Journal of Medical Sciences

ISSN 1682-4474

science alert

ANSInet
an open access publisher
http://ansinet.com

Research Paper

JMS (ISSN 1682-4474) is an International, peer-reviewed scientific journal that publishes original article in experimental & clinical medicine and related disciplines such as molecular biology, biochemistry, genetics, biophysics, bio-and medical technology. JMS is issued six times per year on paper and in electronic format.

For further information about this article or if you need reprints, please contact:

Rukhsana Anwar
University College of Pharmacy, University of Punjab, Lahore, Pakistan

J. Med. Sci., 6 (4): 662-665
July-August, 2006

Studies of *Raphanus sativus* as Hepato Protective Agent

Rukhsana Anwar and Mubasher Ahmad

Raphanus sativus (Radish) leaves powder, its water and ethanol extracts significantly decreased the activity of SGOT, SGPT, SLDH, SAP and serum total bilirubin in paracetamol induced rabbits. Paracetamol produces Hepatotoxicity. Paracetamol significantly increase the SGOT, SGPT, SLDH, SAP and serum total Bilirubin levels both in acute and chornic administration. Crude powder of *Raphanus sativus* leaves reduced risk of liver damage by paracetamol. Crude powder of *Raphanus sativus* also declined the SGOT, SGPT, SLDH, SAP and serum total bilirubin levels after the chornic administration of paracetamol. Crude powder, its water and ethanol extracts produced non-significant effect on total proteins contents.

Key words: Serum, body weight, SGOT, SGPT, SLDH, SAP

ANSInet
Asian Network for Scientific Information

University College of Pharmacy, University of Punjab, Lahore, Pakistan

INTRODUCTION

Raphanus sativus (Radish) belongs to the family Crucifareae. *Raphanus sativus* is coarse, rough or glabrous. Leaves are lyrate pinnate or pinnatifid. Cultivated all over Sub-Continent up to 16,000 ft in temperate and warm countries.

Juice of fresh leaves is diuretic and laxative, seeds are expectorant, diuretic, carminative and roots are used for urinary complaints (Kritikar and Basu, 1987).

The protective effect of *Rephanus satives* juice against paracetamol hepatotoxicity was investigated. Combined treatment with radish juice and paracetamol induced decrease of body temperature, haematocrit, glutathione content and increase of lipid peroxidation in comparison to the radish juice pre-treatment. Radish juice pretreatment did not significantly change examiner parameters. However, some beneficial effects of radish juice in acute live injury caused by paracetamol can be assumed (Popovic *et al*., 1993).

Pretreatment of rats with plant extract prevented the paracetamol induced rise in serum enzymes alkaline phosphatase and transaminase (GOT, LGPT) (Gilani *et al*., 1996).

Toxic doses of paracetamol destroy the cellular defense system in hepatic tissues. The degree of the destruction can be assessed by measuring the metabolism of sulfhydral compounds, oxygen redicals and the release of certain enzymes (Wlodek and Rommelspacher, 1997).

Paracetamol produced liver damage as manifested by significant rise in liver weight, aspartate aminotransferase (AST) activity and bilirubin concentration (Rasheed *et al*., 1995).

The present investigation was carried out to find out the hepatoprotective effects of *Raphanus sativus* leaves. The effects of *Raphanus sativus* leaf powder, its water and ethanol extracts were studied on SGOT, SGPT, SLDH, SAP and serum total bilirubin and serum total proteins with and without paracetamol.

MATERIALS AND METHODS

Fine powdered *Raphanus sativus* leaves, its water and ethanol extracts were used.

Healthy male albino rabbits with the average weight 1.3-1.5 kg were used. They were retained for acclimatization for period of one week in the animal house of Faculty of Pharmacy, University of Punjab Lahore. The research was conducted in 1998-1999 and during the research rabbits were given fresh green fodder twice a day.

Rabbits were randomly divided into four groups of five animals each.

Group I was treated chronically with the paracetamol (Oral dose 100 mg kg^{-1} of b.w). The drug was administered every 24 h for 45 days. Crude *R. sativus* leaf powder administered to the same group on 46th and 47th day.

Group II treated with crude powder of *Raphanus sativus* leaves (oral dose 2 g kg^{-1} of b.w) in parecetamol (oral dose 4 g kg^{-1} of b.w) induced rabbits.

Group III treated with water extract of *Raphanus sativus* leaf powder (Equivalent to 2 g kg^{-1} of b.w of crude powder) in parecetamol (4 g kg^{-1} of b.w) induced rabbits.

Group IV treated with ethanol extract of *R. sativus* leaf powder (Equivalent to 2 g kg^{-1} of b.w) in parecetamol induced rabbits.

The samples were drawn from the marginal ear vain before starting the dosing and 6, 12 and 24 h after the dosing.

The activities of serum enzymes were determined by using the standard kits supplied by Randox Laboratories, UK.

Statistical evaluation: Mean levels±SE of all the parameters were recorded and student t-test was applied to check their significance.

RESULTS AND DISCUSSION

Chronic administration of Paracetamol for 45 days significantly raised the SGOT, SGPT, SLDH, SAP and Serum total bilirubin level. Crude *Raphanus sativus* leaf powder administration declined the SGOT, SGPT, SLDH, SAP and Serum total bilirubin level (Table 1). Total proteins contents remained unaffected.

Crude *Raphanus sativus* leaf powder declined the SGOT activity in paracetamol induced rabbits. The maximum effect 7.60±0.87 μL^{-1} $p>0.6$ was observed at 6 h post administration. Values remained insignificant up to the completion of experiment (Table 2).

Water extract of *Raphanus sativus* leaves blocked the rise in SGOT activity in paracetamol induced rabbits. The maximum effect was observed 6.40±0.77 μL^{-1} $p>0.8$ at 6 h post administration (Table 3).

Ethanol extracts declined the SGOT activity. The values remained insignificant up to the completion of experiment. The maximum effect was observed 5.70±0.74 μL^{-1} $p>0.6$ at 6 h after the administration (Table 4).

The crude powder, its water and ethanol extracts produced blocking effect on paracetamol induced increase in the SGPT activity. The lowering effect with crude powder on SGPT activity was observed 15.20±2.60 μL^{-1} $p>0.8$ at 6 h interval (Table 2).

Table 1: Effect of chronic administration of paracetamol (100 mg kg^{-1} b.w) on different biochemical parameters SGOT, SGPT, SLDH, SAP, serum total bilirubin and serum total protein activity at different time interval and its blocking effect with *Rephanus sativus* leaf powder (n = 5)

	Chronic effect of paracetamol on different biological parameters (Dose 100 mg kg^{-1} of b.w)				Effect of *R. sativus* leaf powder (1 g kg^{-1} of b.w) parameters administrated on	
Parameters	Zero day	7th day	30th day	45th day	46th day	47th day
SGOT μL^{-1}	3.0±48	9.0±0.8	11.0±1.0	22.0±2.0	20.02±2.0	7.0±0.9
SGPT μL^{-1}	11.0±1.0	20.0±2.0	38.0±3.5	46.0±2.0	32.0±1.05	18.0±2.0
SLDH μL^{-1}	49.25±5.0	51.2±4.0	98.5±6.00	120.30±12.20	115.30±8.5	110.40±3.00
SAP μL^{-1}	69.3±5.0	95.21±8.0	122.1±12.0	174.90±15.0	158.40±11.00	140.30±2.00
Serum total bilirubin (mg dL^{-1})	0.044±0.025	0.118±0.01	0.242±0.01	0.263±0.02	0.154±0.02	0.154±0.025
Serum total protein (mg dL^{-1})	7.93±0.05	7.28±0.4	6.30±0.8	0.154±0.02	5.67±0.80	5.23±0.80

Table 2: Effect of crude *Raphanus sativus* leaf powder (2 g kg^{-1} of b.w) on SGOT, SGPT, SLDH, SAP, serum total bilirubin and serum total protein in paracetamol (4 g kg^{-1} of b.w) induced rabbits (n = 5)

	Time (h)			
Parameters	Normal	6	12	24
SGOT μL^{-1}	8.60±0.36	7.60±0.87	7.00±1.05	8.80±0.86
		p>0.6	p>0.1	p>0.8
SGPT μL^{-1}	16.20±2.65	15.20±2.06	16.40±2.92	17.00±0.8
		p>0.8	p>0.8	p>0.8
SLDH μL^{-1}	293.53±17.17	404.62±30.60	408.42±37.13	384.6±68.57
		p<0.01	p<0.02	p>0.2
SAP μL^{-1}	386.0±94.23	367.56±79.85	394.00±58.88	394.12±80.55
		p>0.8	p>0.8	p>0.2
Serum total bilirubin (mg dL^{-1})	0.106±0.048	0.122±0.033	0.160±0.043	0.168±0.040
		p>0.6	p>0.4	p>0.2
Serum total protein (mg dL^{-1})	5.06±0.55	4.33±0.67	4.52±0.51	5.14±0.45
		p>0.2	p>0.4	p>0.8

Table 3: Effects of water extracts of the *Raphanus sativus* leaves (Equivalent to 2 g of crude drug kg^{-1} of b.w.) on SGOT, SGPT, SLDH, SAP, serum total bilirubin and serum total protein in paracetamol (4 g kg^{-1} of b.w.) induced rabbits (n = 5)

	Time (h)			
Parameters	Normal	6	12	24
SGOT μL^{-1}	6.80±1.41	6.40±0.77	5.40±0.46	6.00±0.63
		p>0.8	p>0.2	p>0.6
SGPT μL^{-1}	14.00±0.089	12.80±0.744	13.40±2.570	12.20±2.250
		p>0.2	p>0.6	p>0.2
SLDH μL^{-1}	211.00±13.11	197.00±12.44	162.00±7.195	141.15±9.33
		p>0.4	p<0.01	p<0.01
SAP μL^{-1}	287.60±37.38	323.90±22.18	267.22±36.43	270.02±32.80
		p>0.2	p>0.8	p>0.8
Serum total bilirubin (mg dL^{-1})	0.158±0.02	0.162±0.03	0.164±0.019	0.157±0.019
		p>0.8	p>0.8	p>0.8
Serum total protein (mg dL^{-1})	5.75±0.162	5.81±0.234	5.90±0.291	5.91±0.265
		p>0.8	p>0.6	p>0.6

Table 4: Effects of ethanol extracts of the *Raphanus sativus* leaves (Equivalent to 2 g of crude drug kg^{-1} of b.w.) on SGOT, SGPT, SLDH, SAP, serum total bilirubin and serum total protein in paracetamol (4 g kg^{-1} of b.w.) induced rabbits (n = 5)

	Time (h)			
Parameters	Normal	6	12	24
SGOT μL^{-1}	6.20±0.741	5.70±0.740	5.02±0.595	4.42±0.974
		p>0.6	p>0.2	p>0.1
SGPT μL^{-1}	16.50±1.470	14.80±0.719	15.00±1.345	14.32±0.931
		p>0.2	p>0.4	p>0.2
SLDH μL^{-1}	156.56±27.00	104.65±11.36	90.36±10.71	87.05±10.75
		p>0.1	p>0.05	p<0.02
SAP μL^{-1}	322.11±11.486	294.94±11.52	318.50±3.584	322.30±7.083
		p>0.1	p>0.6	p>0.8
Serum total bilirubin (mg dL^{-1})	0.155±0.024	0.145±0.022	0.088±0.179	0.074±0.013
		p>0.6	p>0.5	p>0.01
Serum total protein (mg dL^{-1})	5.78±0.059	5.91±0.053	6.03±0.034	5.79±0.264
		p>0.1	p<0.01	p>0.8

The lowering effect on SGPT activity was observed with water extract 12.80±0.744 μL^{-1} $p>0.2$ at 6 h post administration (Table 3). The lowering effect on SGPT activity was observed with ethanol extract 14.80±0.719 μL^{-1} $p>0.2$ at 6 h after the administration (Table 4).

Crude *Raphanus sativus* leaf powder increased the serum LDH activity in paracetamol induced rabbits. The maximum value was observed at 6 h 404.60±36.60 μL^{-1} $p<0.1$ (Table 2). The water and ethanol extracts declined the serum LDH activity in paracetamol induced rabbits.

The lowering effect on serum LDH activity was observed with water extract 197.00±12.44 μL^{-1} $p>0.4$ at 6 h post administration (Table 3).

The lowering effect on SLDH activity was observed with ethanol extract 104.65±11.36 μL^{-1} $p>0.1$ at 6 h post administration (Table 4).

Crude powder *Raphanus sativus* leaves produced insignificant effect on Serum AP in paracetamol induced rabbits. The maximum value was observed 394.00±58.88 μL^{-1} $p>0.8$ at 12 h post administration (Table 2). Water and ethanol extracts of *Raphanus sativus* declined the SAP activity in paracetamol induced rabbits. The maximum effect was observed with water extract 267.22±36.43 μL^{-1} $p>0.8$ (Table 3) at 12 h post administration. The maximum effect was observed with ethanol extract 294.94±11.52 μL^{-1} $p>0.1$ at 6 h interval (Table 4).

Crude powder and its water and ethanol extracts produced a blocking effect on paracetamol induced rise in serum total bilirubin. The maximum blocking effect was observed at 6 h.

The maximum effect observed with crude powder was 0.122±0.033 mg dL^{-1} $p>0.2$ (Table 2). The lowering effect on serum total bilirubin observed with water extract was 0.162±0.03 mg dL^{-1} $p>0.8$ (Table 3).

The lowering effect on serum total bilirubin with ethanol extract observed was 0.145±0.022 mg dL^{-1} $p>0.6$ (Table 4).

Raphanus sativus leaf powder, its water and ethanol extracts produced little effect on serum total protein in paracetamol induced rabbits (Table 2-4).

DISCUSSION

Paracetamol induced hepatic injury and the extent of hepatic damage is assessed by the level of serum transminas (GOT, GPT) serum bilirubin, serum LDH and serum AP in circulation.

Rephanus satives is used in daily life. The protective effect of *Rephanus satives* juice against paracetamol (Popovic *et al*., 1993) hepatotoxicity was investigated.

The study was conducted with the aim to know the hepatoprotective effects of *Rephanus satives* leaves to whom studies were not available. For this purpose, liver injury was induced in rabbits by giving hepatotoxic dose of paracetamol the liver injury was manifested by a rise in serum GOT, GPT, LDH, AP and bilirubin levels. The hepatoprotective effects of the *Rephanus satives* leaves powder, its water and ethanol extracts were studied by giving to the rabbits whom the values of serum transaminase, LDH, AP and serum total bilirubin had been raised by giving priority the different doses of paracetamol.

In all the experimental procedures *Rephanus satives* leaves powder, it water and ethanol extracts have shown almost competitive efficacy in terms of reducing the elevated transaminase, total bilirubin LDH and AP levels.

It was observed that ethanol extract was more effective in decreasing transaminase, LDH, AP and total bilirubin level than crude powder and its water extract. Furthermore the active components which produced marked reduction in the elevation of SGPT, SGOT, LDH, AP and serum total bilirubin are probably more alcohol extractable than water. The variability may be due to the reason that crude powder contains many compounds with different types and different on set of action.

REFERENCES

Gilani, A.H., K.H Janbaz and M.S. Akhtar, 1996. Selective protective effect of an extract from fumaria parviflora on peracetamol induced hepato-toxicity. Gen. Pharmacol., 27: 979-983.

Kritikar, R.K. and B.D. Basu, 1987. Indian Medicinal Plants. Vol. I. Ed. 2nd Edn., India: International Book Distributors, 9/B, Rajpur Road, Dehradum., 1: 178.

Popovic, M., V. Lukic, V. Jakovljevic and M. Mikov, 1993. The effect of the radish (*Raphnus sativus* SSP Niger) juice on liver function. Fitoterapia, 64: 229-231.

Rasheed, R.A., B.H. Ali and A.R. Basher, 1995. Effect of Teucium stocksianum on paracetamol induced hepatoxicity in mice. J. Pharmacol., 26: 297-301.

Wlodek, L. and H. Rommelspacher, 1997. 2-Methyl-thiazolidine-2, 4-dicarboxylic acid as prodrug of L-cysteine. Protection against paracetamol hepatoxicity in mice. Fundam. Clim. Pharmacol., 11: 454-459.