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Levels of AST and ALT in Wistar Rats Treated With Heavy Metals Released from Atamonia and Pepsi Cans (=Tins=) as Cooking Pots during Feeding

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Abstract

Background: This study was done to estimate the serum levels of ALT and AST.

Methods: Ninety adult males Wistar rats weighting about (160-220 gram each) were taken for the study. Serum ALT and AST levels were assessed by BioSystem, S.A, Costa Brava 30, Barcelona. Spain2011).

Results: On comparison of the controls and treated rats levels in serum samples, it was found that the difference was statistically significant. Conclusion: In the present study, Heavy metals from cooking pots made out of Atmonia & Pepsi cans such as Lead, copper, Aluminum, Ferrous and Arsenate give a significance increase ($P \leq 0.01$) in levels of ALT and AST.

Keywords: Heavy metals from cooking pots released from Atmonia & Pepsi cans; wistar rats and ALT and AST

Introduction

Heavy metals are natural constituents of the earth's crust, but in discriminate human activities have drastically altered their geochemical cycles and biochemical balance [1]. This results in accumulation of metals in plant parts having secondary metabolites, which is responsible for a particular pharmacological activity, prolonged exposure to heavy metals such as cadmium, copper, lead, nickel, and zinc can cause deleterious health effects in humans, molecular understanding of plant metal accumulation has numerous biotechnological implications also, the long term effects of which might not be yet known [2]. Ferner [3] stated that if unrecognized or inappropriately treated, toxicity can result in significant illness and reduced quality of life so It is important to take protective measures against excessive exposure to heavy metals. Roberts [4] reported that heavy metals might enter the human body through food, water, air, or absorption through the skin when they are exposed to humans in agriculture and in manufacturing, pharmaceutical, industrial, or residential settings. Industrial exposure accounts for a common route of exposure for adults and Ingestion is the most common route of exposure in children.

Materials and Methods

Animal groups and experimental design

Ninety adult males Wistar rats weighting about (160-220 gram each) was allocated for the experiments. They were then divided into 3 groups of 30 rats each. All groups of rats were kept under standard conditions (Temperature, light, humidity). Rats were fed with standard chow and free tap water when they will be out of metabolic cage. Then, rats were fed with food cooked into two types of locally cooking pots. These were Atmonia and Pepsi can pots. They were known as "Cooking Halla". All test animals were used after the time of adaptation under laboratory conditions.

Feeding technique

Rats ware fed for three months on a food made out of millet flour. Millet flour which prepared by addition of millet flour to cool water and kept for two hours for fermentation. Then the fermented food was cooked in the test pots (Atmonia, Pepsi cans) on a calm fire .Each pot received 9Kgs of fermented homogenous millet dissolved in tap water for serial cooking's. each cooked food from the two cooking pots collected separately in sterilized clean trays and kept until dry . The dried food was milled until became fine and kept under laboratory conditions until use. Every one rat of the two test group (Atmonia, Pepsi can) was fed into 3gms/day of cooked food using feeding sucker plastic bottle. The control rats ware fed into normal feeding chow as described above. All test and control rats ware kept under laboratory conditions.

All rats ware fed into food consists of protein (meat) to avoid cannibalism.

Collection of blood samples

Blood samples were collected by cardiac puncture and allowed to clot for 2 hours at room temperature, followed by centrifugation at 3500g for 10 minutes to obtain the serum. Estimation of AST and ALT according to Murray et al. [5] and Fischbach et al. [6] respectively

Results and Discussion

(Table 1) The results are expressed as Mean (n=10) per treatment and respective control groups. Levels of significance values was, **p<0.01, considered to be statistically significant.

CV% = 9%, SE+=1.71

Table 1: Means of ALT from Wistar rats after feeding on feed Cocked in cocking pots made of Atmonia and Pepsi cans compared with normal range and control after one months.

Treatment	Total	Mean
Atmonia	172.25	34.45
Pepsi cans	156.54	31.31
Normal reading	157.50	31.50
Control	113.13	22.63
Grand total	599.42	
Grand mean		29.97

Table 2: Means of ALT from Wistar rats after feeding on feed Cocked in cocking pots made of Atmonia and Pepsi cans compared with normal range and control after two months.

Treatment	Total	Mean
Atmonia	231.36	46.27
Pepsi cans	199.95	39.99
Normal reading	152.50	30.50
Control	113.13	22.63
Grand total	696.94	
Grand mean		34.85

(Table 2) The results are expressed as Mean (n=10) per treatment and respective control groups. Levels of significance values was, **p<0.01, considered to be statistically significant.

CV%= 5.6% , SE+ =3.44

Table 3: Means of ALT from Wistar rats after feeding on feed cocked in cocking pots made of Atmonia and Pepsi cans compared with normal range and control after three months.

Treatment	Total	Mean
Atmonia	281.36	56.27
Pepsi cans	249.95	49.99
Normal reading	157.50	31.50
Control	113.13	22.63
Grand total	801.94	
Grand mean		40.10

(Table 3) The results are expressed as Mean (n=10) per treatment and respective control groups. Levels of significance values was, **p<0.01, considered to be statistically significant.

CV%=13.6 SE+=3.45, *G1–5=Replications of control.

Table 4: Of means of AST from Wistar rats after feeding on feed cocked in cocking pots made of Atmonia and Pepsi cans after one month.

Treatment	Total	Mean
Atmonia	707.63	141.53
Pepsi cans	588.57	117.71
Normal reading	542.50	108.50
Control	414.39	82.88
Total	2253.09	112.65

(Table 4) The results are expressed as Mean (n=10) per treatment and respective control groups. Levels of significance values was, **p<0.01, considered to be statistically significant.

CV% = 11%, SE+=7.82

Table 5: Means of AST from Wistar rats after feeding on feed cocked in cocking pots made of Atmonia and Pepsi cans compared with normal reading and control after two month.

Treatment	Total	Mean
Atmonia	1000.87	200.17
Pepsi cans	762.75	152.55
Normal reading	542.50	108.50
Control	414.39	82.88
Total	2720.51	136.03

(Table 5) The results are expressed as Mean (n=10) per treatment and respective control groups. Levels of significance values was, **p<0.01, considered to be statistically significant.

CV%=15.8%, SE+=13.6

(Table 6) The results are expressed as Mean (n=10) per treatment and respective control groups. Levels of significance values was, **p<0.01, considered to be statistically significant.

CV%=13.5%, SE +=14.2

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Table 6: Means of AST from Wistar rats after feeding on feed cocked in cocking pots made of Atmonia and Pepsi cans compared with normal reading and control after three months.

Treatment	Total	Mean
Atmonia	1249.87	249.97
Pepsi cans	1111.00	222.20
Normal reading	542.50	108.50
Control	414.39	82.88
Grand total	3317.76	
Grand mean		165.88

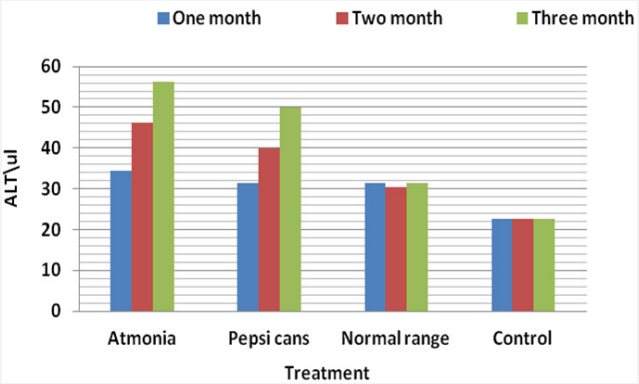

Figure 1: Mean amount of ALT/ul from Wistar rats fed on feeds cocked in cocking pots made of Atmonia and Pepsi cans in comparison with normal range and control for three months.

Table 1 & Figure 1 indicated that AST for Atmonia and Pepsi cans were higher, in the first, second and third month compared with the control. These results were clearly in line with Kim [7] who reported that heavy element such as Pb, Fe, Cu and Al were considered as the main reasons for high elevation of AST and ALT. The results obtained from this study were supported the assumption that heavy elements released in feeds cooked in cooking pots made of Atmonia and Pepsi cans were the main reasons of high elevation of liver functioning enzymes of Wistar rats such as AST, ALT and ALP. Alkaline phosphatase (ALP) an enzyme also found in the liver, bile ducts, and bones [8]. High levels of these enzymes may cause liver damage or disease, a blocked bile duct, or bone disease. Also agree with [9] who reported that AST has cytosolic and mitochondrial forms and is present in tissues of the liver, heart, skeletal muscle, kidneys, brain, pancreas, and lungs, and in white and red blood cells. AST is less commonly referred to as serum glutamic oxaloacetic transaminase and ALT as serum glutamic pyruvic transaminase. Table 2, 3 & Figure 1 showed increase level of ALT in the second and third months respectively compared to their controls. This result also in line with Kim [7]. In analysis of variance, there was significant difference between groups at P≤0.01.

Table 4 & Figure 2 indicated that AST for Atmonia and pepsi cans were increase in levels by increasing the time of treating. McLin & Yazigi [10] reported that ALT and AST specific marker of hepatocellular necrosis.

Table 5,6 & Figure 2 indicate increase level of AST and ALT in the second and third months respectively compared to their controls. In analysis of variance, there was significant difference between groups at P≤0.01 [11-13].

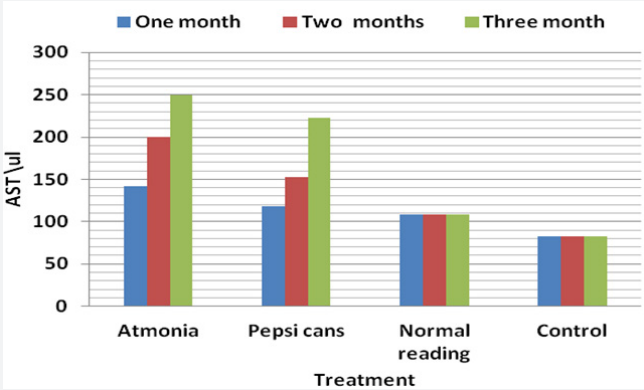

Figure 2: Mean amount of AST u/l from Wistar rats fed on feeds cocked in cocking pots made of Atmonia and Pepsi cans in comparison with normal range and control for three months.

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