



IN VITRO HEPATOPROTECTIVE EVALUATION OF ABUTILON INDICUM TEA GRANULES ON PARACETAMOL AND CARBON TETRACHLORIDE INDUCED HEPATOTOXICITY

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ABSTRACT

Aqueous extract of *Abutilon indicum* with onion were formulated with tea granules using Isphagula as binding agent. Decoctions of the formulations were screened orally for hepatoprotective activity in adult albino rats. The aqueous extract of *Abutilon indicum* with onion showed significant hepatoprotective activity by lowering the elevated serum enzymes SGOT, SGPT, ALKP, BIL in rats treated with hepatotoxic agents like paracetamol and carbon tetrachloride.

Key words : *Abutilon indicum*, Paracetamol, Carbon tetrachloride, Hepatoprotective, Hepatotoxicity.

INTRODUCTION

Abutilon indicum (Malvaceae) is used in siddha and ayurveda systems of medicine. It is found in tropical India and Ceylon¹. It is a annual herb, leaves cordate, ovate, toothed or slightly lobed, long petioled. The leaves consist of large quantity of mucilage². Literature survey revealed that the leaves are used in the treatment of bronchitis, headache, stomach complaints, abortifacient, bone fracture, colic convulsions, febrifuge, antiemetics, diuretic and spermatorrhea³⁻⁵. The plant contains gallic acid and two new sesquiterpene lactones alantolactone and Isoalantolactone. Presence of alkaloids, leucoanthocyanins, flavanoids, sterols, triterpenoids, saponins and cardiac glycosides is also reported.

EXPERIMENTAL

The fresh leaves of *Abutilon indicum* were collected from the medicinal garden of Arulmigu Kalasalingam College of Pharmacy, Krishnankoil, Virudhunagar district, Tamil Nadu and authenticated at Ayya Nadar Janaki Ammal College, Sivakasi. Onion and tea dust were purchased from local market, carbon tetrachloride was procured from E. Merck (India) Ltd, Mumbai and Silymarin suspension was procured from M/s Micro labs, Bangalore.

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EXTRACTION AND CONCENTRATION

Four kg of shade dried leaves of *Abutilon indicum* were reduced into fine powder. From this, 500 g of fine powder was extracted with distilled water using continuous hot percolation method. The extract was concentrated to a dry residue. The dry residue was powdered after desiccation (Powder I). Another 500 g of fine powder of aqueous extract was mixed with 1 kg of small pieces of onion, which was cleaned and peeled off before mixing. Then it was extracted with distilled water using continuous hot percolation method. The extract was concentrated to a dry residue. The dry residue was powdered after desiccation (Powder II).

Formulation of *Abutilon indicum* tea granules

Five g of powder-I and 45 g of tea dust was mixed with Isphagula mucilage to get granules of *Abutilon indicum* tea granules-I (AITG-I). Five g of powder-II and 45 g of tea dust was mixed with Isphagula mucilage to get *Abutilon indicum* tea granules-II (AITG-II). The granules of uniform size were obtained by passing them through a sieve No. 20.

Toxicity studies

Adult albino (150–180 g) of either sex were used for hepatoprotective study. They were obtained from Tetrex limited, Madurai. They were fed with standard rat pellet diet *ad libitum* with free access to drinking water. The rats were maintained under controlled conditions of light (12 h in light and 12 h in dark). For the study, 18 adult albino rats were taken and it was divided into two groups, each consisting of 9 rats. Decoction of AITG-I prepared in water was administered orally in the dose of 0.1, 0.5, 1 g/kg for the first group. To the second group decoction of AITG-II was administered in the same manner as above in the same dose range. The animals were observed for mortality for 48 h after the administration of the decoction.

Assessment of hepatoprotective activity in paracetamol induced toxicity

Thirty adult albino rats of either sex were divided into 5 groups each containing of six rats. Control group of animals received decoction of tea dust in a dose of 2.5 g/kg orally for 7 days. Animals in group-II received only the hepatotoxin paracetamol in the dose of 3 g/kg orally for 7 days. Animals in group-III received Silymarin syrup in a dose of 100 mg/kg and paracetamol in a dose of 3 g/kg orally for 7 days. Animals in group-IV and group-V received AITG-I and AITG-II in a dose of 100 gm/kg and paracetamol in a dose of 3 g/kg orally for 7 days.

The method of Handa and Anupama⁶ was used to evaluate paracetamol induced hepatotoxicity. After 7 days, the blood was collected from each group separately by puncturing the retro orbital sinus. Haematological parameters including RBC count, WBC count and haemoglobin content were carried out before the coagulation of blood. The results of the study are tabulated in Table 1. After the above estimation, blood was allowed to coagulate at 37°C for 30 minutes and the serum was separated by centrifugation at 2500 rpm and analyzed for

biochemical investigations i.e. serum glutamic oxaloacetic transaminase (SGOT). Serum glutamic pyruvic transaminase (SGPT), Serum alkaline phosphatase (SAP) and Serum Bilirubin (SBIL).

Table 1. Effect of formulation of *Abutilon indicum* on hepatic damage induced by paracetamol

Group (n = 6)	Biochemical Parameters Mean \pm SD			
	SGOT (IU/L)	SGPT (IU/L)	SAP	SBIL
Control	105.16 \pm 5.42	45.08 \pm 1.86	119.97 \pm 8.20	1.07 \pm 0.49
Paracetamol Treated	333.81 \pm 9.01	262.78 \pm 2.50	311.99 \pm 3.1	3.22 \pm 0.20*
Silymarin Treated	118.63 \pm 2.43*	49.14 \pm 1.16*	130.18 \pm 1.76*	1.12 \pm 0.08*
AITG-I	131.2 \pm 0.24*	65.64 \pm 0.14*	155.64 \pm 4.22	1.41 \pm 0.09*
AITG-II	121.64 \pm 0.26*	52.64 \pm 2.28	144.12 \pm 2.64	1.25 \pm 0.05*

* P < 0.005 indicates significant compared to control. n denotes the number of animals used.

Assessment of hepatoprotective activity in carbon tetrachloride induced toxicity

For this study, 30 adult albino rats of either sex were divided into 5 groups containing 6 rats each. The first group served as control and received 2 mL of olive oil i.p. for 7 days, used as vehicle. Group-II received 1:1 carbon tetrachloride in olive oil in a dose of 2 mL/kg for 7 days, i.p. Animals in group-III received Silymarin syrup in a dose of 100 mg/kg orally for 7 days with 1:1 carbon tetrachloride in olive oil. The animals in group-IV and group-V received AITG-I and AITG-II in a dose of 100 mg/kg orally for 7 days with 1:1 carbon tetrachloride in olive oil. After 7 days, the method of Handa and Anupama⁶ was adopted to evaluate the hepatoprotective activity of *Abutilon indicum* tea granules. The results are tabulated in Table 2.

Table 2. Effect of formulation of *Abutilon indicum* on hepatic damage induced by carbon tetrachloride

Group (n = 6)	Biochemical Parameters Mean \pm SD			
	SGOT (IU/L)	SGPT (IU/L)	SAP	SBIL
Control	110.42 \pm 6.42	41.24 \pm 7.08	121.96 \pm 7.14	1.08 \pm 0.50
Carbon tetrachloride Treated	389.62 \pm 8.44	299.96 \pm 9.60	395.16 \pm 8.62	4.42 \pm 0.96
Silymarin Treated	119.54 \pm 3.64*	48.63 \pm 0.83*	130.64 \pm 2.44*	1.16 \pm 0.04*
AITG-I	162.78 \pm 4.92	69.46 \pm 3.98	169.78 \pm 6.56	1.86 \pm 0.14*
AITG-II	132.48 \pm 6.98	52.42 \pm 3.14	142.26 \pm 6.14	1.42 \pm 0.64*

* P < 0.005 indicates significant compared to control. n denotes the number of animals used.

Assessment of liver function

Biochemical and haematological parameters such as SGOT, SGPT, SAP, SBIL, WBC, RBC and Haemoglobin content were analysed to determine the functional state of liver and the results are tabulated in Table 1 and 2.

Statistical Analysis

Results of biochemical estimations and hematological parameters are reported as mean \pm SD values. Significance of difference in each case was calculated by students "t" test.

RESULTS AND DISCUSSION

Administration of AITG-II alongwith paracetamol showed significant hepatoprotective activity than AITG-I administered alongwith paracetamol, but the activity produced by AITG-II is less than the activity of standard drug silymarin.

Administration of AITG-II with carbon tetrachloride showed remarkable improvement in RBC, WBC and Hemoglobin content and decrease in SGOT, SGPT, SKP and SBIL level. Administration of AITG-II alongwith carbon tetrachloride showed significant activity than AITG-I, but it is less active than standard drug silymarin. The significant activity of AITG-II indicates the synergetic activity of onion alongwith *Abutilon indicum*

REFERENCES

1. K. M. Nadkarni, In : "Indian Materia Medica", Vol. I, Popular Prakashan, Bombay (1976) p. 8.
2. K. R. Kirthikar, and B. D. Basu, In : "Indian Medicinal Plants", 2nd Edn, Vol. II, Oriental Enterprises, Dehra Dun (2001), p. 430.
3. "The Wealth of India" – Raw Materials, Vol. I, Publications and Informations Directorate, CSIR, New Delhi (2000), p. 7.
4. S. P. Ambasta, In : "The Useful Plants of India", Vol. I, National Institutes of Science Communication, CSIR, New Delhi (2000) p. 3.
5. S. G. Joshi, In : "Medicinal Plants", 1st Ed., Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi (2000) p. 251.
6. S. S. Handa and S. Anupama, Indian J. Med. Res., **92**, 276 (1990).
7. A.E. Galigher, and E. N. Koylost, In ; "Essential of Practical Micro Technique", 2nd Ed., Lea and Febiger, Philadelphia (1971) p. 77.

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