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ORIGINAL RESEARCH ARTICLE

Hepatoprotective Activity of *Brahmi ghrita*

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ABSTRACT

Brahmi Ghrita contains *Brahmi (Bacopa monneri), Vacha (Acorus calamus), Kushtha (Saussurea lappa), Shankhapushpi (Convolvulus pluricalis) and Purana Ghrita,* indicated for treatment of *Apasmar*a and *Graha* disorders. This Ghrita was used for evaluation of its Hepatoprotective activity. For this purpose, animals were obtained from animal house and only those animals were selected which have abnormal liver function test. These animals were divided in three groups A, B and C namely control, *Brahmi Ghrita* 400 and 800 mg/kg body weight treated groups. *Brahmi Ghrita* was administered orally for period of one month. After one month animals were scarified and biochemical parameters were studied. It was observed that total serum bilirubin was reduced from 1.47 to 0.5, 0.57 mg/dl, alkaline phosphate from 378.72 to 311.52, 83.27 unit/liter, serum glutamic-oxaloacetic transaminase from 123.67 to 83.33, 41.17 unit/liter and serum Glutamic Pyruvate Transaminase from 131.23 to 76.64, 52.5 unit/liter in dose dependent manner.

Key words: *Brahmi Ghrita*, Alkaline phoshphate, Bilirubin.

INTRODUCTION

The liver is vital organ of paramount importance involved in maintenance of metabolic functions, detoxification of exogenous and endogenous challenges like xenobiotics drugs, viral infections and chronic alcoholism [1]. Liver diseases are worldwide problem: conventional drugs used in the treatment of liver diseases are sometimes inadequate and can have serious adverse effect. Herbal medicine is in great demand in developed as well as developing countries for primary healthcare of their wide biological medicinal activities, higher safety.

Brahmi Ghrita contained *Brahmi (Bacopa monneri), Vacha (Acorus calamus), Kushtha (Saussurea lappa), Shankhapushpi (Convolvulus pluricalis) and Purana Ghrita* [2]. Brahmin, a chemical present in *Brahmi* is highly toxic in therapeutic doses it toxicity resembles with toxicity of strychnine. It also contain saponins, monnierin, hersaponin, bacosides A & B. Bacoside A & B possess haemolytic activity [3]. Crude extract of *Kushtha* shows moderate cytotoxicity in human tumour cell line. Besides these *Brahmi* is reported for antioxidant [4], hepatoprotective activity [5], *Kushtha* for anti inflammatory activity [6], anti-hepatitis B activity, *Vacha* and *Shankhapushpi* reported for increase acquisition [7], Sedative and Tranquilizing action [8] respectively. So in this study combined effect of all ingredients was studies on liver.

MATERIALS AND METHODS

Pharmaceutical study

Bacopa monneri (BG) was prepared as described in one of our earlier studies [9]. Briefly, it was prepared by adding paste of *B. monneri* (40% w/w), *A. calamus* (20% w/w), *C. pluricaulis* (20% w/w) and *S. lappa* (20% w/w) in freshly prepared 3 litres juice of *B. monneri* in stainless steel vessel having 750 ml clarified butter. *Brahmi* juice was prepared by cutting the whole *Brahmi* plants in to small pieces, and then crushed with end runner till paste was prepared, this paste was squeezed with clean cloth in this way juice of *Brahmi* was prepared. Above mixture was heated for 9 h and filtered after acquiring completion test (absence of sound when paste was put on fire, appearance of

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its own colour, smell and disappearance of forth). In this way, BG was prepared.

Animals

Eighteen Charles Foster rats of either sex weighing between 160 g and 180 g were used for experimental study. The animals were obtained from the Central Animal House, Institute of Medical Sciences, Banaras Hindu University, Varanasi. The animals were housed in polypropylene cages at an ambient temperature of 25°C ± 1°C and 45-55% relative humidity, with a 12:12 h light/dark cycle. Animals were provided with commercial food pellets and water *ad libitum* unless stated otherwise. They were acclimatized to laboratory conditions for at least 1 week before using them for the experiments. Principles of laboratory animal care (National Institute of Health publication number #85-23, revised in 1985) guidelines were always followed.

EXPERIMENTAL STUDY

Biochemical analysis was done for eighteen animals and only those animals were selected for experiment which have abnormal liver function test. In this way only eighteen animals were selected and divided in to three groups i.e. one control group and two *Brahmi Ghrita* treated groups receiving 400 & 800 mg/kg body weight of *Brahmi Ghrita*. In the control group, (first groups) no drugs were given only diet and water was provided. BG in a dose of 400 mg/kg body weight was administered once a day along with diet and water and in third group, BG in a dose of 800 mg/kg body weight was administered once a day along with diet and water for period of one month. After the period of one month biochemical analysis were repeated again.

Statistical Analysis

The data, expressed as Mean ± SD, were subjected to Kruskal-Wallis one way analysis of variance (ANOVA). Inter group comparisons were made by Mann-Whitney-U-test (two tailed) for only those responses, which yielded significant treatment effects in the ANOVA test. $P < 0.05$ was considered statistically significant.

RESULTS

There was no significant changes observed in haematological parameters, summarised in (**Table 2**)

Alkaline phosphate, serum glutamic-oxaloacetic transaminase, Serum Glutamic Pyruvate Transaminase, total and direct bilirubin were decreased significantly, summarised in (**Table 1**).

Table 1: Showing Biochemical analysis of control and treated rats

Group	Dose	Total Bli.	Bli.Direct	Bli.Ind.	SGOT	SGPT	A. Phasphate	Albu.
Control	-	1.47±0.08	1.27±0.12	0.20±0.09	123.67±3.33	131.23±1.79	378.72±7.81	9.02±1.55
BG	400	0.5±0.18	0.2±0.09	0.3±0.09	87.33±3.61**	76.64±7.77***	311.52±2.52***	8.98±1.21
BG	800	0.57±0.16	0.4±0.17	0.2±0.09	44.17±2.32***,##	52.5±2.51***,##	83.27±4.03***,###	8.67±0.97

BG- *Brahmi Ghrita*, n= Six animals in each group, SGOT: serum glutamic-oxaloacetic transaminase, SGPT: Serum Glutamic Pyruvate Transaminase, A. Phosphate: Alkaline phosphate Values are Mean ± SD, ***p<0.001 compared to control, ##p<0.01, ###p<0.001 compared to BG 400 group

Table 2: Showing haematological parameters of control and treated rats

Group	Dose (mg/kg)	Haemoglobin mg/dl	TLC (X 10^3/µl)	Neutrophil	Lymphocyte	Eosinophil	Monocyte	Basophil
Control		15.23±0.94	7.02±0.61	34.83±4.31	61.5±5.24	1.5±0.55	1±0.00	0.33±0.52
BG	400	13.95±1.13	7.12±0.52	31.83±6.21	65.67±6.47	0.83±0.41	1±0.00	0.00±0.00
BG	800	14.02±1.47	7.07±0.55	30.17±4.26	68.50±4.04	1.33±0.52	1.17±0.41	0.00±0.00

BG: Brahmi Ghrita, n: six animals in each group , Values are Mean ±SD, Hb : Haemoglobin

DISCUSSION

Liver has to perform different kinds of biochemical, synthetic and excretory functions, so no single biochemical test can detect the global functions of liver. All laboratories usually employ a battery of tests for initial detection and management of liver diseases and these tests are frequently termed "Liver function tests" [10]. It includes bilirubin, aminotransferase, alkaline phosphate, albumin and globulin. Abnormalities in liver function tests (LFTs) are elevated levels of static biochemical tests, including aspartate aminotransferase (AST) (formerly serum glutamic-oxaloacetic transaminase-SGOT), alanine aminotransferase (ALT) (formerly serum glutamate pyruvate transaminase-SGPT), alkaline phosphatase, bilirubin, and albumin. Among them, bilirubin is formed by haemolysis of red blood cells. Once formed, bilirubin is transported to the liver bound to albumin as it is water insoluble. This fraction of bilirubin is referred to as indirect or unconjugated bilirubin. In the liver bilirubin is conjugated to glucoronic acid (mono and di glucuronides) to form conjugated bilirubin by the enzyme uridyl diphosphate glucuronyl

transferase. Total bilirubin is the sum of the unconjugated and conjugated fractions. In obstruction of the bile duct, hepatitis, cirrhosis, in haemolytic disorders and several inherited enzyme deficiencies total bilirubin is increased, and elevated conjugated bilirubin is increased in obstructive & hepatocellular disorders like cirrhosis, hepatitis, will also as a result in elevated total bilirubin as well as direct bilirubin. *Brahmi Ghrita* treated rats decrease the total as well as conjugated serum bilirubin when compared to control group animals. The aminotransferase (formerly transaminase) are the most specific indicators of hepatocellular necrosis; these are SGOT (it is already mentioned earlier) and ALT. These enzymes are involved in amino acid metabolism and serum level these enzyme are sensitive indicators of liver cell injury [11]. ALT is found in cytosol whereas AST activity is highest in the mitochondria. The AST and ALT levels are increased to some extent in almost all liver disease but moderately elevated in acute hepatitis, neonatal hepatitis, chronic hepatitis, autoimmune hepatitis, drug induced hepatitis. Normally serum alkaline phosphate is derived mainly from the liver and skeleton, although other organs, including the intestine, contribute. Approximately 90% of the alkaline phosphatase activity within the liver was found in the microsomal and cell membrane fractions [12]. Elevated serum levels of alkaline phosphatase have been found may be associated specifically with intra hepatic disease as opposed to extra hepatic obstruction. It was observed that *Brahmi Ghrita* (400 mg/kg body weight) treated rats showed significantly decreased in values of AST, ALT and alkaline phosphate as compared to control group and BG (800 mg/kg body weight) treated rats showed significantly decreased AST, ALT and alkaline phosphate as compared to control group as well as BG (400 mg/kg) treated rats. *Brahmi Ghrita* was prepared with *Brahmi (Bacopa monneri), Vacha (Acorus calamus), Kushtha (Saussurea lappa), Shankhapushpi (Convolvulus pluricalis) and Purana Ghrita.* Among them *Brahmi* has maximum percentage so that properties of *Brahmi Ghrita* is mainly dependent on property of *Brahmi*. Ethanolic extract of *Brahmi* has significant amount of phenolic compound, which possessing antioxidant activity. It also has significant superoxide radical scavenging activity, which ultimately adds to its antioxidant potential. Besides this ethanolic extract of *B. monnieri* caused significant inhibition of SGOT and SGPT levels. Serum ALP and bilirubin levels on the other hand, are related to the function of hepatic cell. Increase in serum level of ALP is due to increased synthesis, in presence of increasing biliary pressure. *Brahmi* contains large amounts of saponins it may be suspected that the hepatoprotective activity may be due to the presence of saponins in the extract. The activity may be attributed to their protective action on lipid per oxidation and at the same time the enhancing effects on cellular antioxidant defence contributing to the protection against oxidative damage [13]. *Acorus calomus* confer the hepatoprotective and anti oxidant activities by biochemical and pathological observations against acetaminophen induced liver injury in rats [14]. Two active components,i.e. costunolide and dehydrocos- tus lactone of *Saussurea lappa* showed strong suppressive effect on the expression of the hepatitis B surface antigen (HBsAg) [15]. *Saussurea lappa* also have anti inflammatory activity [6]. Among the ingredients of *Brahmi Ghrita*, *Brahmi* have antioxidant, hepatoprotective, and anti-inflammatory. It may be possible that this *Ghrita* showed Hepatoprotective, anti-inflammatory and antioxidant action of *Acorus, Saussurea* may enhance Hepatoprotective action of *Brahmi.*

CONCLUSION

Brahmi Ghrita significantly decreases the serum level of aminotransferase, alkaline phosphate, bilirubin in dose dependent manner. It is use as hepatoprotective agent.

REFERENCE

1. Dienstag JL, Isselbacher KJ. Toxic and dru g-induced hepatitis, Harrison's Principles of Internal Medicine. 2001; 2:737-42.
2. Shastri G. *Charaka Samhita with* Vidhyotani Hindi commentary *Chikitsa Sthana* 9/60. Reprint ed. Varanasi: Chaukhambha Bharti Academy; 2004. p. 321.
3. Khare CP. Indian Medicinal Plants An Illustrated Dictionary Springer Pvt. Limited 1997. p. 77.
4. Tripathi YB, Chaurasia S, Tripathi E, Upadhyay A, Dubey GP. *Bacopa monneri* Linn. as an antioxidant: Mechanism of action. Indian J Exp Biol 1996; 34:523-6.
5. Sumathy T, Subramanian S, Govindasamy S, Balakrishna K, Veluchamy G. Protective role of *Bacopa monneri* on

morphine induced hepatotoxicity in rats. Phytother Res 2001; 15:643-5.
6. Cho JY, Baik KU, Jung JH, Park MH. *In vitro* anti-inflammatory effects of cynaropicrin, a sesquiterpene lactone, from *Saussurea lappa*. Eur J Pharmacol 2000; 398:399-7.
7. Khare CP. Indian Medicinal Plants An Illustrated Dictionary Springer Pvt. Limited 1997. p. 170.
8. Yoshikawa M, Hatakeyama S, Inoue Y, Yamahara J. Saussureamines A,B,C.D and E, new antiulcer principles from Chinese saussurea radix. Chem Pharm Bull 1993; 41:214.
9. Yadav KD, Reddy KR. Standardization of *Brahmi Ghrita* with special reference to its pharmaceutical study. International Journal of Ayurvedic Medicine 2012;3:16-21.
10. Thapa BR, Walia A. Liver function test and their interpretation. Indian Journal of Pediatrics 2007; 74: 663-7.
11. Pratt DS, Kaplan MM. Evaluation of abnormal liver-enzyme results in asymptomatic patients. New England Journal of Medicine 2000; 342:1266–71.
12. Tirtha G, Tapan KM, Mrinmay D, Anindya B, Deepak KD. In Antioxidant and Hepatoprotective Activity of Vitro Ethanolic Extract of Linn. Aerial *Bacopa monnieri*: Areial parts, IJPT 2007; 6:77-85.
13. Palani S, Raja S , Kumar RP, Venkadesan D, Devi K, Sivaraj A, Kumar BS. Therapeutic efficacy of Anti hepatotoxic and anti antioxidant *Acorus* calamusactivities of on acetaminophen induced toxicity in rat, Int. J. Int. Biol. 2009; 7: 39-44.
14. Chen HC, Chou CK, Lee SD, Wang JC, Yeh SF. Active- *Saussurea lappa* compounds from clarke that sup- press hepatitis B virus surface antigen gene expres- sion inhuman hepatoma cells. Antiviral Reseach1995; 27: 99-09.