Efficacy of *Pcroriza kurrooa benth* in experimentally induced Hepato-toxicity in Cross-bred calves

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Abstract

Alcoholic extract of roots of *picrorhiza kurrooa Benth* was screened for its photochemical & hepato protective activity by metabolic (biochemical) profile for hepato-protective activity by invasive blood sampling in calves. The mean extractability percentage obtained was 40.5. Phyto-chemical study revealed that the presence of reducing sugar, glycosides & saponins. The level of SGOT (AST), SGPT (ALT), alkaline phosphates, bilirubin increased significantly while the level of protein, albumin, globulin and glucose decreased significantly and moderate but not significant increase in cholesterol level in serum in calves treated with CC14 (thrice a week for two weeks, intra ruminally) were observed. The bio-chemical alterations might be due to damage of liver cells and impairment in its functions. The animals treated with alcoholic extract 10 & 15 mg/kg Body wt. For 14 days by oral route afforded a significant protection against biochemical alterations induced by carbon tetrachloride. Thus the efficient protection of calves to varying degree, by the alcoholic extract of *Picrorhiza kurrooa Benth* given with carbon tetrachloride was observed from the clinical & biochemical investigations.

Keywords: Hepato-toxicity, Alchoholic Extract, Biochemical.

Introduction

Picrorhiza kurrooa benth is a ground clasping hairy herbs belonging to family *scrophulariaceae* locally called as Kutaki or Kali – Kutki . It is one of potent drugs for ailments concerned with the liver and spleen. It is a major constituent for the herbal preparations, used for hepatic & splenic disorders, such as Liv52,Livomyn, Agrogyawardhini, Livogen etc. hence it has been planned to carry out hepatooprotective activity on alcoholic extract of roots of *picrorhiza kurrooa benth* alone.

Materials and methods

The roots of *picrorhiza kurrooa benth* were procured from local market at Nagpur. The roots were powdered, sieved and was subjected to alcoholic extraction as described by the method of Rosenthaler (1930). A thimble of 50 gm of powdered root was extracted with absolute alcohol in Soxhlet apparatus by heating on mentle till the colorless solvent started returning back in the reservoir. To calculate percentage extractability & adequate extract for screening the whole procedure was repeated for many times.

A. Phytochemical study

The phytochemical study was undertaken for detection of various active principles of alcoholic extract of *Picrorhiza kurrooa Benth*, as Guntur (1948) & Gibbs (1974).

B. Hepatoprotective activity

Twenty four adult healthy cross- bred (Sahiwal X Jershy) male calves 1 ½ years of age & 70 -120 kg wt. procured from Nagpur Veterinary College, Cattle breeding Farm, were randomly divided into four groups, each containing 6 animals. They were kept under identical manage mental conditions & were observed for any ill health for week before the actual commencement of experiment .

Group I : Control group
Group II : Received hepatotoxic agent (CCL4) acted as CCL4 treate group
Group III & IV: Treated with alcoholic extract (test drug) at two dose levels & hepatotoxic agent for 14 days of experiment period.

Experiment hepatic damage was induced in calves of group II to IV by intra ruminal administration of hepatotoxic agent CCL4- 0.5 ml/10kg Body wt. thrice

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a week for two weeks (kohle et.a 1993).

The animal of group III & IV were treated with the alcoholic extract daily @ 10, 15 mg/kg Body wt. by oral route respectively.

All the animals were provided routine feed & clean fresh water during the experimental period.

Blood samples were collected from all animals on 15th day of experiment i.e. 24 hrs. After the last treatment & serum samples were separated for metabolic profiles.

The biochemical analysis of serum was carried out using the ready made kits marketed by M/S Qualigenes Fine Chemicals & Biolab diagnostics, compiled accordingly to the following standard methods

1. SGOT (AST) & SGPT (ALT) (Reitman & Frankels method 1957).
2. Serum alkaline phosphatase.
3. Serum total bilirubin, Dimethyl/ Sulphoxide method.
4. serum total protein, albumin & globulin(Doumas, BJ,1978) method.
5. serum cholesterol – one step method of wybenga & pileggi.
6. Serum glucose –GOD POD method by Raaubo E. (1996).

Results and Discussion

The percentage extractability of roots of *Picroriza kurrooa Benth* was around 40.5%. The consistency obtained was yellowish-brown semi-solid. The phytochemical study revealed presence of rducing sugar, glycosides & saponin, the active principle after various tests were applied for qualitative determination of active principle. Rastogi *et al* (1991) reported the compound from roots of *picrohiza kurrooa Benth* apocynin a new iridoid glucoside. Singh & Rastogi, (1972) also reported the presence of iridoid glucoside Picroside 1 (I) & Kutkoside II in the alcoholic extract of roots & named the mixture as Kutkin.

The clinical signs such as depression, decreased appetite & thirst, salivation, nasal discharge, pasty diarrhea were noticed in cross-bred calves of all groups except controle group after 24 hrs of CCl4, administration, similar observation were made by Kohle *et al.*(1993) in cross bred calves.

The depression may be due to CCl4 toxicity of central nervous system while inappetance was probably due to partial absence of bile salts coupled with enlarged liver. Pasty diarrhea & other signs noticed were might be due to hypoglycemia & failure of the normal hepatic detoxification mechanism which resulted in accumulation of excess toxic products as ammonia (Blood *et al ,1989)*

All the calves of treated group (III & IV) with alcoholic extract of roots of *picrohiza kurrooa Benth* showed improvement of the clinical signs in comparison with CCl4 treated calves , this effect appears to be various medicinal properties of root of *picrohiza kurrooa Benth ,* as mentioned by Chopra *et al* (1956).

The mean SGOT level in calves of CCl 4 treated group was increased significantly unto 15th day (shown in table) showing more than four fold increase than controle group.

The alcoholic extract of roots of *picrohiza kurrooa Benth* (10mg & 15 mg/kg Body wt.) provided a significant protection against SGOT increase produced by CCl4. The mean levels of SGPT (three fold) serum alkaline phosphatase (two fold) were significantly (1 & 0.01) increased in CCL4 , treated calves whereas extract of root afforded significant protection in calves of treatment group. These findings are in agreement with Dwivedi *et al(*1990) who observed hepatoprotective activity of picroliv, a standardized iridoid glycoside fraction of alcoholic extract of of *picrohiza kurrooa Benth.* the hepatoprotective activity could be due to decreased permeability of hepatocyte cell membrane or due to prevention of its rupture or damage & release of intracellular enzymes to the blood (Haultenius, 1982). The mean serum bilirubin level increased significantly ($p > 0.01$) four fold on 15th day in CCl 4 treated group as compared to control group. This is due to disturbances of the balance between rate of production & excretion of bilirubin by damaged parenchyma cells as discussed by Patra & Pradhan (1995). However in all groups treated with extract mean bilirubin levels remained nearer to controle group in comparison with CCl 4 treated group on 15th day which agreed with the observations of Dwivedi *et al* (1990) and also effective against jaundice (Kirtikar & Basu,1975). Thus of *picrohiza kurrooa Benth* effectively reduced the serum bilirubin content. The total mean serum protein, albumin & globulin values decreased significantly by CCL 4 administrations (Group II) and were restored in calves (group III & IV) of treatment group. These findings corroborated the observation of Mahanta *et al* (1983). Hence it may be postulated that of *picrohiza kurrooa Benth* induced hepatic function & stimulated regene-ration of hepatic parenchyma which helped proper synthesis & metabolism of proteins. Improvement of protein synthesis in liver following the treatment with Picroliv, the iridoid glycoside fraction of of *picrohiza kurrooa Benth* was also observed by Dwivedi *et al* (1991) in rats.

The significantly decreased blood glucose level of CCl 4 treated group was resorted in treatment group at both the dose level of root extract. These findings coinside with findings of Patra & Pradhan (1995) who

used Livol containing of *picrohiza kurrooa Benth* as one of the herbal ingredients. The probable mechanism of this action may be regeneration of hepatic parenchyma & stimulation of metabolism of carbohydrate, thus helping to maintain normal blood glucose level. The serum cholesterol levels were not significantly altered in treatment group & CCl4 treated group when compared with controle group.

From the above findings it is concluded that it is cheaper & readily available herbal drug as hepato protective .

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