



**Hepatoprotective activity of Acacia nilotica extract in carbon  
tetrachloride induced albino rats.**

Suryakant, Dr. Rajesh Khare , Dr.S.D. Dwevidi

Government Benazir college Bhopal

Email rbarkhe@gmail.com

**Abstract**

The present study was carried out to access the antioxidant activity of Acacia nilotica fruit. Plant Acacia nilotica belongs to family leguminoceae. Its common name in Hindi is Babool the aerial parts and roots are used in herbal drugs for different diseases carbon tetrachloride is a common hepatotoxin used for experimental purpose to induce liver disorder.

Keywords : Acacia nilotica, Antioxidant activity, CCl<sub>4</sub>, Liver disorder

**Introduction**

Transitional herbal medicines have been in latest from ancient time in India. Recent few years ayurvedic medicines of India gaining popularity worldwide. Side effects of allopathic medicine have changed the direction of research of new medicines towards herbal medicines. Ayurvedic treatment are mainly based on plant materials. The floral diversity of India is quite rich in terms of medicinal plants which have been used in traditional medicines.

Herbal drugs constitute only those traditional medicines which primary use medicinal plant preparation for therapy (Hota and Pathi,2003). Many plant best medicines are reported for incurable disease like Asthma, diabetes cardiovascular disorder, gastrointestinal problems, anorexia, cirrhosis of lives, rheumatism cancer and many other disease. Eclipta alba provide relief to asthma patients (Khare et.al.2006). Similarly Tephrosia purpurea notice for its antihistaminic activity by Kapil and Saxena (2006). Chopra et.al.(1956) have presented a glossary of Indian medicinal plants. Rastogi and Mehrotra (1969) gave a detailed account of Indian medicinal plants.

Disease caused by free radicals can be cured by antioxidants. Some plant extracts where reported to contain antioxidant by Ven and Latha (2002)& Usha et.al.(2007).

---

Plant origin crude drugs with antioxidant activity has become a popular field of study (Kumar & Latha,2002). Carbon tetrachloride is a common hepatotoxin used for experimental purpose to induced liver disorder (Abraham and Fred 1999).

## **Material and methods**

Plant materials :

The plant material used in the present study it is a common plant *Acacia nilotica*, found abundantly in in Vidisha district of Madhya Pradesh where collected from villages and brought to the laboratory. The plant material after proper identification was kept in herbarium record of the laboratory at S. No. 24. only fruits ( legume /Lomentum) were selected for experimental purpose. They were shade dried for fifteen days and powdered in grinder. The Powder material was Soxhlated in water. After 48 hours Soxhletion, the extract was filtrate and evaporated to dry in water back. The percentage yield was recorded. Aqueous crude extract was stored in glass vials for further experimental use.

## **Phytochemical analysis :**

Albino rats of wistar strain are reared and cared in research laboratory of Zoology Department for long time as per norms of CPCSEA. Female albino rats were selected for the study. The weight of each selected animal was approximately 100 gram $\pm$ 5gm. The diet and tap water throughout diet was procured from golden feed New Delhi.

( c ) Grouping of animals :

The animals were group in polyester cages in to following manners : ( 6 animal in each group).

Group I : control, normal healthy rats.

Group II : CCl<sub>4</sub> Control Rats injected with CCl<sub>4</sub> in paraffin oil (1:1). 2ml./kg. bodyweight, intraperitoneally.

Group III : Paraffin oil control. Rats injected with paraffin oil 2ml./kg bodyweight intraperitoneally.

Group IV : Induction and treatment. (1:1) CCl<sub>4</sub>+ Paraffin oil was injected intraperitoneally.(25 gm/animal Aqueous extract orally was started a day after the injection for a period of 2 weeks)

Group V : Aqueous extract control.

Rats administrated with extract orally 2007.(25mg/100gm. Bodyweight = 25mg /animal) for two weeks.

(1 ml =100 mg. )

(Grouping of animals and drug extract administration process were followed as per Usha et.al.,2007.)

(e) Blood serum collection :

Blood was collected from all the animals with the help of veterinary doctor of Veterinary hospital Vidisha and kept in glass vials with proper labeling. After 30 minutes, collected blood samples were centrifuged for 20 minutes at 2000 rpm to separate serum. The serum used for biochemical analysis. Level of alanine amino transferase in the serum was assessed.

### **Observation and Results**

( a ) phytochemical analysis : plant extract was tested for the presence of alkaloids and flavonoids and found positive for both.

Three fraction of alkaloids and two fraction of flavonoids where observed by T.L.C.

Above analysis confirms presence of alkaloids and flavonoids in the extract.

( b ) **Assessment of serum enzyme :**

The level of alanine amino transferase was analysed in serum samples of different groups of albino rats. Table – 1 reports that in the group II, there was a significant increase in the serum level of alanine aminotransferase.

Where as ,in group IV there was a significant decrease in the value which tends to reach the normal value.

In group II, animals receive only CCl<sub>4</sub>+ paraffin oil injection. But when the aqueous extract of *Acacia nilotica* was orally given in group IV , after receiving the CCl<sub>4</sub> paraffin oil injection, the enzyme level remains to the normal value which confirms antioxidant activity of the extract.

( c ) **Body weight of experimental rats :**

From the Table -2 it was obvious that the rats of group II which received CCl<sub>4</sub>+ paraffin oil injection recorded weight loss whereas animal of group IV which received plant extract treatment found normal body weight.

( d ) **Behaviour change :**

Rat of group II show some normal behaviour in comparison to group I (health rats). Loss of activeness slow moment, sluggishness , dulness were observed in group II. They showed no interest in feeding. Lack of sound response and lack in playing behaviour were noted.

They try to avoid activities which are normally found in group I. All the animals (rats) of group II showed sickness behaviour.

Animals of group IV which received plant extract orally found active, normal movements, interest in feeding, quick response and playing behaviour.

## Discussion

Carbon tetrachloride damages liver cells because of its metabolite trichloromethyl (Das et.al. 2001). The CCl<sub>4</sub> increases protein catabolism in which oxidation of protein takes place and results in the storage of oxidized proteins in the liver ( Abraham & Fred 1999).

CCl<sub>4</sub> produces free radicals ( reactive oxygen ) that causes liver cell damage and leading to elevated levels of serum parameters like alanine aminotransferase, aspartate amino transferase , r- glutamyl transferase and alkaline phosphatase Rosaeki et. al.(1970). Reduction I this type of activity in CCl<sub>4</sub>+ aqueous extract treated group (group IV) can be considered as the antioxidant activity of the plant extract ( Jaya Sekhar et.al.1997)

The healthy conditions of animals of (group IV) treated with extract of *A. nilotica* as compared to that observed in only CCl<sub>4</sub> treated (group II) demonstrate that the ability of plant fruit extract in reduction and neutralization of reactive oxygen generated by CCl<sub>4</sub>.

In conclusion, the plant material (extract) certainly contains some antioxidant substance that play an important role in controlling the free radicals. The chemical which is responsible for antioxidant activity has to be investigated for further study.

Presence of alkaloids and flavonoids in plant extract ,normal serum enzyme level normal body weight and normal active behaviour of animal in group II (extract treated group) shows & proves antioxidant activity of *Acacia nilotica* fruit extract.

**Table -1 Alanine amino transferase level in experimental animals (u/2).**

Group	Treatment	Alanine aminotransferase Level in serum
I	Normal	46.2
II	CCl <sub>4</sub> + Paraffin oil	110.0
III	Only Paraffin oil	46.2
IV	CCl <sub>4</sub> +(Aqueous extract)	46.0
V	Only aqueous extract	45.2

**Table – 2 Bodyweight of experimental animals.**

<b>Group</b>	<b>Treatment</b>	<b>Bodyweight before treatment</b>	<b>Bodyweight after treatment</b>
I	Normal	100 gm ± 5 gm	100gm±5gm
II	CCl <sub>4</sub> + Paraffin oil	100 gm ± 5 gm	70 gm± 8gm
III	Only Paraffin oil	100 gm ± 5 gm	94gm ± 4gm
IV	CCl <sub>4</sub> +(Aqueous extract)	100 gm ± 5 gm	97 gm ±5gm
V	Only aqueous extract	100 gm ± 5 gm	105gm±5gm

**References :-**

- Chopra,R.N.; Nayar S.L. and Chopra, I.C. (1956)
- Glossary of Indian medicinal plants. New Delhi, CSIR Publication, India
- Das K.K; Das, S.N.; Das Gupta,S.;
- The influence of ascorbic acid on nickel induced petak prepaid peroxidation in rats. J. Basic Clin. Physiol Pharmacol 2001; 12: 187-95.
- Hota N.P; Pathi M.M.; Typical uses of certain common and uncommon plants. Ancient Science of Life 2003: 1-6.
- Harbone J.B. (1984). Phytochemical methods. II edition .Champ & Hall Publication Newyork , USA.
- Jayasekhar , P .;Mohanam,P.V.;Rathinam, K.; Hepatoprotective activity of ethyl acetate extent of Asia catechu,Indian journal of Pharmacology 1997;29:422-8
- Khare M.L.; Saxena ,R.C.;Soni, Kapil and Uikey,Jyoti.(2006). Phytochemical studies with smooth muscles relevant activity of Eclipta Alba. Indian journal of applied life sciences.(1):18-20
- Rastogi, R.P and Mehrotra ,B.N. (1969). Indian medicinal plants. Delhi Pub. India.
- Rastogi, R.P. and Mehrotra, B.N. (1998-2002) Compendium of Indian medicinal plants, Vol. 1-6. Central Drug Research Institute/National Institute of Science Communication, Lucknow/New Delhi.

Rosaeki ,S.B.;Rav D.; Lehman D Prentice M. Determination of serum Gamma glutamyl trans peptides activity and its clinical applications Ann. Clin. Bio Chem 1970;7:143

Soni., K. Kapil and Saxena , R.C (2006). Anti histamine effect of crocin extended isolated from purpurea on histamine induced broncho -canstriction in isolated trachea of guinea pigs. Indian journal of Applied Life Sciences. 1 (1) :21-23.

Usha , K.;kasturi,G.M and Hemlatha , P.(2007). Hepatoprotective activity of hygrophila spinner science Asia accident tiles on carbon tetrachloride induced liver damage in experimental rates in Indian Journal of Clinical Biochemistry. 22(2) :132-135.

Ven Kumar , M.R Latha M.S.; antioxidant activity of curculigo orchidies in carbon tetrachloride induced hepatopathy in rats . Indian Journal Clinical Bio. Chem. 2002;17-2: 80-7

Permila Abraham , P.; Will Fred, G.; Decreased activity of hepatic alkaline protease in rats with CCl4 induced liver cirrhosis. Indian Journal of Experimental Biology 1999;37:1243-44