Biochemical Effects Of B-Success (A Nigerian Herbal Remedy) On Liver And Heart Of Albino Rats

P Agbasi, O Orisakwe, E Obi, C Ilo

Citation

P Agbasi, O Orisakwe, E Obi, C Ilo. *Biochemical Effects Of B-Success (A Nigerian Herbal Remedy) On Liver And Heart Of Albino Rats*. The Internet Journal of Herbal and Plant Medicine. 2012 Volume 1 Number 2.

Abstract

Introduction: Although Nigerian herbal practitioners have shown some improvements in the standardization of doses and dosages, many herbal supplements have poor toxicological assessment to ensure human safety. A toxicological assessment of B-Success herbal supplement commonly used in Nigeria was carried out on liver, heart and kidney of adult albino rats. Method: Twenty albino rats divided into four groups of five rats each were used. Twenty male rats were divided into four dose groups of five rats each namely 0.00, 315,630, 945mg/kg/day (representing 0, 25, 50 and 75% of the LD_{50} of B-Success herbal supplement) orally for 90 days. Animals had access to deionized water and were fed ad libitum with rat chow for 90 days. The feed and fluid consumption of the animals were measured on daily basis while the body weight was measured weekly. Animals were anaesthetized after 90 days, bled and bilirubin, creatinine, high density lipoprotein cholesterol (HDL),low density lipoprotein (LDL), alanin transaminase (ALT), and aspartate transaminase (AST) were measured.Result: The alanin transaminase (ALT), aspartate transaminase (AST) and urea of 630, 945 mg/kg/day dose groups were significantly increased compared to control. While only the creatinine value of 945mg/kg/day dose group was significantly increased compared to control $p<0.05$. The creatinine, ALT and AST levels in 945 mg/kg/day group were dose dependently increased $p<0.05$ compared to lower dose treatment groups of 315 and 630 mg/kg/day. B-Success did not significantly increase ($p>0.05$) the bilirubin levels compared to control. The total cholesterol, high density lipoprotein (HDL) cholesterol of all the B-Success treated groups were significantly increased $p<0.05$ compared to control. The low density lipoprotein (LDL) cholesterol values of 630, 945mg/kg/day groups were significantly decreased $p<0.05$ compared to control.Conclusion: Taken together B-Success may be toxic to liver and kidney and protective to heart in albino rats at the doses studied.

INTRODUCTION

The use of traditional and alternative medicine has increased worldwide[1]. Also the rate of herbal remedies use has risen astronomically in the third world mainly due to poverty and affordability of the regimen. In Nigeria, the traditional herbal medicine practitioners have strong government recognized association with strong lobbying power and patronage. They engage in regular trade fair exhibitions in various cities to showcase their herbal remedies most of which are registered by a federal government agency; National Agency for Food, Drug Administration and Control (NAFDAC). The herbal and traditional methods in Nigeria have reasonable level of success in the area of malaria therapy, traditional child birth, bone setting among others, although largely unreported.

Although Nigerian herbal practitioners have shown some improvements in the standardization of doses and dosages, many herbal supplements have poor toxicological assessment to ensure human safety. This forms a major drawback in their use. Many investigators have reported detrimental toxicological implications of consuming some of these supplements[1-3]. In view of all these, we set out to investigate the effects of B-Success on the liver, kidney and heart of albino rats.

METHODOLOGY

Preparation of the extract of B-Success herbal supplement as described from a previous study[4] was used. About 400g of the powered herbal supplements were macerated in one litre of ethanol for 24 hours. The filtrate obtained after passing over Whatman 4 cellulose filter paper, pore size 20-25□m and diameter 15cm, was concentrated with a vacuum evaporator for 8 hours. 72g of the dried solid extract were recovered and water was used as the vehicle to prepare the required concentrations used in the study. Phytochemical studies were done using the extract described above[5].

ANIMAL STUDY

Animals:Adult male albino rats (165-250g) were supplied by the Animal Facility Centre of the Department of Pharmacognosy University of Nigeria, Nsukka. The animals were fed ad libitum with deionised water and standard rat chow (Pfizer Pharmaceuticals Plc, Ikeja Nigeria).

SUBCHRONIC TOXICITY STUDY

Twenty adult albino rats were allocated to four dose groups of five (5) rats each. The first group received 315mg/kg (25% of the LD_{50}), second group 630mg/kg (50% of the LD_{50}), and third group 945mg/kg (75% of LD_{50}) of the B-Success herbal supplement by oral gavage for 90 days. Doses were chosen based on previous LD_{50} determination using a modification of Lorke method[6] and correspond to doses commonly used by the people. The control group received no herbal drug but had access to deionized water and were fed ad libitum with rat chow for 90 days. The feed and fluid consumption of the animals were measured on daily basis while the body weight was measured weekly. Animals were anaesthetized after 90 days, bled and bilirubin , creatinine, high density lipoprotein cholesterol (HDL), low density lipoprotein (LDL), alanin transaminase (ALT), and aspartate transaminase (AST) were measured.

STATISTICS ANALYSIS

Values were reported as mean ± SEM. Students t-test was used to analyze the difference between sample means while Analyses of Variance (ANOVA) was employed to analyze the data using computer software programme, Standard Package for Social Sciences (SPSS) version 11; Chicago, IL USA. P<0.05 was considered as significant.

RESULTS

PHYTOCHEMICAL ANALYSIS

Phytochemical analysis showed saponins, flavonoids, glycoside, and terpenoids.

BODY WEIGHT AND BIOCHEMICAL ANALYSIS

Feed , fluid intake and body weight changes of albino rats treated with the extract of B-Success for 90 days are shown on Table 1. Fluid intake was significantly increased in the 315 mg/kg B-Success group. Administration of B-Success supplements (630 and 945 mg/kg) significantly affected the weight gain of the albino rats.

Table 2 shows Alanin transaminase (ALT) and Aspartate transaminase (AST) level of 630 and 945 mg/kg groups being significantly increased p<0.05 compared to control. The ALT and AST values of the highest dose group were dose dependently increased compared to other test groups. The bilirubin values in all the test groups did not significantly increase compared to control. The urea value of 630 and 945 mg/kg groups were significantly (p<0.05) increased compared to control. Only the creatinine value of 945 mg/kg group was significantly increased p<0.05 compared to control

Table 3 presented total cholesterol and high density lipoprotein cholesterol (HDL) of 630 and 945 mg/kg groups to be dose dependently increased p<0.05 compared to control. Low density lipoprotein (LDL) cholesterol of 630 and 945 mg/kg groups were significantly decreased compared to control.

Figure 1

Table1: Intake (feed and fluid) and body weight changes of albino rats treated with the extract of B-Success for 90 days.

Dose (mg/kg/day)	Feed (g/day/group)	Fluid (ml/day/group)	Initial body weight (g)	Final body weight (g)	% weight gain
0.00[a]	118.15± 27.98	172.97 ± 32.39	159.08 ± 8.4	231.56 ±9.36	42.1±4.1
315	119.14 ± 29.16	207.46 ± 33.19*	164.9 ±6.1	245.80 ± 13.47	49.0 ± 3.8[$]
630	118.32 ± 31.57	240.74 ± 25.798	168.8 ± 11.3	231.78 ± 3.57	39.8 ± 4.1
945	121.96 ± 27.60	199.31 ± 39.59	196.02±19.2	256.66 ± 11.66	26.06±8.01

Values expressed as mean ± SEM n=5
* Statistically significant difference from the control p≤ 0.05

[$] Significantly increased compared to945 mg/Kg group (p < 0.05)

Figure 2

Table 2 Effect of B-Success on liver and kidney biochemical parameters of albino rats

Treatment groups	ALT	AST	T. Bilirubin	Urea	Creatinine
Control	108.6 ± 5.4	44.4 ± 0.14	1.5±4.1	68.2±9.4	0.55 ± 1.7
315 mg/kg	130.2 ±9.4	46.7 ± 1.4	1.6 ±5.9	71.8 ± 1.6	0.61±1.5
630 mg/kg	150 ± 0.3*	4 9.3 ± 0.16+*	1.6 ± 9.0	75.7 ± 0.2*	0.63±1.5
945 mg/kg	190±0.2*#	63.3±0.15*#	1.7±8.	80.1±9.8*+	0.73±9.4*#

* Significantly increased compared to control (p < 0.05)
# Dose dependently increased compared to group 2and 3(p>0.05)
+ Dose dependently increased compared to group 2(p>0.05)
Values expressed as mean ± SEM n=5

Figure 3

Table 3: Effect of B-Success on lipid biochemical parameters of albino rats

Treatment groups	T.chol.	HDL chol.	LDL chol.
Control	100.36 ± 0.19	48.8 ± 0.18	38.4±0.10
315 mg/kg	100.7 ±0.3	48.7 ± 0.2	38.18 ±9.7
630 mg/kg	102.8 ± 0.10*	60.42 ± 0.19*	30.14 ± 9.7*
945 mg/kg	109.8±0.14*	64.3±0.13*	29.5±0.18*#

* Significantly increased compared to control ($p < 0.05$)
# Dose dependently increased compared to group 2and 3($p>0.05$)
Values expressed as mean ± SEM n=5

DISCUSSION

The present investigation was primarily undertaken to delineate the hepatic, nephrotic and cardiac effects of B-Success herbal supplement. Alanin transaminase (ALT) and Aspartate transaminase (AST) of B-Success treated rats were significantly increased. It is well known that liver enzymes are usually raised in acute hepatotoxicity but tend to decrease with prolonged intoxication due to damage to hepatocytes[7]. Increase in liver enzymes may be as a result of either damage or hyperplasia of liver cells. Boku et al 2008 [8] reported increased bilirubin and amino-transaminase enzymes in cat after nimesulide a non steroidal anti-inflammatory drug (NSAID) administration which later returned to normal after drug withdrawal. Nutritional supplements like herbalife caused hepatitis and cirrhosis[9]. Green tea has been shown to induce oxidative stress in human livers[10]. Even Kava plant extract in Kava herbal mixture was reported to have caused liver failure in people taking them[11].

The percentage weight gain of medium and high dose treatment groups were dose dependently reduced although not significant compared to control but the high dose group was significantly decreased compared to those of low dose category. Overall, the percentage weight gain of low dose group was not significantly higher than control and medium dose treatment group except the high dose group. This shows that B-Success at low dose caused increased feeding and weight gain and this had dose dependent reversal effect as the drug dose increased and this is also followed with increased toxicity. The amino-transaminases of low dose group were not significantly elevated. B-Success at low dosage increased appetite and feeding which decreases as dose size increases as demonstrated by percentage weight gain.The urea of medium and high groups and the high dose group's creatinine were dose dependently increased compared to control. B-Success caused dose dependent increase in the urea and creatinine levels. Increased urea and creatinine levels are known to result from or caused by kidney failure. Some natural substances from plants are known to be deleterious to the kidney. Aristolochic acid from roots of Aristolochia tree of Chinese origin contained in many preparations example slimming pills caused chronic renal failure in humans and has even been shown to be carcinogenic to the kidney tissues[12]. Apart from liver that is known to be involved in biotransformation, kidney has also been shown to be in involved in biotransformation or metabolism of exogenous substances[13] and in this way can be damaged by chemicals it is trying to detoxify. Also damage or block of renal tubules during filtration and reabsorption process (normal kidney function) can also cause kidney failure and subsequent retention of substances like urea and creatinine. Further studies will be needed to determine the mechanism of toxicity of kidney by B-Success. Equally, Tribulus terrestris plant extract used to treat and prevent kidney stone caused increased transaminases and creatinine elevation[14]. Another Nigerian herbal remedy called U and D sweet bitter caused dose dependent creatinine increase in chronic administration[15].

B-Success in this study produced decreased LDL and increased HDL cholesterol which is beneficial to the heart and circulatory system. Flavonoids one of phytoconstituent of B-Success, are a group of natural compounds widely present in vegetables, fruits and edible plants that possess potent biological activities. Dietary intake of flavonoids is suggested to prevent and lower the risk of chronic diseases[16]

References

1. Ang H H. and Lee KL Analysis of mercury in Malaysia herbal preparations. A Peer- review, Journal of Biomedical Sciences 2005;4(1):31-36.
2. Orisakwe OE., Debem HC., Etuk EU and Elsa AT. Sparmatoxic effects of operation sweep supplement in male albino rats. J of Basic and Clinical Physiology and Pharmacology 2010; 21(2): 147-156.
3. Dioka C., Orisakwe OE., Afonne OJ., Agbasi PU., Akumka DD., Okonkwo CJ., Ilondu N. Investigation into the haematologic and hepatotoxic effects rinbacin rats. J Health Science 2002;48(5):393-398.
4. Obi E., Akunyili DN., Ekpo BO., Orisakwe OE. Heavy metals hazards of Nigerian Herbal Remedies. Science Total Environ. 2006; 369(1-3): 35-41.
5. Trease GE and Evans W.C.Pharmacognosy12th edition.

1983. Balliere-Tindall. London. 241-260.
6. Lorke, D A new approach to practical acute toxicity testing Archives of Toxicology, 1983; 54, 275-287.
7. Cornelius. CE. Biomedical evaluation of hepatic function in dogs. Journal American.Hospital. Association. 1979;15: 25-29
8. Boku MK., Guzel M., Karakurum MC., Ural K., Aktas S. Nimesulide-induced acute biliary tract injury and renal failure in a kitten: a case report.Veterinarni medicine 2008;3:169-172
9. Stickel F., Droz S., Patsenker E., Bogi-Stuber K., Aebi., Leib S L. Long term nutritional supplement (herbalife) consumption caused hepatitis and cirrhosis. Journal Hepatology 2009; 50(1):111.
10. Mazzanti G., Menniti-Ippolito F., Moro P.A., Cassetti F., Raschetti R, Santuccio C, Mastrangelo S. Hepatotoxicity from green tea: a review of the literature and two unpublished cases. European Journal Clinical Pharmacology 2009;65(4);331.
11. Tescke R., Genthner A., Wolff A. Kava hepatotoxicity: Comparism of aqueous, acetonic extracts and Kava-herbal mixtures. Journal Enthnopharmacol 2009;123 (3):378.
12. Grollman AP., Chen C., Moriga M., Dickman K., Wu L., Mihalyne G., Edwards KL., Snappina K., Pu Y. Aristolochic acid nephropathy in Taiwan: Harbinger of global iatrogenic disease. Journal Clinical Oncology 2011; 29: (suppl. Abstract 1592)
13. Alexander, KN., Ginny, LK and Peter JH. Cytochrome P450 metabolism and nephrotoxicity of N-(3,5-Dichlorophenyl) succinamide in fischer 344 rats. Fundamental and Applied Toxicology 1997;37:117-124.
14. Azita HT., Mohammad-Reza A., Saeed A., Sumni D. Tribulus terrestis-induced several nephrotoxicity in young healthy male. Nephrology. Dialysis. Transplant 2010;25(11): 3792 - 3793.
15. Ezejiofor NA., Maduagwuna N., Igwebuike OV., Hussaini DC., Orisakwe OE. Nephrotoxicity effects of aqueous extract of U and D Sweet-bitter(A Ngerian herbal remedy) in male albino rats. Journal Basic and Clinical Physiology and Pharmacology 2008;19(2):151-158.
16. Pan M H, Lai C S and Ho C T. Anti-inflammatory activity of natural dietary flavonoids Food Function., 2010, 1, 15–31

Author Information

P.U. Agbasi

O.E Orisakwe
Department of Prosthesis and Orthopaedic Technology, School of Health Technology, Federal University of Technology

E Obi
Department of Pharmacology, College of Medicine, Nnamdi Azikiwe University

C.E Ilo
Department of Pharmacology, College of Medicine, Nnamdi Azikiwe University