

PLANT DRUGS A VITAL ROLE IN THE MANAGEMENT OF LIVER DISEASES

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Abstract

Herbal medicine are made from the roots, stems, leaves, bark, fruit, seeds, or flowers of several plants believed to have medicinal properties. Many conventional drugs are also derived from plants. Herbal drugs is still the mainstay of about 75 - 80% of the world population, mainly in the developing countries, for primary health care. This is primarily because of the general belief that herbal drugs are without any side effects besides being cheap and locally available. According to the World Health Organization (WHO), the use of herbal remedies throughout the world exceeds that of the conventional drugs by two to three times . The use of plants for healing purposes predates human history and forms the origin of much modern medicine. Standardization of herbal drug is an important tool in the formulation of high quality herbal products. Quality of herb is depends upon on many factors like cultivation, collection, drying, storage, processing for market etc. Now a day's substitution and adulteration of herb is very common due to scarcity of drug and its high price prevailing in the market.

Keywords: Plant Drugs, Liver Diseases, Hepatoprotective Medicine.

Introduction

Herbal medicine are made from the roots, stems, leaves, bark, fruit, seeds, or flowers of several plants believed to have medicinal properties. Many conventional drugs are also derived from plants. Herbal drugs is still the mainstay of about 75 - 80% of the world population, mainly in the developing countries, for primary health care. This is primarily because of the general belief that herbal drugs are without any side effects besides being cheap and locally available. According to the World Health Organization (WHO), the use of herbal remedies throughout the world exceeds that of the conventional drugs by two to three time.¹ The use of plants for healing purposes predates human history and forms the origin of much modern medicine. Standardization of herbal drug is an important tool in the formulation of high quality herbal products. Quality of herb is depends upon on many factors like cultivation, collection, drying, storage, processing for market etc. Now a day's substitution and adulteration of herb is very common due to scarcity of drug and its high price prevailing in the market.²

LIVER

The liver is among the most complex and important organs in the human body. Its primary function is to control the flow and safety of substances absorbed from the digestive system before distribution of these substances to the systemic circulatory system. A total loss of liver function leads to death within minutes.

The liver is the largest gland in the body. It weighs about 1.5 kg (3 to 4 pounds), lies immediately under the diaphragm, and occupies most of the right hypochondrium. and part of the epigastrium.

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The liver is a versatile organ which is responsible for the metabolism of chemicals and for the regulation of internal chemical environment. Hepatotoxicity may be caused by thousands of synthetic chemicals, drugs, bacteria, fungi, plants and animal toxicants. These agents cause liver damage either by themselves or by getting converted to toxic metabolites. The most common hepatic disorders are viral hepatitis, non-alcoholic fatty liver disease (NAFLD), drug-induced hepatotoxicity, and alcoholic fatty liver disease.

In India, it was reported that about 1% of the population was infected with hepatitis C and 2-4% with hepatitis B virus. NAFLD is the most prevalent liver disease, affecting up to 24% of patients in the general population and up to 74% of those with obesity. The prevalence of this disease is likely to continue to rise, paralleling the increasing global prevalence of diabetes and obesity.^[5] Drugs that damage the liver account for 9.5% of all suspected adverse drug reactions (ADRs), are the main cause of fatal ADRs and are the most common reason for withdrawal of drugs from the market.^[6] Accurate estimate for the incidence and prevalence of alcohol induced liver disease are not available, because many individuals with alcohol-induced liver disease are asymptomatic. In the year 1997, the death rate from alcohol- induced liver disease in USA was 3.8 per 100,000, which corresponds to 40% of death from cirrhosis or 28% of all death from liver disease.^[7] Although, liver has a tremendous ability of regeneration, acute liver illnesses often leads to serious chronic sequelae such as, chronic hepatitis, cirrhosis and even carcinoma.

Herbal drugs play major role in the treatment of hepatic disorders. In India a number of medicinal plants and their formulations are widely used for the treatment of these disorders. In addition to the already existing medicinal plants, there is several unexplored potential medicinal plants still need to be studied for their therapeutic potential against liver disorders.

HEPATOPROTECTIVE PLANTS

In spite of the tremendous advances made in allopathic medicine, no effective hepatoprotective medicine is available. Plant drugs are known to play a vital role in the management of liver diseases. There are numerous plants and polyherbal formulations claimed to have hepatoprotective activities. Nearly 150 phytoconstituents from 101 plants have been claimed to possess liver protecting activity.^[8]

In India, more than 87 medicinal plants are used in different combinations in the preparation of 33 patented herbal formulations.^[8] Most commonly used 12 plants in herbal formulations are given in Table 1. Only a small portion of the hepatoprotective plants as well as formulations used in traditional medicine are pharmacologically evaluated for their efficacy. Several plants were reported as hepatoprotective against hepatotoxicity in animals by Indian investigators during the last few decades^[9] Table 2. Some of the polyherbal formulations are verified for their hepatoprotective action

against chemical induced liver damage in experimental animals^[10] Table 3. Studies carried out in foreign countries also show a good number of hepatoprotective plants Table 4. In most of these studies, marginal or moderate levels of hepatoprotective activities were observed. The efficacy is not sufficient enough to use as effective drug.^[11] Besides, most of the reported studies describe the beneficial effects of the drugs against a few hepatotoxic chemical-induced subclinical level of hepatotoxicity. It is not known whether or not these drugs exhibit any beneficial effects against severe liver damage. Systematic investigations have to be done to separate the good ones from the therapeutically useless plants. Furthermore, in almost all cases the mechanism of their hepatoprotective effects remains to be studied.

The antihepatitis virus activities of the traditional plants are not studied in experimental animals except in a few plants. This is mainly due to the lack of ideal in vivo test systems. Picrorrhiza kurroa, Glycyrrhiza glabra, Eclipta alba and Andrographis paniculata are reported to have activity against jaundice producing Hepatitis B virus.^[12] Only a few plants are really very promising hepatoprotective agents based on the available data. These include P. kurroa (Picroliv), A. paniculata (Andrographolide), Silibum marianum (Silymarin) and Eclipta alba.^[13]

A recent report indicates that fumaric acid obtained from Sida cordifolia has significant anti-hepatotoxic activity in rats.^[14-20] Ursolic acid, which occurs in, may plants also showed promising hepatoprotection against paracetamol and carbon-tetrachloride induced liver damage in rats. Some of the plant constituents reported to have antihepatotoxic activity are given in Table 5. Even these compounds are not subjected to systematic exhaustive studies to demonstrate their efficacy against severe liver damages caused by viruses, hepatotoxic chemicals which damage liver by different mechanisms, etc. Antioxidants can protect experimental animals and human from oxidant mediated liver damages. This effect can be seen even in certain common vitamins, spices and vegetables (e.g. Vitamin-E and turmeric).²¹⁻²³

Table 1. Most commonly used plants in herbal formulations in India

Andrographis paniculata
Boerhaavia diffusa
Eclipta alba
Picrorrhiza kurroa
Oldenlandia corymbosa
Asteracantha longifolia
Apium graveolens
Cassia occidentalis
Cichorium intybus
Embelia ribes
Tinospora cordifolia
Trachyspermum ammi

Table 2. Plants having liver protective against toxic chemical induced liver damage in experimental animals

Acanthus ilifoliosus
Verbenalin
Sida cordifolia
Acacia catechu
Picrorrhiza kurroa
Ocimum sanctum
Combrelum dolichupetalum
Morinda lucida
Eucalyptus tereticornis
Nigella sativa
Atlantia racemosa
Asteracantha longifolia nees
Hedychium spicatum
Ricinus cummunis
Tephrosia purpurea
Curculigo orchiodes

Table 3. Some of the polyherbal formulations verified for their anti hepatotoxicity against toxic chemical-induced liver damage in experimental animals.

Liv.52
Liv.42
Liver cure
Livol
B.Liv.
Hepatomed
Jigrine
Tefroli
Stimuliv
Koflet
Icterine
HD-03

Table 4. Some of the plants shown to have antihepatotoxicity in experimental animals by investigations in foreign countries

| | |
|----------------------|-----------------------|
| Acacia catechu | Withania somnifera |
| Acuba japonica | Helichrysum arenarium |
| Luffa echinata | Pistacia lentiscus |
| Atracylodes lanceae | Phillyrea latifolia |
| Apium graveolens | Nicotiana glauca |
| Croton oblongifolius | Schizandra chinensis |
| Bupleurum falcatum | Silybum marianum |
| Curcuma longa | |
| Kalanchoe pinnata | |
| Phellinus rimosus | |
| Picrorrhiza kurroa | |
| Vietnamese ginseng | |
| Thujopsis dolabrata | |

Table 5. Some of the plant constituents possessing hepatoprotective activity

| Constituent | Plant name |
|-------------------|-------------------------|
| Andrographolide | Andrographis paniculata |
| Silybin | Silybum marianum |
| Picroside I | Picrorhiza kurroa |
| Picroside II | Picrorhiza kurroa |
| Kutkoside | Picrorhiza kurroa |
| Gomishins | Schizandra chinensis |
| Schisandrin A | Schizandra chinensis |
| Glycyrrhizin | Glycyrrhiza glabra |
| Glycyrrhetic acid | Glycyrrhiza glabra |
| Saikosaponins | Bupleurum falcatum |
| Sarmentosins | Sedum sarmentosum |
| Wuweizisu C. | Schizandra chinensis |
| Catechin | Anacardium occidentale |
| Ursolic acid | Eucalyptus spp. etc. |
| Curcumin | Curcuma longa |
| Fumaric acid | Sida cordifolia |
| Lupeol | C. nurvala |

PHYTONUTRIENTS

A number of other dietary antioxidant substances exist beyond the traditional vitamins discussed above. Many plant-derived substances, collectively termed “phytonutrients,” or “phytochemicals,” are becoming increasingly known for their antioxidant activity. Phenolic compounds such as flavonoids are ubiquitous within the plant kingdom: approximately 3,000 flavonoid substances have been described. In plants, flavonoids serve as protectors against a wide variety of environmental stresses while, in humans, flavonoids appear to function as “biological response modifiers.” Flavonoids have been demonstrated to have anti-inflammatory, antiallergenic, anti-viral, anti-aging, and anti-carcinogenic activity. The broad therapeutic effects of flavonoids can be largely attributed to their antioxidant properties. In addition to an antioxidant effect, flavonoid compounds may exert protection against heart disease through the inhibition of cyclooxygenase and lipoxygenase activities in platelets and macrophages.²⁴

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