Journal of Biological Sciences and Bioconservation
Volume 5, Number 2, 2013
ISSN: 2277-0143

Invivo Effect of Co-trimoxazole on Plasma Aminotransferase (AST) (EC 2.6.1.1) and Alanine Aminotransferase (ALT) (EC. 2.6.1.2) Activity of Wistar Albino Rat

Nwachoko, N. and Laya, R.O.
Chemistry Department (Biochemistry Option)
Rivers State University of Science and Technology, Port Harcourt, Nigeria.
E-mail: blessedconfidence@yahoo.com

ABSTRACT

The assay of plasma alanine aminotransaminase (ALT) and aspartate aminotransaminase (AST) are known to be useful in assessing the functional integrity of the liver. Thus, this investigation considered possible invivo effect of septrin on plasma aspartate aminotransferase (AST) and alanine aminotransferase (ALT) of wistar albino rat. The rates were divided into five groups (control group and experimental groups). The experimental groups were administered with serially diluted co-trimoxazole at different concentration (0.1, 0.3, 0.5, and 1.0) mg/ml. Blood samples were collected on day four and day eight for analysis. Values of AST and ALT were measured using LAB-TECH colorimeter. From the result, the mean values of AST after day 4 of administration were (36.00, 49.50, 59.00, 63.00, 63.00) U/l and after day 8 (44.00, 49.50, 53.00, 76.00, 76.00) U/l for group A, B, C, D and E respectively. Also the mean values of ALT after day 4 of administration were (12.00, 6.00, 8.00, 6.00, 12.50) U/l and after day 8 (12.00, 10.00, 4.00, 14.50, 10.00) U/l for group A, B, C, D, and E respectively. The result showed that values of AST of the experimental rats had significant increment ($P > 0.05$) Compare to that of control group. ALT activity in the blood sample of the experimental rats had no significant different when compared to that of control group.

Keywords: Alanine Aminotransaminase, Aspartate Aminotransferase and Co-trimoxazole.

INTRODUCTION

Co-trimoxazole (Septrin) is a sulfonamide antibiotic combination of trimethoprim and sulfamethoxazole in the ratio of 1:5 used in the treatment of variety of the bacteria infections. Co-trimoxazole was claimed to be more effective than either of its components individually in treating bacteria

infection (Disen *et al;* 2008). Co-trimoxazole interferes with the estimation of serum/plasma creatinine. This may result in over estimation of serum/plasma creatinine (Harmatz *et al;* 1991*;* ACBLM).

Septrin in an antibacterial drugs composed of two active component of trimethoprim and sulfamethoxazole. Sulfamethoxazole in a competitive inhibition of dihydropteroate synthetase enzyme. Sulfamethoxazole competitively inhibits the utilization of para-aminobenzoic acid (PABA) in the synthesis of dihydrofolate by the bacteria cell resulting in bacteriostasis. Trimethoprim binds to and reversibly inhibits bacterial dihydrofolate reductase (DHFR) and blocks the production of tetrahydrofolate, thus trimethoprim and sulfamethoxazole blocks two consecutive steps in the biosynthesis of purines and therefore nucleic acid essential to many bacteria (Ulker *et al; 2009;* Brumfit and Hamilton-Miller, 1994).

Aspartate Aminotransferase (AST) is an enzyme involved in the transfer of an amino group from aspartate to ∝ – Ketoglutarate. AST is present in most organs. The highest concentrations listed in descending order, are found in liver, heart, skeletal muscle, kidney, brain, pancreas, lung, leucocytes and erythrocytes. Because of its wide tissue distribution, elevated AST levels have low specificity for any single disease. AST activities in liver are 7000x higher than that of serum activities. Historically, AST has been used clinically to diagnose hepatitis, myocardial infarction and skeletal muscle disease. AST increases in the absence of ALT increase indication cardiac or skeletal muscle disease (Horder, and Rej, 1983). ALT is a better indicator of liver disease, because of us more limited tissue distribution (*Horder*, and Rej, 1983; Ogunka-Nnoka *et al*; 2012).

Alanine transminase or ALT is a transaminase enzyme also called serum glutamic-pyruvic transaminase (SGPT) or alanine aminotransferase (ALAT). It is found in plasma and in various bodily tissues, but most commonly and predominantly associated with the liver. It catalyzes the two parts of the alanine cycle. It catalyzes the transfer of an amino group from L-alanine to x-kelogluterate, the products of this reversible transmination reaction are pyruvate and L-glutamate. ALT (and all transaminases) requires the coenzyme pyridoxal phosphate, which is converted into pyridoxal amine in the first phase of the reaction, when an amino acid is converted into a keto acid (*Horder*, and Rej, 1983).

METHODOLOGY

Animal Collection

Twenty (20) wistar albino rats were collected from Biochemistry Department Animal House, University of Port-Harcourt. Blood samples were collected after four and eight days of administration of the septrin solution.

Sample Preparation

A stock solution of 480mg of septrin and 100ml of distilled water was prepared by dissolving the drug in 100ml of distilled water. This was followed by serial dilution of the stock solution with distilled water as shown below.

Concentration (mg/ml)	Volume of Stock Solution (ml)	Volume of Distilled Water (ml)
0.00	0.0	20
0.1	2.0	18
0.3	6.0	14
0.5	10.0	10
1.0	20.0	0

Grouping:

Group A, rats administered with 0.00 (control group),
B = 0.1,
C = 0.3,
D = 0.5 and
E = 1.0 all in mg/ml.

AST and ALT values were determine according to Reitman & Frankel, 1957).

RESULTS

The result of the invivo effect of co-trimoxazole (Septrin) on plasma aspartate aminotransferase and alanine aminotransferase values are presented below.

Table 1: Day Four AST and ALT Values

Groups	AST (U/L)	ALT (U/L)
A	36.00 ± 0	12.00 ± 0
B	49.50 ± 6	6.00 ± 4
C	59.00 ± 0	8.00 ± 0
D	63.00 ± 16	6.00 ± 4
E	63.00 ± 16	12.50 ± 20

The above table showed the result of mean values ± STD for AST and ALT after 4 days of administration.

Table 2: Day Eight AST and ALT Values

Groups	AST (U/L)	ALT (U/L)
A	44.00 ±6	12.00 ± 0
B	49.50 ± 39	10.00 ±4
C	76.00 ± 0	4.00 ± 0
D	76.00 ± 0	14.50 ± 6
E	76.00 ± 0	10.00 ± 4

The above table showed the result of AST and ALT means values ± STD after eight days of administration.

Table 3: Day Four and Eight Values of AST

Groups	Day 4 (U/L)	Day 8 (U/L)
A	36.00 ± 0	44.00 ± 6
B	49.00 ± 6	59.50 ± 39
C	59.00 ± 0	53.00 ± 36
D	63.00 ± 16	76.00 ±0
E	63.00 ± 16	76.00 ± 0

The above table showed the AST values for both day four and eight.

Table 4: Day Four and Eight Values of ALT

Groups	Day 4 (U/L)	Day 8 (U/L)
A	12.00 ± 0	12.00±0
B	6.00 ± 4	10.00 ± 4
C	8.00 ± 0	4.00 ± 0
D	6 . 00 ± 4	14.50 ± 4
E	12.50 ± 20	10.00 ± 4

The above table showed the ALT values for both day four and eight.

DISCUSSION

From the result, table 1 showed the mean value obtained for both AST and ALT after day 4 of septrin administration to the wistar albino rats. Table 2 showed the mean values obtained after day 8 of septrin administration to the wistar albino rat ± STD for both AST and ALT. Following the sequence, table 3 is the result comparing the mean values ± STD obtained for plasma AST of day 4 and day 8 of septrin administration. The result from the table showed a significant increase in the mean values of plasma AST in the experimental groups (B, C, D

and E) ($P > 0.05$) when compared with the mean value of plasma AST in the control group (A).

Table 4 is the result comparing the value of plasma ALT for both day 4 and 8. From the result, meaningful conclusion cannot be drawn since the mean result values had no uniformity in either ascending or descending order.

ACKNOWLEDGMENT
Authors are grateful to God Almighty.

REFERENCES

Association of Clinical Biochemistry and Laboratory Medicine (ACBLM): "Alanine Amino Transferase; Analyte Monograph" *Retrieved* 23 June 2013.

Brumfit, W. and Hamilton –Miller, J.N. (1994). Limitations and Indications for the Use of Co-trimoxazole. *Chemother* 6(1): 3-11.

Disen, D.L, Hess, D.T. and Stamter J.S. (2008). Hypoxic Vasodilation by Red Blood Cell; Evidence for an S-Nitroso-Thiol-Blood Signal. *Circulation Research* 103 (5): 543-53.

Harmatz J.S, Grecnblatt D.S, Shader R.I. (1991). Clinical Pharmacokinetics of Anxiolytics and Hypnotics in the Elderly, *Clin. Phaemokinet* 21:65.

Horder, M and Rej, R. (1983). Aspartate Amino Transferase in Methods of Enzymatic Analysis 3rd Ed. Hu Bergmeyer, J.

Indian Journal of Drugs and Diseases 1(3) 74-78.

Ogunka-Nnoka C.U, Uwakwe A.A. and Nwachoko N.C. (2012). Serum Enzyme and Histological Studies of Albino Rat Treated with Ethanol/Potash Extract of *Sorghum Bicolor* Leaf Sheath.

Ulker, P. Sati, L. Celik-Ozenic, Meiselman, H.J. and Baskurt, O.K. (2009). Mechanical Stimulation of Nitric Oxide Synthesizing Mechanism in Erythrocytes*. Biology 46 (20): 121-32.*

Reference to this paper should be made as follows: Nwachoko, N. and Laya, R.O. (2013), Invivo Effect of Co-trimoxazole on Plasma Aminotransferase (AST) (EC 2.6.1.1) and Alanine Aminotransferase (ALT) (EC. 2.6.1.2) Activity of Wistar Albino Rat. *J. of Biological Science and Bioconservation,* Vol.5, No.2, Pp. 107 – 112.