

Improvement of liver function in rats subjected to hepatotoxin by a crude protein derived from leaves of Cajanus indicus

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Rats subjected to hepatotoxicity with CCl₄ were treated with crude protein isolated from Cajanus indicus. It was observed that after treatment with the protein for seven days serum bilirubin and GPT were reduced significantly (P < 0.001) compared to CCl₄ control. GOT, however, showed no appreciable change.

Introduction

Cajanus indicus is an edible herb. Its fruit is used as pulses throughout the Indian subcontinent. In rural India, specially in the Gangetic plains, water extract of the leaves of Cajanus indicus has been extensively used for the treatment of jaundice and hepatomegaly¹ for many years but the active principle is not known.

Hepatic dysfunctions due to ingestion of hepatotoxins are increasing world wide. As there is no confirmed remedy to this dangerous situation, which is often irreversible and fatal, we have undertaken a systematic search to identify the active principle in the water extract of leaves of Cajanus indicus.

Method

The proteins of the water extract of leaves were precipitated by 90% Ammonium Sulphate, centrifuged and reconstituted in Tris-Hcl buffer pH 7.3. Sephadex G-10 column chromatography and 12% SDS PAGE showed two proteins (m.wt. approx 40 and 42 Kd). Rats (male, b.wt. 90 ± 10 gm) were treated with a hepatotoxic agent-- Carbon tetrachloride² (0.3 ml; two doses at an interval of 7 days orally) and the crude protein fraction were injected (0.5 ml i.p. conc 42 µg/ml) ten days after the first CCl₄ dose when the rats showed changes in stool and urine colour (whitish brown and deep yellow that stained the abdominal wall near the genitals, respectively).

The experimental rats were divided into two groups keeping suitable controls: rats treated with CCl₄ were injected with (1) only one dose of the protein-- group 1 or

(2) 7 doses (1 dose per day for 7 days) consecutively-- group 2. Twenty four hours after the last injection in group 2 all the rats were sacrificed (groups 1 and 2). Heart blood and liver impression smear were taken. The serum was tested for bilirubin³, GOT and GPT⁴. The liver impression smear was fixed in methanol, stained with Giemsa stain and viewed under microscope.

Conclusion

Results (Table 1) showed that serum bilirubin and GPT were reduced significantly in the group that was treated with the crude protein for 7 days. No appreciable change was observed with GOT and histological examination showed slight improvement in the liver architecture in the 7 day treatment group. Thus, it seems that the proteins present in the water extract of leaves of Cajanus indicus play an important role in improving liver function of animals suffering from jaundice.

Table 1. Effect of leaf protein of Cajanus indicus on liver function of rats.

Test	Bilirubin mg%	GOT IU %	GPT IU %
Control	--	7 ± 2	10 ± 3
CCl ₄	7 ± 2*	18 ± 3*	26 ± 4*
CCl ₄ + Ci(1)	4 ± 1	18 ± 1	24 ± 2
CCl ₄ + Ci(7)	1 ± 0.5*	15 ± 4	14 ± 2*

Result is the mean ± SD of 3 sets of experiments; n = 10 in each group. p < 0.001; Ci(1) or (7) -- Treated for 1 or 7 days with crude protein.

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從 *Cajanus Indicus* 葉分離的粗蛋白可改善遭受
肝毒素損害的大鼠的肝功能

摘要

作者用四氯化碳 (CCl₄) 把大鼠的肝細胞破壞，然後用 *Cajanus Indicus* 分離出的粗蛋白治療，並與四氯化碳對照組比較，結果觀察到，用粗蛋白治療 7 天後，大鼠血清膽紅素和谷丙轉氨酶 (GPT) 明顯減少 ($p < 0.001$)，但是谷草轉氨酶沒有明顯改變。

Reference

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