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# REVIWE ON SOME MEDICINAL PLANT USED IN HEPATOPROTECTIVE AND NEPHROPROTECTIVE ACTIVITY

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**Abstract**:

Medicinal plants may serve as a vital source of potentially advantageous new compounds for the development of effective therapy to action an array of kidney problems. Abounding herbs accept been accurate to be accomplishing as nephroprotective agents while abounding added are claimed to be nephroprotective and hepatoprotective but there is abridgement of any such accurate affirmation to abutment such claims. There is no plant in this Universe which is non-medicinal and which cannot be made of use for many purposes and by many modes. This definition rightly suggests that in principle all plants have a potential medicinal value. Medicinal plants have been considered as important therapeutic aid for alleviating ailment of humankind. Search for eternal health and longevity and to seek remedy to relieve pain and discomfort prompted the early man to explore his immediate natural surroundings to develop a variety of therapeutic agents using natural resources. Herbal plants or botanical medicines have been used traditionally by herbalist worldwide for the prevention and treatment of liver disease. Medicinal plants play a key role in human health care.

**Keyword:** Herbal drugs, therapeutic agents, hepatoprotective, nephroprotective, medicinal plants

The World Health Organization (WHO) estimates that about 80% of population living in the developing countries relies on traditional medicines for their primary health care needs. In almost all the traditional system of medicines, the medicinal plants play a major role and constitute the backbone. A large body of evidence has collected to show potential of medicinal plants used in various traditional systems. In the last few years more than 13 000 plants have been studied for the various diseases and ailments all over the world.3 Herbal medicine is the study and use of medicinal properties of plants. Plants have the ability to synthesize a wide variety of chemical compounds that are used to perform important biological functions. Most of the phytochemical beneficial effects consumed by human beings, they are used effectively treat to human disease. At least 12,000 such compounds have been isolated so far; a number estimated to be less than 10% of the total. Chemical compounds in plants mediated their effects on the human body through processes identical to those already well understood for the chemical compounds in conventional drugs.

In Indian system of medicine several herbal remedies has been tried for the treatment of kidney failure since the time of charka and sushruta. New approaches to improve and accelerate the joint drug discovery and development process are expected to take place mainly from innovation in drug target elucidation and lead structure discovery.

Extracts and metabolites of the plant particularly those from leaves and fruits possess useful pharmacological activities. The fruits are utilized as vegetable and regarded as essential ingredient in the South Indian diet. Ethnobotanical studies are often significant in revealing locally important plant species especially for the discovery of crude drug.

The liver and kidney is one of the human body's key organs that regulates metabolism and has secretion, storage, and detoxification functions. The bile it releases significantly contributes to digestion. The liver is the first destination of toxins from the intestinal tract further then the kidney removes the toxic material through the urine.

**1.2** Hepatotoxin-associated liver injury makes excretion of bile defective and is reflected in increase in toxins' serum levels . Concentrations of aspartate transaminase (AST) and alanine transaminase (ALT) in cytoplasm and mitochondria of the damaged liver cells also increase. The leakage of plasma causes an increase in serum hepatospecific enzymes, leading to cellular leakage and disturbance of functional integrity of the liver cell membrane. In addition, high bilirubin concentration in serum is a manifestation of an increase in erythrocyte degeneration rate. On the other hand, a majority of the hepatotoxic chemicals damage liver cells and subsequently kidney mostly through lipid peroxidation or other oxidative forms. As in the presence of free radicals, lipids peroxidize more rapidly, the free radicals scavenging mechanism obviously playing an important role in inhibition of lipid peroxidation chain reaction.

**1.3** The kidneys play an important role in human physiology, maintaining fluid homeostasis, regulating blood pressure, erythrocyte production and bone density, regulating hormonal balance, and filtering and removing nitrogenous and other waste products. Chronic kidney disease (CKD) is characterized by a progressive loss of functions while acute kidney injury (AKI) is an abrupt reduction in kidney function. Both CKD and AKI have increased worldwide and are considered one of the leading public health problems. A projection of health concerns by 2040 ranked CKD as the fifth leading cause of death worldwide.

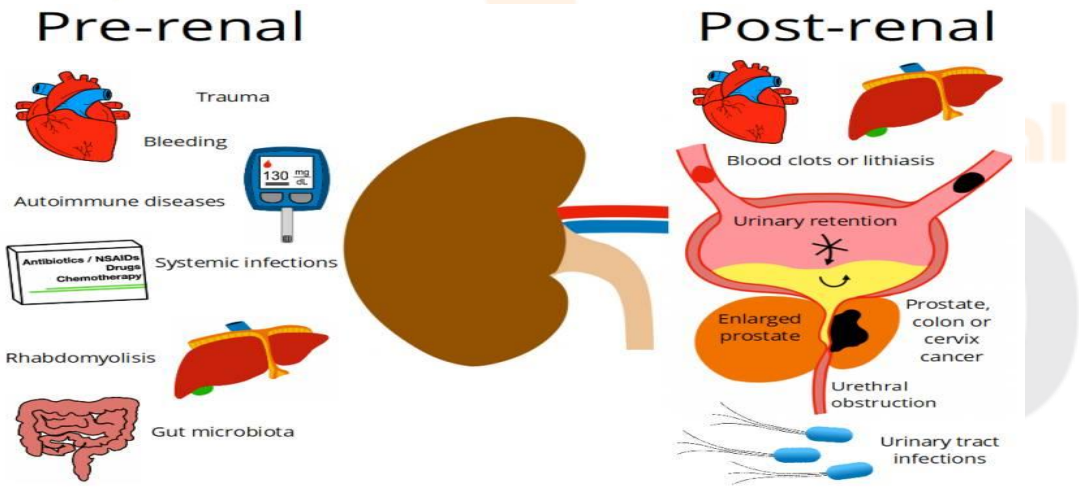


Fig no: 1 Pre-renal and post-renal disease.

According to clinical criteria, pre-renal diseases are related to a decrease in renal perfusion or alteration in the systemic circulation, which will first compromise the glomerular filtration rate (GFR) and secondly lead to more severe alterations in the kidney structure. These dysfunctions are reflected in clinical analyses by changes in biomarker levels; for example, an increase in serum creatinine; and fluctuations in urine flow.

Plants are of enormous medicinal importance; they are being extensively explored for their use against Nephrotoxicity and Hepatotoxicity. Herbal drugs can be quite acceptable as these drugs are known to cause

either lesser or no side effects. Herbal medicine is oriented toward prevention, health maintenance, and treatment of diseases.

**1.4** Amrutottara kwatha churna also known as Nagaradi Kasha yam is a classical ayurvedic medication designed specifically for vitiating Kapha Doshas including chronic fever, cough, cold, sore throat, evading infections and even good for constipation and loss of appetite. Enriched with potent bronchodilator and anti-inflammatory qualities, this formulation bolsters immunity, remedies fever, and provides relief from an abrupt asthma attack by increasing the airflow to the lungs and dilating and relaxing the bronchial passage ways .The incredible herbs that are used to formulate Nagaradi Kasha yam possesses powerful hepatoprotective and hepato-stimulative properties which makes it a magical remedy during jaundice, in which the liver gets mostly effected. The medication offers support to the liver functioning by secreting bile which in turn helps the liver enzymes to come down to normal levels. It also cleanses and detoxifies the liver and improves liver functioning**.**

Chemical constituents Gingenol, Shagaol present in Nagara (Zingiber officinale), diterpenoid lactones, aliphatic compounds, steroids of Guduchi (Tinospora cordifolia), and flavanoids in Hareetaki (Terminalia chebula).

Amrutottara or Nagaradi Kwatha Churna (Mixture of *Zingiber officinale, Tinospora cordifolia & Terminalia chebula)* which is widely used formulation in Jwara (fever) but there is no scientific evidence to support its hepatoprotective and nephro-protective activity. Hence, we have proposed this study to scientifically validate the potential of through pharmacological and analytical means.

**A**yurvedic science has got its rich heritage in India. People in India believe that natural products are safe compared to synthetic drugs. The development in these traditional systems of medicine leads to maintain proper quality of the product. India is rich in its flora and fauna. Mother Nature has gifted us uncountable plants and every plant has numerous chemicals that are use in treating diseases of animal and human beings. That may be its primary metabolites or secondary metabolites every chemical in plants have some of therapeutic activity when we use in definite quantity.

There are different formulations we find in ayurvedic system of medicine one of them is churna. But among all formulation the most simple's ayurvedic formulation is churna. Churna can be prepare easily because it don't require any special condition for its preparation or any special instrument, for preparing churna one has to make powder of different ingredient and mix it well in certain quantity, so it can be prepare by any person.

**Hepatorotective plants**

| **Botanical name** | **Family** | **Partsused** | **Chemical constituents** |
|---|---|---|---|
| Amaranthus caudatus Linn | Amaranthaceae | Whole plant | Flavonoids, saponins, glycosides |
| Anisochilus carnosus Linn | Lamiaceae | Stems | Alkaloids,flavonoids, Glycosides |

| | | | |
|---|---|---|---|
| Asparagus racemosus Linn | Asparagaceae | Roots | Phenols, coumarins |
| Azima tetracantha | Salvadoracaeae | Leaves | Flavonoids, Triterpenoids |
| Calotropis procera R.Br | Asclepediaceae | Root bark | Terpinoidsglycosides, Flavonoids |
| Cajanus cajan Linn | Leguminosae | Pigeon pea leaf | Flavonoids, stibenes |
| Cajanus scarabaeoides Linn | Fabaeceae | Whole plant | Flavonoids |
| Carissa carindas Linn | Apocyanaceae | Root | Alkaloids, tannins, steroids |
| Clitoria ternatea Linn | Fabaceae | Leaves | Phenolic Flavonoids |
| Cucumis trigonus Roxb | Cucurbitaceae | Fruit | Flavonoids |
| Ficus religiosa Linn | Moraceae | Stem bark | Glycosides, steroids, Tannins |
| Garcinia indica Linn | Clusiaceae | Fruit rind | Benzophenones, Garcinol |
| Gmelina asiatica Linn | Verbenaceae | Aerial parts | Flavonoids |
| Hyptis suaveolens Linn | Lamiaceae | leaves | Flavonoids |
| Leucas cilita Linn | Lamiaceae | Whole plant | Flavonoids |
| Melia azhadirecta Linn | Piperaceae | leaves | Spectro photo metric method |

**Table no 1 List of plants having nephroprotective activity**

| **Botanical name** | **Family** | **Partsused** | **Chemical constituents** |
|---|---|---|---|
| Adhatoda zeylanica | Acanthaceae | Leaves | Flavonoids, saponins, glycosides |
| Aegle marmelos | Rutaceaeae | Leaves | Alkaloids,flavonoids, Glycosides |
| Aerva javanica | Amaranthaceae | Fresh roots | Phenols, coumarins |
| | | | |

| | | | |
|---|---|---|---|
| Aerva lanata | Amaranthaceae | Whole plant | Flavonoids, Triterpenoids |
| Allium sativum L | Amaryllidaceae | Garlic | Alkaloid, spacian, terpine |
| Aloe barbadensis | Xanthorrhoeaceae | Leaves | Flavonoids, stibenes |
| Avuri kudineer | Fabaceae | Roots and Leaves | Flavonoids |
| Bauhinia variegate | Adhatoda zeylanica | Stems | Alkaloids, tannins, steroids |
| Berberris aristata | Berberidaceae | Root bark | Phenolic Flavonoids |
| Boerhaavia diffusa | Nyctaginaceae | Leaves | Flavonoids |
| Butea monosperma | Fabaceae | Whole plant | Glycosides, steroids, Tannins |
| Carica papaya | Caricaceae | Seeds | Papain, carakain |
| Cassia auriculata | Fabaceae | Root | Flavonoids |
| Casuarina equisetifolia | Casuarinaceae | Dried leaves | Flavonoids |
| Cichorium intybus | Asteraceae | Aerial Parts | Flavonoids |
| Clitoria ternatea | Papilionaceae | Whole plant | alkaloid |
| Crataeva nurvula | Capparidaceae | Fruit | Alkaloids, tannins, steroids |
| Ginkgo biloba | Ginkgoceae | Leaves | Phenolic Flavonoids |
| *Tinospora cardifolia* | Menispermeacea | Stem | Flavonoids |
| *Tribulus terrestris* | Zygophyllaceae | Fruits | Glycosides, steroids, Tannins |
| *Vitex negundo linn* | Verbenaceae | Bark | Benzophenonl |
| *Withania somnifera* | Solanaceae | Roots | Flavonoids |
| Zingiber officinale roscoe | Zingiberaceae | Ginger Rhizome | Flavonoids |
| | | | |

## 1. 5 .MATERIALS AND METHODS

### 1.5.1 Collection& authentication plant Materials:

*Zingiber officinale*, *Tinospora cordifolia & Terminalia cheblula* will be collect or purchased from local market, Bilaspur, Chhattisgarh. Identification and authentication will be done from department of Botany, Guru Ghasidas Central University, Bilaspur, and Chhattisgarh.

### 1.5.2 Preparation of plant extract:

Powdered plants materials will mix in ratio of 2 parts of *Zingiber officinale*, 4 parts *Terminalia Chebula*, 4 parts *Terminalia Chebula*, weighed and packed in Soxhlet. Solvents will used for soxhlation are mixture of methanol and water in the ratio of 50:50 respectively

**1.5.3 Hepatoprotective and nephroprotective activity**: Animals will be divided into five groups, of six animals each. Group I will use as normal control group, Groups II, III, IV and V received 500 mg of paracetamol per kg body weight Intraperitoneal for 3 days. Group II received only Paracetamol. Group III will administer silymarin at a dose of 10 mg/kg p.o. Group IV& V will be treated with extracts in two different doses. Drug treatment will start 5 days prior to paracetamol administration and continue till day 7. After 48 hours of the third paracetamol dose administration, the animals will scarify under ether anesthesia. Blood samples will be collected by retro-orbital method and the serum will separate for determining the different bio-chemical parameters. The livers and kidneys will then immediately remove; small pieces will be fixed in 10% formalin and kept for Histopathological assessment.

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