



EFFECT OF INSTANT NOODLES COOKED/PREPARED WITH NATURAL SPICE AND SEASONING ON SOME BIOCHEMICAL PARAMETERS IN RAT

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ABSTRACT

A high Population today relies on instant noodles for their breakfast, lunch and dinner. This study sort to evaluate the effect of instant noodles formulated with Natural spice and that prepared with noodle seasoning on some biochemical parameters. Fifty four (54) Wistar rats were divided into 9 different groups of 6 rats each, Group 1 was control group served with rat pellet and tap water, while groups 2 to 9 served as the treatment groups and were fed differently prepared instant noodles and rat pellet. All the biochemical parameters were analyzed using standard methods. There were no significant difference ($P>0.05$) in all lipid parameters in groups fed with instant noodles prepared with noodle seasoning compared with the control and the group with Natural spice. Also, in both Total and direct bilirubin the groups fed with instant noodles prepared with noodle seasoning both 80 % and 50 % indicated no significant increases ($P<0.05$). The activities of AST, ALT, and ALP rats in groups fed with instant noodles prepared with noodle seasoning increased significantly ($p<0.05$) (23.00 ± 1.97), (31.96 ± 2.09) when compared to groups that consumed instant noodles cooked with Natural spice (40g crayfish and 30g of onions) compared with the normal control group respectively. This confirmed the hepatotoxic effect of instant noodles cooked with the noodle seasoning that shows a negative impact on the activities of liver enzymes but cooking with Natural spice seems to ameliorate the effect of free radicals deposited on the spices.

Keywords: Instant noodles, Natural spice, noodle seasoning, Biochemical parameters

INTRODUCTION

Instant noodles are dry noodles gotten from wheat flour, they are precooked noodles sold with flavoring powder, seasoning, oil, and some other ingredients depending on the brand. (Amin *et al.*, 2010). Some of the components of these noodles include: refined flour of weed, salt as well as oil and they are still being used today in different brands of instant noodles, (Kim, 1996a). Noodles have been observed to be exceptionally handled with vast majority of supplements. They are mostly referred to as junk food (Hope, 2009). A particular meal of these instant noodles is said to contain much sugar, sodium as well as other added substances, however low in essential components like vitamins, protein, fiber and minerals, (Josiah *et al.*, 2017) The availability, of low price, fast and easy way of preparing these noodles have made it very popular, as it only takes 2-3 min to prepare it. There have been several brands of instant noodles in the market in recent times. (Shin, 2003). There are a whole lot of different instant noodles, in different countries of the world, (Seller *et al.*, 2007). The first brand of instant noodles that was introduced into Nigeria in 1988 was indomie instant noodles, which Indofood produced. Instant noodles are also distributed in many other countries of the world (Seller *et al.*, 2007). Order than Indonesia which is the major producer of Indomie, instant noodles have started production since 1995 in Nigeria here (World Instant Noodle Association (WINA, 2016). Since the introduction of the first brand of instant noodle into Nigeria, it has been accepted by many homes in both urban and rural areas by the rich, average income earners and the poor. Indomie instant noodle gradually became a household name such that, children and even some adults termed all brands of instant noodles as "INDOMIE" (Alabi *et al.*, 2014).

Nevertheless, due to the elaborate adverts on different brands of these noodles, and of course the affordability and easy to

eat nature, it has attracted different classes of people ranging from children to adults, students and working class, both in rural and urban area. (Indofood, 2010). A study headed by lead researcher Dr. Hyun Joon Shin of the Baylor University Medical Center Russia, in 2003 suggests that instant noodles are unhealthy because they contain Monosodium glutamate (MSG), a lot of saturated fat, sodium, and a petroleum byproduct chemical called "tertiary-butylhydroquinone" (TBHQ), which is an antioxidant used as a preservative, and it is believed to slow digestion as well as cause other discomfort, (Aydia, 2011). Ingredients in the instant noodles include wheat flour, iodized salt, vegetable oil, potassium carbonate, guar gum, tartrazine, (CI 19140) and (TBHQ) sodium polyphosphate, and other ingredients in the seasoning powder. It is obvious that despite the supposed unhealthy substances used in the production of Instant noodle, it still seems to be one of the favorite foods for most families. Instant noodles are known to be junk foods which contain a high amount of refined carbohydrates, but low in fiber, protein and other vital nutrients, (Aydia, 2011). Also, a research study by (Sanni *et al.*, 2013), showed that the consumption of instant noodles affects the activity of small intestinal alkaline phosphatase significantly. Monosodium glutamate, which is an important composition of the spice, has also been reported to be used in inducing obesity in rats (Sharma *et al.*, 2013). Interestingly, people who take indomie as their favorites as well as staple food with toxicological effect, (Etim *et al.*, 2006), consume some of the toxic substances contained in different brands of instant noodle. Hence, the need to carry out this research on the effect of chronic consumption of instant noodles prepared with noodles seasoning compared with the consumption of noodles prepared with Natural spice on the activities of liver enzymes.

MATERIALS AND METHODS

Materials needed for the preparation of Instant noodle, include the following: crayfish, onions, Water, spoon, pot, stove, top loading balance and analytical balance.

Methods

Instant noodles with noodle seasoning, (100grams pack) crayfish, and onions were purchased from Watt market in Calabar Cross River State. 100 grams of instant noodles weighed with an analytical balance (Labocon LAB 200 Series Electronic Analytical Balance), and placed in a clean pot. 500ml of water (Unical table water) was added to the noodles; its seasoning was also added and was boiled for about 7mins. When the water dried up and the noodles became soft enough for consumption, it was removed from the stove.

For instant noodles prepared with Natural spice, the above process was repeated but instead of adding instant noodle seasoning, 40 grams of crayfish and 30 grams of onions were added to 100grams of instant noodles.

Laboratory Animals

Fifty four (54) Wistar albino rats weighing between (100g) was used for the study. The rats were divided into 9 different

groups of 6 rats each, and fed with different instant noodles prepared with the seasoning and the one cooked with Natural spice (crayfish and onion) at different percentages (50% and 80%). Feeding of the rat was done for 90 days (3 months). The rats were according to European convention for protection of vertebrate animals and other scientific purposes guidelines, (European treaty series, 2005). Group 1 was control group and fed with rat pellet and tap water *ad libitum*, while groups 2 to 9 served as the treatment groups, and were fed instant noodles and rat pellet at 50% and 80% proportion respectively. (50% = 50% noodles + 50% pellet while 80% feed = 80% noodles + 20% pellet mixed together), at the end of 90 days experiment, the rats were fasted overnight and sacrificed by anaesthetizing with chloroform vapour in desiccators, then dissected using surgical forceps and scissors. Blood was collected from the heart via cardiac puncture using sterile syringes and needles. The blood was divided into two fractions; one fraction was collected into heparinized screw-cap bottles for hematological analysis, while the second fraction was collected into plain screw-cap bottles for Biochemical analysis.

Table 1: Experimental Design

Groups	Growth rate (g/day)
Group 1 (CONTROL)	0.49
Group 2 (Instant noodle A + Natural spice 80%)	0.35
Group 3 (Instant noodle A + Natural spice 50%)	0.42
Group 4 (Instant noodle A + seasoning 80%)	0.14
Group 5 (Instant noodle A + seasoning 50%)	0.29
Group 6 (Instant noodle B + Natural spice 80%)	0.40
Group 7 (Instant noodle B + Natural spice 50%)	0.44
Group 8 (Instant noodle B + seasoning 80%)	0.35
Group 9 (Instant noodle B + seasoning 50%)	0.39

Biochemical assays

The biochemical assay were considered using standard methods with Randox Diagnostic kits (Randox Laboratory Limited, Crumlin, United Kingdom) were used for the determination of alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL) and Very Low Density Lipoprotein (VLDL). The concentrations of bilirubin were also determined with Randox kit

Statistical analysis

The data obtained were analyzed statistically using analysis of variance (ANOVA) and the student's t-test to determine whether the null hypothesis should be rejected to accept the alternative hypothesis corresponding at 95% (0.05) probability level.

RESULT

Effect of 50% and 80% instant noodles prepared with natural spice and Noodle seasoning on serum liver Enzymes (AST, ALT, ALP) (U/L) was investigated.

The mean AST (Aspartate amino transferase) activities of experimental animals in **table 2** fed with instant noodles prepared with noodle seasoning increased significantly ($p < 0.05$) groups 4 (23.00±1.97), 5(22.85±2.25), 8(23.11±1.66) and group 9 (22.91±1.51) when compared to those in control (1) (16.10±2.31). Also, all the groups fed with instant noodles

prepared with noodle seasoning indicated significant increases ($p < 0.05$) in AST groups 4(23.00±1.97) 5 (22.85±2.25), 8(23.11±1.66) and group 9 (22.91±1.51) when compared to those fed with instant noodles prepared with Home spice, groups 2 (15.39±1.78) 3 (15.95±1.39), 6(14.95±1.30) and group 7(15.99±1.7) respectively. The mean activities of ALT (Alanine aminotransferase) in experimental rats fed with instant noodles prepared with noodle seasoning increased considerably ($p < 0.05$) groups 4(31.96±2.09), 5 (29.37±2.66), 8 (30.99±1.68) and group 9(29.53±2.69) when compared to those in the normal control group (26.00±2.56). However, rats in all groups fed with instant noodles prepared with noodle seasoning showed significant increase ($p < 0.05$) in mean activities of ALT 4(23.00±1.97) , 5 (22.85±2.25), 8(23.11±1.66) and group 9 (22.91±1.51) when compared with the Rats in all groups fed with instant noodles prepared with Natural spice, groups 2 (25.18±2.55), 3 (25.93±1.92) 6 (25.69±1.31) and group 7(25.01±3.04) respectively. ALP (Alkaline phosphatase) showed same significant increases ($p < 0.05$) in activities in the experimental Rats fed with instant noodles prepared with noodle seasoning groups 4 (25.89±0.71) 5 (23.44±0.55) 8 (26.15±0.52) and 9(24.58±0.65) compared to those in the normal control group (16.56±0.68). Also when compared to the groups fed with instant noodles prepared with Home spice, group 2 (15.46±0.64), 3 (15.7±0.61), 6 (15.81±0.44) and group 7 (14.74±0.50) respectively.

Table 2: Mean AST (Aspartate amino transferase) activities of experimental animals

	AST (U/L)	ALT (U/L)	ALP (U/L)
Group 1 (Normal Control)	16.10±2.31	26.00±2.56	16.56±0.68
Group 2 (Noodle A + Natural Spice 80%)	15.39±1.78	25.18±2.55	15.46±0.64
Group 3 (Noodle A + Natural Spice 50%)	15.95±1.39	25.93±1.92	15.7±0.61
Group 4 (Noodle A + Seasoning 80%)	23.00±1.97 ^{*,a,b}	31.96±2.09 ^{*,a,b}	25.89±0.71 ^{*,a,b}
Group 5 (Noodle A + Seasoning 50%)	22.85±2.25 ^{*,a,b}	29.37±2.66 ^{*,a,b}	23.44±0.55 ^{*,a,b}
Group 6 (Noodle B + Natural Spice 80%)	14.95±1.30 ^{c,d}	25.69±1.31 ^{c,d}	15.81±0.44 ^{c,d}
Group 7 (Noodle B + Natural Spice 50%)	15.99±1.78 ^{c,d}	25.01±3.04 ^{c,d}	14.74±0.50 ^{c,d}
Group 8 (Noodle B + Seasoning 80%)	23.11±1.66 ^{*,a,b,e,f}	30.99±1.68 ^{*,a,b,e,f}	26.15±0.52 ^{*,a,b,e,f}
Group 9 (Noodle B + Seasoning 50%)	22.91±1.51 ^{*,a,b,e,f}	29.53±2.69 ^{*,a,b,e,f}	24.58±0.65 ^{*,a,b,e,f}

Values are expressed as mean ± SEM, n = 6.

* =significantly different from control group at (p < 0.05)

a = significantly different from Noodle A + Natural Spice 80% at p<0.05.

b = significantly different from Noodle A + Natural Spice 50%

c = significantly different from Noodle A + Seasoning 80%

d = significantly different from Noodle A + Seasoning 50%

e = significantly different from Noodle B + Natural Spice 80% at p<0.05.

f = significantly different from Noodle B + Natural spice 50% at p<0.05.

Effect of chronic consumption of instant noodles prepared with noodle seasoning and natural spice on the Concentrations of serum lipid profile in different experimental groups.

There was no significant differences between the treatment groups, compared with group 2 (171.30±12.07) group 3 (172.30±4.65) group 4 (176.00±5.50) 5 (175.10±4.79) group 6(170.00±7.38) group 7 (170.40±6.29) 8 (173.80±5.09) group 9(174.00±6.30) and the normal control group (172.80±5.79). Also, there was no -significant increases (p > 0.05) observed in the total cholesterol level of rats in **Table 3** fed with instant noodles prepared with noodle seasoning, groups 4 (176.00±5.50) 5 (175.10±4.79), 8 (173.80±5.09) group 9(174.00±6.30) when compared to the group fed instant noodles prepared with natural spice groups, 2(171.30±12.07) 3 (172.30±4.65), 6(170.00±7.38) and group 7 (170.40±6.29) and those in the control group (1) (172.80±5.79). Triglyceride (TG) level did not show any significant differences between group 1 (the normal control group) (100.30±7.62) and all other treatment groups, group 2 (99.83±3.80) group 3 (100.40±9.45) group 4 (101.16±8.94) group 5 (101.25±3.20) group 6 (100.77±8.83) group 7(100.10±7.42) Group 8 (101.75±2.63) group 9 (101.69±6.04). Also, the groups fed with instant noodles prepared with noodle seasoning showed no-significant difference (P > 0.05), groups 4(101.16±8.94)5 (101.25±3.20), 8 (101.75±2.63) and group 9 (101.69±6.04). In triglyceride level when compared to those rats fed with instant noodles prepared with natural spice groups 2 (99.83±3.80) group 3 (100.40±9.45), 6 (100.77±8.83) and group 7(100.10±7.42) as well as the normal control group. There was no significance difference observed in High Density Lipoprotein (HDL) in group 1 (Normal control group) (34.56±1.15) and all the treatment groups group 2 (33.66±2.41) group 3(32.26±0.93) group 4 (30.21±1.10) group 5 (30.41±1.48) group 6 (31.41±1.48) group

7(31.07±1.26) group 8 (31.56±1.02) and group 9 (30.80±1.26) respectively. The groups fed with instant noodles prepared with noodle seasoning groups 4 (30.21±1.10) group 5 (30.41±1.48),8 (31.56±1.02) and group 9 (30.80±1.26) were seen to be reduced significantly when compared to those fed with instant noodles prepared with natural spice, groups 2 (33.66±2.41), 3(32.26±0.93) 6 (31.41±1.48) group 7(31.07±1.26) and those in the normal control group, (34.56±1.15). The low-density lipoprotein (LDL) level of experimental animals in all treatment groups 2 (19.37±0.76) 3 (19.08±1.89) 4(21.63±1.79) 5(21.25±0.64). 6 (18.95±1.77), 7(18.82±1.48), 8 (2135±0.53) and group 9 (21.94±1.21) never indicated any considerable difference (P < 0.05) comparing it to control. (1) (20.05±1.52). However, groups fed with instant noodles prepared with noodle seasoning groups 4 (21.63±1.79) 5(21.25±0.64), 8 (2135±0.53) and group 9 (21.94±1.21) increased non significantly (p> 0.05) when compared to both the control group (1) (20.05±1.52) and the groups fed with instant noodles prepared with natural spice, groups 2(19.37±0.76) 3 (19.08±1.89), 6(18.95±1.77), 7(18.82±1.48) respectively. Very Low-density lipoprotein (VLDL) did not indicate any significant differences between group 1(Normal control group) (118.2±4.87) and all the treatment groups. Groups 2 (117.00±3.80),3 (117.00±3.80) ,4 (119.2±4.87) .5(119.2±4.00) 6(117.7±6.09) 7 (118.5±67.51) 8 (119.9±4.59) and group 9(119.3±5.91) respectively. However, the groups fed with instant noodles prepared with noodle seasoning groups 4 (119.2±4.87) .5(119.2±4.00), 8 (119.9±4.59) and group 9 (119.3±5.91) showed no significant ((P> 0.05) increases in VLDL level when compared to those in the groups fed with instant noodles prepared with natural spice, groups 2 (117.00±3.80), 3 (117.00±3.80), 6 (117.7±6.09) 7 (118.5±67.51) and the normal control group, (118.2±4.87).

Table 3: Concentrations of Serum Lipid Profile in Different Experimental Groups

	TCHOL (md/dL)	TG (mg/dL)	HDL (mg/dL)	LDL (mg/dL)	VLDL (mg/dL)
Group 1 (Normal Control)	172.80±5.79	100.30±7.62	34.56±1.15	20.05±1.52	118.2±4.87
Group 2 (Noodle A + Natural Spice 80%)	171.30±12.07	99.83±3.80	33.66±2.41	19.37±0.76	117.00±3.80
Group 3 (Noodle A + Natural Spice 50%)	172.30±4.65	100.40±9.45	32.26±0.93	19.08±1.89	117.00±3.80
Group 4 (Noodle A + Seasoning 80%)	176.00±5.50	101.16±8.94	30.21±1.10	21.63±1.79	119.2±4.87
Group 5 (Noodle A + Seasoning 50%)	175.10±4.79	101.25±3.20	30.41±1.48	21.25±0.64	119.2±4.00
Group 6 (Noodle B + Natural Spice 80%)	170.00±7.38	100.77±8.83	31.41±1.48	18.95±1.77	117.7±6.09
Group 7 (Noodle B + Natural Spice 50%)	170.40±6.29	100.10±7.42	31.07±1.26	18.82±1.48	118.5±67.51

Group 8 (Noodle B + Seasoning 80%)	173.80±5.09	101.75±2.63	31.56±1.02	21.35±0.53	119.9±4.59
Group 9 (Noodle B + Seasoning 50%)	174.00±6.30	101.69±6.04	30.80±1.26	21.94±1.21	119.3±5.91

Values are expressed as mean ± SEM, n = 6.

There were no significant differences in all the groups

TCHOL= total cholesterol, TG= Triglyceride, HDL= High density Lipoprotein, LDL= Low density lipoprotein, VLDL= Very low density lipoprotein.

The Total and direct bilirubin concentration of rats in **table 4** fed with the two types of instant noodles prepared with noodle seasoning and the ones prepared with Natural spice 80% and 50% respectively showed no significant differences compare with the treatment group in both Total and direct bilirubin the groups fed with instant noodles prepared with noodle seasoning both 80 % and 50 % indicated no significant

increases ($p < 0.05$) groups 4 (10.74 ± 0.94 , 4.76 ± 0.45), 5 (10.71 ± 1.04 , 4.60 ± 0.44), 8 (10.88 ± 0.75 , 4.78 ± 0.30) 9 (10.70 ± 0.33 , 4.64 ± 0.47) when compared to the groups fed with instant noodles prepared with Natural spice. Groups 2 (10.67 ± 0.83 , 4.52 ± 0.40), 3 (10.65 ± 0.41 , 4.51 ± 0.48) 6 (10.66 ± 0.65 , 4.53 ± 0.24) and 7 (10.61 ± 0.85 , 4.64 ± 0.47) respectively.

Table 4: Concentrations of Total and direct bilirubin in the different experimental groups

	Total Bilirubin (mg/dL)	Direct Bilirubin (mg/dL)
Group 1 (Normal Control)	10.52±0.57	4.50±0.26
Group 2 (Instant noodle A + Natural spice 80%)	10.67±0.83	4.52±0.40
Group 3 (Instant noodle A + Natural spice 50%)	10.65±0.41	4.51±0.48
Group 4 (Instant noodle A + seasoning 80%)	10.74±0.94	4.76±0.45
Group 5 (Instant noodle A + seasoning 50%)	10.71±1.04	4.60±0.44
Group 6 (Instant noodle B + Natural spice 80%)	10.66±0.65	4.53±0.24
Group 7 (Instant noodle B + Natural spice 50%)	10.61±0.85	4.60±0.37
Group 8 (Instant noodle B + seasoning 80%)	10.88±0.75	4.78±0.30
Group 9 (Instant noodle B + seasoning 50%)	10.70±0.33	4.64±0.47

Values are expressed as mean ± SEM, n = 6.

NO significant difference between groups at $p < 0.05$.

DISCUSSION

The serum enzymes of toxicological importance assessed in this study were Aspartate aminotransferase (AST), Alanine aminotransferase (ALT), and Alkaline phosphatase (ALP). The mean AST (Aspartate amino transferase) activities of experimental animals in the groups fed with instant noodles prepared with noodle seasoning increased significantly. The ALT activities in the animals fed with instant noodles and spices showed a significant increase compared to animals fed with instant noodles prepared with the natural spices. ALT is the protein-metabolizing enzyme responsible for the transfer of amino group between alanine and a keto acid to form pyruvate and a new amino acid (Chattopadhyaya, 1973). It is the primary enzymes responsible for the loading of ammonia from the muscles to the liver in the urea synthesis. ALT activity is usually indicative of the severity of cell injury. The results of the present study show that there was a serious injury to the animal fed with instant noodles with the spices. AST activity recorded in the present study also shows a cell injury to the hepatic cells in the group fed with instant noodles with spices. The aminotransferase (AST and ALT) are the most commonly use routine markers of hepatocytes injury damage with or without necrosis usually lead to the leakage of these intracellular enzymes in the blood stream (Stanley, 2005). ALP activity also shows a significant increase in groups fed with instant noodles with spices compared to the group prepared with the natural spices. From the deduction of the results recorded ALP play a very important roles as enzymes cofactor (Chatterjea, 2007). The enzymes, AST and ALT are both Cytoplasmic and mitochondrial enzymes involved in a wide spectrum of protein metabolism, at the level of amino group transfer between glutamate and pyruvate (Champe, 2008).

The increase in AST activities may be as a result of the effect of both monosodium glutamate and tetrazine. The hepatic cells may not function properly under pathological conditions, thereby resulting in imbalanced intermediary metabolism. The report is in line with the findings of Sharma, who

observed an increase in alanine aminotransferase levels in rats administered with Tartrazine dye at a low dose 50 mg/kgb.w/day for 21 days. (Sharma *et al.*, 2013; Etim *et al.*, 2006), who also, recorded an increase in the AST activities of Wistar rats administered with indomie seasoning.

The increase in mean activities of ALT of rats in these groups was suspected to have resulted from the harmful effects of both tartrazine and Monosodium glutamates used as coloring agent, flavor enhancer as well as other preservatives in the instant noodles. This result supported a report by (Sharma *et al.*, 2013), who reported an increase in the activities of ALT in rats that consumed indomie with seasoning, other researchers including Sharma (Etim *et al.*, 2006), who reported an increase in ALT activities on experimental animal when MSG was administered even at low does. This increase can be attributed to damage in liver cells, were the greater the damage in hepatocytes the more these enzymes are released into the blood stream (Zailani *et al.*, 2016).

Lipids are heterogeneous compounds related more by their physical and chemical properties. Lipids are transported in the form of high-density lipoprotein (HDL), low-density lipoprotein (LDL), very low-density lipoprotein (VLDL) and chylomicrons. In addition, the levels of serum lipid parameters usually reflect the integrity and synthetic ability of the liver, as the liver is the major organ responsible for repackaging of lipids of both exogenous substances. (Eteng, *et al.*, 2020). The main serum lipids are cholesterol, low-density lipoprotein (LDL), high-density lipoprotein (HDL) and triacylglycerol. HDL function in triacylglycerol transport by facilitating the activation of lipoprotein lipase in the transfer of triacylglycerol's between lipoprotein classes, and the removal of chylomicron remnants and VLDL enriched in triacylglycerol as well as the Apo lipoproteins. HDL includes antioxidative enzymes and phospholipids constituent that are exchangeable with other lipoproteins such as LDL and VLD. Many different types of the HDL particles are generated with different metabolic roles. HDL contain many different protein constituents whose main purpose is to enable selection of

cholesterol from cell esterification of cholesterol in plasma transfer of cholesterol to other lipoproteins, and the returns of cholesterol from peripheral tissues to the liver for excretion a process that is called cholesterol transfer (Gordon, 2011). There was significant increase in LDL among the groups fed with instant noodles with spices. LDL are the main carriers of cholesterol to the adrenal and adipose tissues were they now act as receptors to Apo 100 that are able to take in the LDL by a similar process occurring in liver (Engelmann, 2008). Within these tissues, cholesterol esters are hydrolyzed to yield endogenous sources before they are released into circulation. This increases in Total cholesterol level in groups fed with instant noodles prepared with noodle seasoning is in line with the finding by (Amin *et al.*, 2010; Zailani *et al.*, 2016), who reported a higher level of Total cholesterol concentration in rat administered with tartrazine even at low level. In addition, serum total cholesterol level may be a pointer to the disruption in the structure and functions of the membrane, which can affect its fluidity, permeability and transport system. Research further indicated that diets that contain more fiber can bind to cholesterol and reduce the cholesterol to triacylglycerol concentration (Etim *et al.*, 2006; Zailani *et al.*, 2016). Therefore, a high concentration of cholesterol in group fed instant noodle cooked with seasoning must have been due to absence of fiber in the food as reported by (Tai *et al.*, 2009).

In triglyceride, level when compared to those rats fed with instant noodles prepared with Natural spice across the groups, supported a report by (Tawfik, 2012), who found out that any food that has high amount of fiber can bind cholesterol as this fiber in the diet can lower cholesterol and glycerol concentration. Therefore, the significant differences in the group fed with instant noodles prepared with noodle seasoning is suspected to be due to the unavailability of fiber in instant noodles, but preparing with onions and crayfish increased the fiber content and therefore cause no harm to the groups fed with instant noodles prepared with natural spice when compared with the control group. This result again supported (Hope, 2001; Tawfik, 2012), who stated that health has been raised against all instant noodle marks particularly as regards healthy benefit as a result of its high amount of carbohydrate, sodium and without more nutritional ingredients such as meat and vegetables which renders it low in dietary fiber. HDL transports abundance or unused cholesterol from the tissues back to the liver, and there the cholesterol is separated to bile acids and is then discharged through faeces making it useful. Again, the marked increase in the HDL level among the group fed with natural spices across the groups indicates the ability to lower the level of atherogenic predisposing factor of LDL cholesterol. Very Low-density lipoprotein (VLDL) is seen as a valuable factor that can pin point the danger of heart disease. In addition, increase amount of VLDL means an increase danger of Coronary Heart disease. (Etim *et al.*, 2006; Tawfik, 2012). In this study, the differences found between all groups fed with instant noodles and control was not significant. However, the groups fed with instant noodles prepared with noodle seasoning across the groups, could have been caused by the effect of monosodium glutamate in the seasoning. In addition, Bilirubin is the terminal product of heme metabolism, the total and direct bilirubin concentration of rats fed with the two types of instant noodles prepared with noodle seasoning and the ones prepared with Natural spice 80% and 50% respectively showed no significant differences between the treatment groups and the normal control groups. What could observe as and increases may be as a result of the toxic effect of monosodium glutamate which is present in the noodle

seasoning and not present in the noodle prepared with home spice. Bilirubin has to be converted to soluble bilirubin in the liver, it then goes into the bile to be stored in the gall bladder or sent to the intestines where other metabolic activity take place. In addition, increases in bilirubin are linked with a range of illness and coma, which includes jaundice associated with hepatitis and cirrhosis anemia, and sickle disease.

Elevation in serum bilirubin could be caused by rapid breakdown of red blood cells, malfunctioning of the liver or bile ducts etc. This result was in line with a report by (Tawfik, 2012b), who reported that the consumption of low dose of MSG may cause an adverse health effect on the hepatic and renal function in experimental animals.

CONCLUSION

The result could lead to the modification of the synthetic integrity of the cells and alteration membrane permeability leading to hepatocellular damage via the consumption of instant noodles prepared with seasoning against the Natural spices (cray fish and onions). The report further suggests that the toxicological effect of synthetic spices in instant noodles could bring about negative impact in human health after a long time of consumption.

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CONFLICT OF INTEREST

The authors declare no conflict of interest

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