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## **A SYSTEMATIC REVIEW ON NEPHROPROTECTIVE PLANTS**

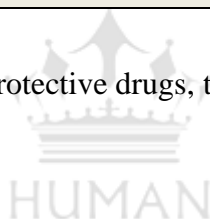
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### **ABSTRACT**

Nephrotoxicity is one of the most common kidney issues and occurs when body is revealed to a drug or toxin. A numeral of therapeutic agents can adversely act on the kidney resulting in acute renal failure, chronic interstitial nephritis and nephritic syndrome because increasing numeral of potent therapeutic drugs like aminoglycoside antibiotics, chemotherapeutic agents and NSAIDS. Nephroprotective agents are the substances which have protective activity against nephrotoxicity. Because of various complex chemical substances present in medical plants, they have curative properties. This review is concerning the some of the medicinal plants have nephroprotective activity on Cisplatin and Gentamicin produced nephrotoxicity.

**Keywords:** - Nephrotoxicity, nephroprotective drugs, traditional drugs, cisplatin



## **INTRODUCTION:**

Nephrotoxicity takes place when the body is manifested or liable to medicine or toxin, which is considered as pre-eminent and white spreading as well as frequent kidney diseases. There are numerous therapeutic agents responsible for the resulting nephrotoxicity like anticancer drugs, antibiotics, some NSAIDs, etc. Such agents depress the kidney function which leads to renal failure. Nephrotoxicity is the noxious effect of some substances that may include both toxic or fatal chemicals and medication on the kidney. Various medicinal herbs, natural compounds and dietary compounds have been evaluated as possible nephroprotective agents. Medicinal plants play important role as a source of capable compounds for the occurrence of efficacious therapy for the diagnosis of kidney problems. Various kinds of literature searches having done and prove that many medicinal plants have nephroprotective activity. Herbal medicines contain curative properties due to the presence of phytochemical constituents of a medicinal plant. The review involved all the details of phytochemical constituents of medicinal plant which are utilized as nephroprotective drug. In the human body, the kidney is the more essential organ and is included in the metabolism of carbohydrates, proteins, lipids and other nutrients. The important system is tubular cells which are liable for the production of glucose through gluconeogenesis. Many times, humans are exposed awesome toxic agents in the surrounding or environments. Due toxic or noxious effects of medicines and other agents, there is a deterioration of kidney's functioning which is called nephrotoxicity. The effects of chemicals on renal function is known as nephrotoxicity and this me results into glomerular damage, tubular toxicity and inflammation. Various substances are responsible for nephrotoxicity. Includes molds and fungi, cancer causing agents like cisplatin antibiotics like aminoglycosides, metals include arsenic Mercury, Lead. Renal pathology and nephrotoxicity are differentiated when the kidney is not infected by the drug related damage. There are many similar things in between renal pathology and nephrotoxicity like both are resulted due to the damage of renal cells or death of renal cells which leads to change in the structural and functional unit of the kidney which are called nephrons. It is represented in Figure 1.

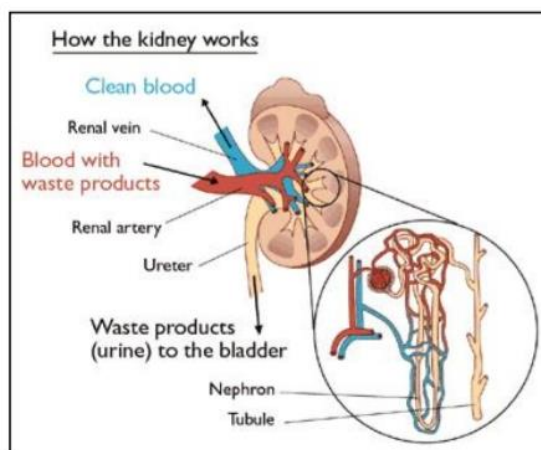


Figure 1: Structure of kidney

### Nephrotoxic agents:

When the human body is revealed to noxious or harmful drugs including industrial and environmental chemicals then it leads to renal disease or dysfunction of the kidney may occurs. There are different kinds of exogenous and endogenous toxic agents like anti cancer drugs, antibiotics also heavy metals. All these agents are responsible for the revelation or displaying of the disease.

### Classification of Nephrotoxicity causing Agents.

1] Antineoplastic agents

A} Alkylating agents: Cyclophosphamide, Cisplatin

B} Nitrosoureas: Semustine, Streptozotocin

C} Antimetabolites: High dos Methotrexate, Cytosine Arabinose

D} Biologic agents: Interferon, Recombinant leukocyte

E} Antitumor antibiotics: Doxorubicin, Mitomycin

2] Heavy metals

Heavy metals include bismuth, lead, arsenic, mercury.

3] Antimicrobial agents: Tetracycline, Amphotericin B, Rifampicin, Acyclovir, Pentamidine, Sulphadiazine.

4] Aminoglycosides: Gentamycin, Amikacin, Streptomycin

5] Miscellaneous: radiocontrast agents

### Nephroprotective drugs:

Traditional drugs are very beneficial and helpful in primary healthcare needs. As per WHO, exceeding 80% of the population is utilizing the traditional medicines which provide complete health benefits, mainly in developing countries. Consumption of such herbs

contains bioactive components which are of great use and it has medicinal values and they protect against diseases. The plant sources which are utilized in the therapy or the development of effective therapy in various kinds of kidney disorders are called as nephroprotective drugs. Traditional awareness will serve as a significant portal or a way and will ease the safer use of natural product and will also encourage for the research of the natural product to rediscover the drug discovery procedure.

### **Phytoconstituents from different medicinal plants as nephroprotective:**

#### **1. *Artemisia annua***



**Fig. 2. *Artemisia annua***

It is known as Qinghaosu in China. *Artemisia annua* (Asteraceae) is a green herb which is used for treating protozoal infection and it is an antimalarial drug. Traditionally it was used for treating fever and hemorrhoids and is considered effective against plasmodium falciparum malaria and its variety of formulation that are available are intra renal, rectal and oral. Its ethanol extract as a verified that is nephroprotective. It includes terpenoids like Artemisiaketone,  $\alpha$ -pinene. Leaves of this plant includes major amount of flavonoids and it has antiviral and antioxidant activity.

#### **2. *Curcuma xanthorrhiza***



**Fig. 2. *Curcuma xanthorrhiza***

It is mostly found in the Java Islands of Indonesia, Malaysia, Thailand and China its common name is “Java Ginger”. *Curcuma xanthorrhiza*- contains the xanthorrhizol and it is Sesquiterpene and it is used as antibacterial, anti-inflammatory and anticancer purpose. The stem part of this plant is used in treating the inflammation in postpartum urine bleeding. In 2005 the study of the plant proved that it has nephroprotective activity.

### **3. *Zingiber officinale***



**Fig. 3. *Zingiber officinale***

Commonly called as ginger and is well known for its medicinal properties in many countries. *Zingiber officinale* (Zingiberaceae) is the vital source of Ginger. The Ginger is pungent in test. It includes phenols and the action which it shows are antiemetic, carminative anti-inflammatory and stimulant. The aqueous and ethanolic extracts of ginger are more effective against cancer and it is used for treating nephrotoxicity.

### **4. *Pedalium murex***



**Fig. 4. *Pedalium murex***

*Pedalium murex* belongs to the family of pedaliaceae. It is found in India Sri Lanka and Africa another names of our gokhru in Hindi and large caltrops in English. It's fruit extracts consists of many phytochemicals such as alkaloids, flavonoids, glycosides, sterols, phenols, saponins, fixed oils, tannins and fats. The best nephroprotective activity is due to the ethanolic extract of dried fruits of *Pedalium murex*.

### **5. *Carica papaya***



**Fig. 5 *Carica papaya***

*Carica papaya* belongs to the family Caricaceae other common names includes Pawpaw, melon tree. It contains the phytoconstituents mostly pseudocarpaine, carpaine, dehydrocarpaine the nephroprotective effect of *carica papaya* is mainly due to the aqueous seed extract which is used for renal injury.

### 6. *Panax ginseng*



**Fig. 6 *Panax ginseng***

*Panax ginseng* belongs to family Araliaceae. Is found in East Asia and Russia. It is more popularly cultivated in different regions of Asia. It is used as medicinal herb in Japan, China and Korea. The main chemical constituent are triterpenes, glycosides, ginsenosides. It plays important role in diagnosing the anticancer activity it maintains the blood sugar level, fatigue and also immune modulation in human. Ginsenoside have Neproprotective activity against Cisplatin-related nephrotoxicity.

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