural products have been extensively screened for their medicinal purposes. Atropine obtained from *Atropa belladonna*, strychnine, a CNS stimulant, ziconotide, identified from a cone snail, *Conus magus*, and Taxol<sup>®</sup> obtained from the bark of the Pacific yew tree are a few examples of active components isolated from natural sources. According to recent studies conducted by the World Health Organization (WHO), about 80% of the world's population relies on traditional medicine. Which come either directly or indirectly from plant sources. Forty-seven percent of the anticancer drugs in the market.

#### 1.2 WHY THERE IS A GROWING INTEREST IN NATURAL SOURCES

- Very efficient in controlling genetic disorders.
- No side effects.
- Non toxic.
- Drugs against Anti-HIV and Anti-Tumour activity are from plant origin.
- Due to technological, economic, cultural and social trends.

#### 1.3 TYPES OF NATURAL PRODUCTS

As noted above, several drug candidates are derived from various naturally occurring medicinal sources.

These can be broadly divided into four categories:

- Natural products from microorganisms.
- Natural products from marine organisms.
- Natural products from animal sources.
- Natural products from plant sources.

#### 1.4 DRUG COLLECTION

Proper time of collection is very important to obtain a drug of

good quality. It depends on the following:

- Time of the year.
- Time of the day.
- Stage of maturity and age

#### 1.5 DRUG CLASSIFICATION

Classifications can be based on:

- Chemical nature
- Therapeutic nature of the plant product
- Natural affinities of the various species
- Morphology of the plant organ from which the drug is obtained

##### 1.6 .1 DRUGS ARE COLLECTED FROM ROOT:

Aconite obtained from the plant *Aconitum napellus*. It is used externally for neuralgia and arthritis, and internally to relieve fever and pain.

- Licorice obtained from the plant, *Glycyrrhiza glabra*. It is used as a demulcent and expectorant and to disguise the flavor of medicinal preparations.

##### 1.6 .2 DRUGS ARE COLLECTED FROM BARK:

Quinine obtained from *Chinchona calisaya*, *C. officinalis*, *C. ledgeriana* and *C. succcicrubra*. It is used as the only adequate cure for malaria.

- Slippery Elm obtained from *Ulmus rubra*. It is used for its soothing effect on inflamed tissues, either in the crude state or in the form of lozenges.

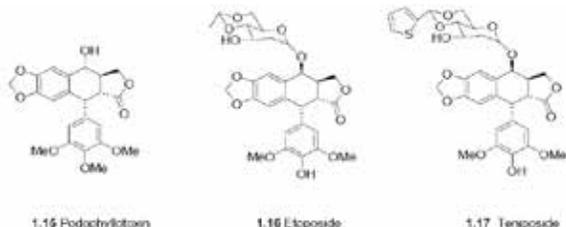
##### 1.6 .3 DRUGS ARE COLLECTED FROM LEAVES:

- Belladonna is obtained from *Atropa belladonna*. Belladonna is used externally to relieve pain and internally to cure excessive perspiration and coughs.
- Cocaine is obtained from *Erythroxylon coca*. It is used as a local anesthetic and as a tonic for digestion and treatment of nervous conditions. It is addictive when used habitually.
- Digitalis is obtained from *Digitalis purpurea*. Its action improves the tone and rhythm of the heart beats thereby making contractions more powerful and complete.
- NEEM

##### 1.6 .4 DRUGS ARE COLLECTED FROM FLOWERS:

- Chamomile is obtained from *Matricaria chamomilla*. The dried flower heads contain an essential oil infusion which is used as tonics and gastric stimulants.

- Hops is obtained from *Humulus lupulus*. Hops are used in medicine for their sedative and soporific properties and also as a tonic.
- In 1974, *Podophyllum peltatum* was shown that it acts as an anticancer agent by binding irreversibly to tubulin. Etoposide and teniposide the modified analogs of podophylotoxin, however, cause cell death by inhibition of topoisomerase II, thus preventing the cleavage of the enzyme- DNA complex and arresting the cell growth. Both these analogs are used in the treatment of various cancers.
- *Catharanthus roseus* is a rich source of indole alkaloids which include the anticancer alkaloids vincristine and vinblastine, and also the antihypertensive alkaloid, ajmalicine.
- This plant was used as a remedy for diabetes, as it was believed to enhance the production of insulin by the body.



### 1.7 DIFFICULTIES WITH PLANT SOURCES :

- Climatic and social conditions of area
- Season of collection
- Condition of storage
- Standardization of active principle
- Purity of active ingredient

### 1.8 METHODS FOR STRUCTURE DETERMINATION

- Natural product chemists mainly use mass spectrometry (MS) and nuclear magnetic resonance spectroscopy (NMR) for structure elucidation of the compounds isolated from various natural sources.
- A few other analytical methods, for instance, infrared spectroscopy, UV-Vis spectroscopy, and X-ray crystallography, are used to provide supplementary information to confirm the proposed chemical structure for the compound.
- Several compounds are not UV active, while others like glycosides are hard to crystallize to give good quality crystals for X-ray analysis. MS and NMR methods, however, are usually sufficient to elucidate the structure of the compound.

### 1.9 CONCLUSION:

Between the years 1981-2006, about a hundred anticancer agents have been developed, of which, twenty five are natural product derivatives, eighteen are natural product mimics, eleven candidates are derived from a natural product pharmacophore, and nine are pure natural products. Thus natural sources make a very significant contribution to the health care system.

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