




ORIGINAL RESEARCH ARTICLE

Effect of Instant Noodles Formulated with Natural Spice and Noodle Seasoning on Hemato-Biochemical Parameters and Body Weight Changes in Albino Rats Model.

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ABSTRACT

Considering the fact that food contains many nutrients that can be exploited and used by man. The study assesses the impact of instant noodles prepared with natural spice and noodles seasoning on changes in body weight and hemato-biochemical parameters in a model using albino rats. Nine (9) distinct groups of six (6) Wistar rats each were given instant noodles with seasoning and one with natural spice (40g of crayfish and 30g of onion) for 90 days. The Wistar rats were divided into 54 groups. While groups 2 through 9 served as the treatment groups and were given variously prepared instant noodles and rat pellets, group 1 served as the control group was given rat pellet and tap water. Using established techniques, all biochemical parameters were examined. The findings revealed that there were no appreciable variations in the body weight of Wistar rats in any of the experimental groups. In comparison to those fed instant noodles cooked with noodle seasoning, those fed instant noodles prepared with natural spice show significantly higher development rates ($P < 0.05$). Furthermore, rats given quick noodles had a non-significant rise ($p > 0.05$) in the concentration of total protein. Additionally, the albumin concentration in these groups increased significantly ($P < 0.05$), when compared to rats fed noodles prepared with seasoning to rats fed noodles prepared with natural spice, non-significant differences ($p > 0.05$) were observed in the blood parameters. Spiced instant noodles are not safe to eat. It is thus advised that users of instant noodles reduce the amount of spices used, as cooking with natural spices appears to mitigate the effect of free radicals deposited on the spices.

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INTRODUCTION

Given the fact that nutrient in food contains enormous amounts of resources available for man to acquire and utilize. Food may be considered the most crucial of all human requirements. Attractively, in the past three decades, technical development in the food sector has led to the manufacturing of convenience foods and ready-to-eat meals, enabling the availability of food for rapid consumption. (Nseobong *et al.*, 2022)

A lot of people eat noodles as an appetizer or as a main meal since they are so quick and simple to prepare. The primary ingredients in instant noodles are sodium polyphosphate, iodized salt, vegetable oil, and wheat flour. TBHQ, tartrazine, guar gum, potassium carbonate, tartrazine, and sodium carbonate. Iodized salt, monosodium glutamate (621), sugar, hydrolyzed vegetable protein, soy powder, pepper, garlic powder, chicken

flavor, and chili powder are all ingredients in the seasoning powder (spices) (Sanni *et al.*, 2013). According to Moutinho *et al.* (2007), the majority of the ingredients in noodles may have harmful effects that cause carcinogenic and teratogenic alterations in rats. Monosodium glutamate (MSG) might be sold as a flavor enhancer by commercial food producers and sellers (Loliger, 2000; Yamaguchi, 1991). According to Uneyama *et al.* (2008), the spices used to make idomi noodles can have physiological and nutritional functions by starting digestion in the stomach and foreseeing following processes in the small intestine and liver. Independent of physical activity and total calorie consumption, mono sodium glutamate intake may be linked to an increased risk of being overweight (He *et al.*, 2008). In our everyday meals, monosodium glutamate is frequently utilized as a culinary spice (Walker and Lupein, 2000). It has been demonstrated that eating this addictive

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meal might lead to metabolic problems and oxidative stress on tissues (Dinz *et al.*, 2005; Nagara *et al.*, 2006). In 1988, De-united Foods PLC's "Indomie" brand of instant noodles was the first to be sold in Nigeria; currently, there are well over eight brands available there (Udeogu *et al.*, 2014). Even though indomie that is ready to eat contains (Junk) food, it is frequently consumed in Nigeria (Gunathilake and Abeyrathne, 2008). More study and training on the potential health effects of this common food are necessary, though, given the rate of instant noodle consumption. In order to compare the effects of chronic intake of instant noodles made with natural spice and those made with noodle seasoning on health, this investigation was undertaken. Additionally, regularly consuming instant noodles may be harmful to health, increasing the risk of diseases like obesity, kidney failure, cancer, and hypertension due to some of the toxic substances present in various brands of instant noodles, especially by those who regard them as their favorites and staple foods, if nothing is done about it (Etim *et al.*, 2006). This study was necessary to demonstrate the negative effects of eating spiced noodles as opposed to noodles with natural flavors.

MATERIALS AND METHODS

Ethical Approval

All the animals received humane care according to the conditions outlined in the ‘Guide for the Care and Use of Laboratory Animals prepared by the National Academy of Science (NAS) and published by the National Institute of Health. The institution approved an experimental number of the researcher is BCM/201845

Materials

Saucepan, stove, top loading balance, analytical balance, water, spoon, Onions, crayfish, and instant noodles.

Sample collection and preparation

Watt Market in Calabar, Cross River State, sold instant noodles with noodle spice, instant noodles (100grams bag), crayfish, and onions. A clean saucepan was filled with 100 grams of instant noodles that had been weighed with an analytical balance. The noodles were given 500ml of universal table water, along with seasoning, and they were cooked for around 7 minutes. It was taken off the heat when the water dried up and the noodles softened enough to eat. The aforementioned procedure was performed for instant noodles made with Natural Spice, except instead of adding instant noodle flavoring, 100 grams of quick noodles were combined with 40 grams of crayfish and 30 grams of onions.

Laboratory animal’s maintainance and treatment

Fifty four (54) Wistar albino weighing between 80-100g 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%) (Table 1). Feeding of the rat was done for 90 days. Group 1 was control group and served with rat pellet and tap water *ad libitum*, while groups 2 to 9 served as the treatment groups fed instant noodles and rat pellet at 50% and 80% proportion respectively. The 50% = 50% noodles + 50% pellet while 80% feed = 80% noodles + 20% pellet mixed together. At the end of the 90 days experiment, the rats were fasted overnight and sacrificed. Thereafter, the rats were according to European convention for protection of vertebrate animals and other scientific purposes guidelines, (European treaty series, 2005), anaesthetized under chloroform vapour in desiccators and were 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

Hematological Analysis

Heamatology Rats' blood samples were collected, then anticoagulation was done and blood parameters were measured by an automated blood analyzer. Parameters include. White blood cell (WBC), red blood cell count (RBCs), (HGB), Mean corpuscular volume (MCV), Lymphocytes (LYM) and Platelet estimation.

Biochemical Analysis: All Biochemical assays for total protein, albumin and serum globulin were carried out using standard methods.

Biochemical analysis centrifuged at 300 rpm for ten minutes to isolate the serum. Total protein, albumin, and globulin were determined by the use of automated analyzers as described by Meyer and Harvey (1998).

Statistical analysis

The collected data were statistically examined using analysis of variance (ANOVA) and the student's t-test to decide whether the null hypothesis should be accepted in favor of the alternative hypothesis at the 95% (0.05) probability level.

RESULTS

During the first week of the trial, animals given 80% natural spice instant noodles had non-significantly lower body weights ($p > 0.05$) (69.130.97%) than those in the control group (75.503.84%). But the same insignificant weight reduction ($p > 0.05$) persisted for the course of the 12-week investigation. (Between 7 and 90 days). 50% quick noodles cooked with homemade seasonings were provided to Group 3. When compared to group 1 (the control group), where body weights grew non-significantly ($p > 0.05$) (79.500.96), and the same non-significant rise was seen throughout the experimental (feeding) period. Look at table 4.3. On day 35, the weights of the group that received the 80% instant noodle A cooked with Noodles flavor (group 4) were not significantly different ($p > 0.05$) from those of the control group (group 1) (81.439.81g). In comparison to the control group (group 1) (83.3510. ±58, 87.2011.48, ± 88.7311.66, 100.689. 86), the same non-significant decline persisted on days 42 (67.281. ±84g), 49 (68.282. ±11g), 56 (68.581. ±08,g), and 90 (88.352±.84g), respectively. The body weights of animals fed with 50% instant noodle A prepared with Noodle seasoning (group 5) had non-significant increase ($p > 0.05$) on days 21 (76.33±7.31g, 76.98±8.61g), 42, (79.33±1.13g,83.35±10.58g),49(78.13±1.81g,87.20±11.4 8g), 56(80.97±1.73g,80(.97±1.73g), 84(87.03±2.3198.58±9.84g) and 90 (89.07±2.30g, 100.68±9.86g) accordingly. Apart from the non-significant ($p > 0.05$) increases recorded in group fed 80% instant noodle B prepared with Natural spice in days 14 (58.67±0.95g, 75.50±3.84g), 21 (59.27±0.71g, 76.98±8.61g) and 84 (81.27±4.86,g 98.58±9.84)g there were also not significantly ($p > 0.05$) reduced in body mass when compared to the body weights of the animals in the normal control group on all other days during the trial period. (Group 1). **Fig. 1.** In comparison to the weights of individuals in the control group (Group 1) on all trial days, the group given 50% instant noodle B made with Natural spice (Group 7) demonstrated non-significant ($p > 0.05$) weight gains. However, animals in group 8 (given 80% Instant Noodle B prepared with Nodules seasoning) had no significant gain in body weight ($p > 0.05$) on days when they receive the diet. 28, 56, 70, 77 and 84 compared

to the the normal control group.(99.05±9.43,80.88±9.52),(109.30±7.59,88.73±11.6 6),(113.88±6.65· 95.48±10.81),(116.65±6.39, 97.28±10.82), (121.55±2.54,98.58±9.84),and non-significant ($p > 0.05$) differences were reported in remaining days.

In certain days 21, 28, 56, 70, 77, and 84, respectively, 80% instant Noodle B made with Noodles flavoring did not substantially ($p > 0.05$) increase the bodyweight of Rats compared to the body weights of animals in the control group (group 1). However, when comparing the body weights of the animals in (group 6) and the group fed with 80% Instant Noodle B made with home spice, non-significant increases ($p > 0.05$) were seen in the body weights of the animals in comparison to the group fed with 80% Instant Noodle B prepared with noodle seasoning (group 8). (73.30±3.90g, 58.67±0.95g),(75.53±3.93g,59.27±0.71g)(76.00±5.57g, 60.03±1.59g) For information, (**Table 4.3**). Furthermore, the results of comparing the body weights of rats fed 50% Instant Noodle B made with Noodles flavoring revealed that there were non-significant increases throughout the course of the feeding period.

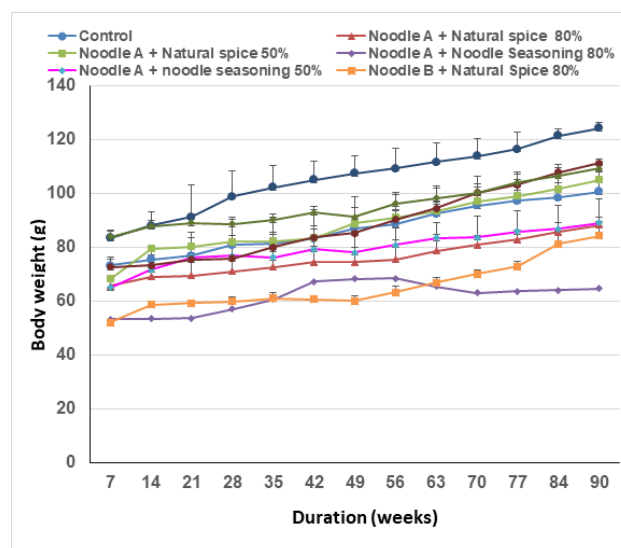


Figure 1: Moving averages of body weights of the different experimental groups.

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

As a consequence, all treatment groups' growth rates were lower than those in the control group (0.49g/day): 0.35, 0.42, 0.14, 0.29, 0.40, 0.44, 0.35, and 0.39 (g/day). However, as compared to the animals in the groups fed with instant noodles produced with noodle seasoning, the groups fed with instant noodles prepared with natural spice show greater growth rates (0.35, 0.42).(0.14, 0.29 g/day) Additionally, the growth rates of those fed 80% instant noodles with flavor (Noodle A 0.14 and Noodle B 0.35 g/day) were lower than those of those fed 50% instant noodles (Noodle A 0.29 and 0.39 g/day). View the table 2 (page 124) below.

Concentrations of several hematological parameters in rats given varying amounts of instant noodles flavoring with natural spices. (%) In comparison to the normal

control group, there were no appreciable variations in the mean white blood cell count across all treatment groups. However, the group that received 80% Instant Noodle A cooked with noodle flavor (Group 4) saw a non-significant rise ($p > 0.05$). (13.55 ± 1.34) and Instant noodle B prepared with Noodle seasoning (group 8) ($13.04.22 \pm 6.08$) when compared to the normal control group (group 1) (11.22 ± 2.34). There were no significant differences in the level of red blood cells between any of the treatment groups and the normal control group ($p > 0.05$), but the groups fed instant noodles seasonings (groups 4, 5, 8 and 9) showed non-significant reductions in the level of red blood cells. (5.35 ± 2.23 , 5.95 ± 1.59 , 6.59 ± 2.55 , 6.17 ± 2.42). When compared to the groups fed with instant noodles prepared with natural spice. Group 2, 3, 6 and 7) (6.91 ± 0.14 , 7.43 ± 2.11 . 8.10 ± 0.78 and 7.21 ± 0.86 respectively.

Additionally, there were no significant variations in the mean hemoglobin across all treatment groups. 2(10.80 ± 0.70) 3 (12.00 ± 2.10) 4(11.65 ± 2.55) 5(11.60 ± 1.30) 6 (12.10 ± 1.10) 7 (12.85 ± 0.55) 8 (11.40 ± 4.40) and group 9 (11.30 ± 3.60) respectively, when compared to the normal control group (13.80 ± 2.13). However, there was no significant difference in the mean hemoglobin content of animals across all treatment groups. ($p > 0.05$) groups 2(10.80 ± 0.70) 3 (12.00 ± 2.10) 4(11.65 ± 2.55) 5(11.60 ± 1.30) 6 (12.10 ± 1.10) 7 (12.85 ± 0.55) 8 (11.40 ± 4.40) and group 9 (11.30 ± 3.60) when compared to the normal control group (13.80 ± 2.13). Also, non-significant increases ($p > 0.05$) were found in groups fed with instant noodles prepared with natural spice (group 2 (12.50 ± 0.70) 3(12.00 ± 2.10) 6 (12.10 ± 1.10) and 7 (12.85 ± 0.55) when compared to those fed with instant noodles prepared with Noodle seasoning group 4(11.65 ± 2.55) 5(11.60 ± 1.30) (11.40 ± 4.40) and group 9 (11.30 ± 3.60).

The mean cell volume (MCV) decreased significantly ($p < 0.05$) in each treatment group compared to the healthy control group. Additionally, animals in group 8 (fed with 80% Instant noodle B prepared with Noodle flavoring) had a significantly lower Mean Cell Volume (MCV) ($p < 0.05$). (58.50 ± 0.50) as contrasted with those in all other treatment groups. percentage Lymphocyte (LYM) analysis revealed no appreciable differences between the treatment groups and the healthy control group, however there were non-significant increases ($p > 0.05$) in groups 4,5,8, and 9

(all of which were served with noodle seasoning) in comparison to the control. Significant drops in platelet levels were seen. ($p < 0.05$) both in group 4 (fed with 80% instant noodle A prepared with noodle seasoning) (422.50 ± 35.5) and group 8 (80% Instant Noodle B prepared with noodle seasoning (424.50 ± 2.50) when compared to the normal control group (583.00 ± 15.26). the level of platelet also increase significantly ($p < 0.05$) in group 6 (fed with 80% Instant Noodle B prepared with natural spice when compared to those in group 2 (80% Instant noodle A prepared with Natural spice.).

Concentrations of protein parameters in the different experimental groups (g/dl)

The quantities of Instant Noodle A and Noodle B with Natural Spice and Noodles Seasoning that were given to the animals are shown in Table 3 (page 124) along with their total protein, albumin, and globulin concentrations. Animals administered noodles and those in the healthy control group did not substantially vary in terms of total protein content. However, the total protein content did not significantly increase in any of the rats fed quick noodles ($p > 0.05$). 2–9 grouping. When compared to the normal control group, the albumin concentration in all treatment groups did not exhibit any discernible variation. Instead, those who had 80% quick noodles seasoned with Noodle seasoning experienced noticeable improvements. ($p < 0.05$) (1.95 ± 0.06) (1.95 ± 0.09) (group 4 and group 8) when compared to the groups fed with 80% instant noodles with Natural spice (group 2 and group 6). (1.48 ± 0.20 , 1.42 ± 0.16). There were also no significant differences in Globulin in normal control group when comparing the animals in other treatment groups. Globulin concentration in group fed with instant noodles prepared with noodle seasoning was significantly higher ($p < 0.05$) (1.95 ± 0.09) when compared to the animals in groups 2 and 3 (fed with 80% and 50% instant noodle A with Natural spice respectively. (1.48 ± 0.20 , 1.46 ± 0.15). Also, the Albumin concentration of animals in group 9 (fed with 50% Instant Noodle B with Noodles seasoning was significantly higher ($p < 0.05$) (1.62 ± 0.06) than those in groups 2,3 and 6 (fed with 80% instant noodle A with Natural spice, 50% instant noodle A with Natural spice and 80% Noodle B with Natural spice) respectively. (1.48 ± 0.20 , 1.46 ± 0.15 and 1.42 groups 2-9 (all treatment groups) to globulin concentration of animals in group 1 (the normal control group).

Table 2 shows the concentrations of various hematological markers in rats given varying amounts of instant noodles seasoned with natural spices.

	WBC 10 ³ cells/ μ L	RBC 10 ⁶ cells/ μ L	HGB g/dL	MCV %	LYM %	PLT 10 ³ cells/ μ L
Group 1(Control)	11.22 \pm 2.34	8.13 \pm 1.05	13.80 \pm 2.13	66.00 \pm 0.43	60.10 \pm 2.38	583.00 \pm 15.26
Group 2(Instant noodle A + Natural spice 80%)	10.34 \pm 1.20	6.91 \pm 0.14	12.50 \pm 0.70	61.00 \pm 0.00*	50.20 \pm 4.50	499.00 \pm 62.5
Group 3(Instant noodle A + Natural spice 50%)	11.02 \pm 1.65	7.43 \pm 2.11	12.00 \pm 2.10	60.50 \pm 0.50*	57.25 \pm 4.55	509.00 \pm 35.0
Group 4 (Instant Noodle A + Noodle Seasoning 80%)	13.55 \pm 1.34	5.35 \pm 2.23	11.65 \pm 2.55	60.50 \pm 0.50*	62.90 \pm 3.40	422.50 \pm 35.5*
Group 5(Instant noodle A + Noodle seasoning 50%)	9.72 \pm 0.70	5.95 \pm 1.59	11.60 \pm 1.30	60.00 \pm 1.00*	61.10 \pm 9.00	448.50 \pm 75.5
Group 6(Instant noodle B + Natural spice 80%)	9.20 \pm 1.40	8.10 \pm 0.78	12.10 \pm 1.10	61.00 \pm 1.00*,c	59.00 \pm 1.70	563.50 \pm 18.5 ^a
Group 7(Instant Noodle B+ natural spice 50%)	11.99 \pm 2.29	7.21 \pm 0.86	12.85 \pm 0.55	61.50 \pm 0.50*,c	57.60 \pm 2.90	521.50 \pm 42.5
Group 8 (Instant Noodle B + Noodle seasoning 80%)	13.04.22 \pm 6.08	6.59 \pm 2.55	11.40 \pm 4.40	58.50 \pm 0.50*,a,b,c	65.20 \pm 11.00	424.50 \pm 2.50*
Group 9 (Instant Noodle B + Noodle seasoning 50%)	8.82 \pm 3.36	6.17 \pm 2.42	11.30 \pm 3.60	60.50 \pm 0.50*,c	65.35 \pm 2.25	479.50 \pm 43.5

Values are expressed as mean + S

*significantly different from control at p<0.05; a = significantly different from Instant Noodle A + Natural Spice 80% at p<0.05; b=significantly different from Instant Noodle A + Natural spice 50% at p<0.05; c= significantly different from Instant Noodle A + Natural spice 80% at p<0.05. e= significantly different from Instant Noodle B + Natural spice 80% at p<0.05. WBC = white blood cells; LYM = lymphocytes; PCV = packed cell volume;

Key: RBC = red blood cells; HGB = haemoglobin; PLT = platelets

Table 3: Concentrations of Protein Parameters in the different Experimental Groups

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

	Total Protein (gm/dL)	Albumin (g/dL)	Globulin (g/dL)
Group 1 (Normal Control)	6.49 \pm 0.12	3.57 \pm 0.19	2.92 \pm 0.29
Group2 (Noodle A + NATURAL SPICE 80%)	2.55 \pm 0.19	1.48 \pm 0.20	0.87 \pm 0.28
Group 3 (Noodle A + NATURAL SPICE 50%)	2.51 \pm 0.11	1.46 \pm .15	1.06 \pm 0.18
Group 4 (Noodle A + NS 80%)	2.52 \pm 0.16	1.95 \pm 0.09 ^{a,b}	0.78 \pm 0.27
Group 5 (Noodle A+ NS 50%)	2.68 \pm 0.20	1.64 \pm 0.16	0.73 \pm 0.14
Group 6 (Noodle B + NATURAL SPICE 80%)	2.58 \pm 0.12	1.42 \pm 0.16 ^d	0.95 \pm 0.10
Group 7 (Noodle B + NATURAL SPICE 50%)	2.58 \pm 0.19	1.45 \pm 0.18 ^d	0.76 \pm 0.27
Group 8 (Noodle B + NS 80%)	2.62 \pm 0.10	1.95 \pm 0.06 ^{a,b,d,e,f}	1.10 \pm 0.14
Group 9 (Noodle B + NS 50%)	2.53 \pm 0.25	1.62 \pm 0.17	0.58 \pm 0.24

a = significantly different from Noodle A + NATURAL SPICE 80% at p<0.05; b= significantly different from Noodle A + NATURAL SPICE 50% at p<0.05; d = significantly different from Noodle A + NS 50% at p<0.05; e = significantly different from Noodle B + NATURAL SPICE 80% at p<0.05. f = significantly different from Noodle B + 50% at p < 0.05.

Key: TP = total protein; ALB = albumin; GLB = Globulin

DISCUSSION

Research has shown that the total amount of nutrients in fast noodles really contribute relatively little to good health. People who consume quick noodles are those who do not have participated in a study. It has been found that those who eat quick noodles frequently have inadequate nutritional levels in their bodies.

According to the findings of our study, there were no appreciable variations in the rats' body weights during the course of the trial as compared to the rats in all treatment groups and the rats in the normal control group. This demonstrated that eating instant noodles had no appreciable ($p < 0.05$) impact on body weight. This outcome was in contrast to prior reports by [Sanni *et al.* \(2003\)](#) and [Josiah *et al.* \(2017\)](#), which claimed that eating quick noodles caused experimental rats to gain weight. Despite the fact that instant noodles and seasoning do contain some monosodium glutamate, which [Igbigbi *et al.* \(2014\)](#) claim raised body weight and caused obesity in rats, it is probable that the quantity found in instant noodles is not sufficient to do either. According to table 2, feeding the experimental animals instant noodles had an impact on their growth rate since all treatment groups' growth rates were lower than those of the control group. When compared to the group fed instant noodles prepared with noodle seasoning, the group fed instant noodles prepared with natural spice experienced faster growth rates. The results of [Sanni *et al.* \(2013\)](#) and [Chukwuebuka *et al.* \(2014\)](#), who claimed that instant noodles are mostly comprised of carbohydrates with little to no protein and other essential elements that sustain growth, were corroborated by the poor growth rates of experimental animals given quick noodles.

Leukocytes, commonly known as white blood cells, are crucial for health and defense against sickness and illness. According to our findings, there were no appreciable variations in the mean white blood cell counts between any of the therapy groups and the healthy control group. However, when compared to the normal control group, a non-significant increase ($p > 0.05$) was observed in the group fed with 80% Instant Noodle A prepared with noodle seasoning and 80% Noodle B prepared without noodle seasoning. The body's reaction to the toxic effects of the coloring agent (tartrazine) used in the production of instant noodles, as reported by the Food Standards Agency website (2008) that instant noodles contain Tartrazine, a synthetic lemon yellow azo dye primarily used as food coloring agent and [Himri *et al.* \(2011\)](#) who discovered a toxic effect of tartrazine in rats, may therefore have contributed to the non-significant increases seen in our results. or because the rat perception of the noodle seasoning's mono sodium glutamate (MSG) as a hazardous substance. This is consistent with [Rashad's \(2007\)](#) research, which showed that monosodium glutamate treatment in rats might have harmful consequences. When compared to the normal control group, there were no appreciable differences in the red

blood cell count between any of the treatment groups. Nevertheless, as compared to the normal control group, some non-Significant reductions ($p > 0.05$) in the percentage of red blood cells were seen in the treatment groups. However, when compared to the groups fed instant noodles prepared with Natural spice, the groups fed instant noodles prepared with noodles seasonings (groups 4, 5, 8 and 9) also displayed non-significant decreases ($p > 0.05$) in the level of red blood cells. 2, 3, 6, and 7 in group. These non-significant ($p > 0.05$) reductions in red blood cell count in the groups fed instant noodles made with seasonings may be attributed to the toxic effects of tartrazine (a coloring agent), which must have inhibited erythropoiesis in the bone marrow to prevent the synthesis of red blood cells or destroyed red blood cells more quickly than they were produced. The results obtained was consistent with a study by [Himri *et al.* \(2011\)](#) who found that modest doses of tartrazine caused membrane disruption, apoptosis, and nephrite in red blood cells in Wistar rats. The outcome also supported a study by [Ashaolu *et al.* \(2011\)](#) that found that MSG's effects on RBC count likely shorten the lifespan of red blood cells.

When compared to the normal control group, the results for hemoglobin showed no discernible differences in the mean hemoglobin levels between any of the treatment groups. In contrast to the normal control group 1, the mean hemoglobin concentration of the animals in all treatment groups decreased non-significantly ($p > 0.05$) in groups 2, 3, 4, 5, 6, 7, 8, and 9. Additionally, when comparing those given instant noodles made with Natural spice (groups 2, 3, and 6) to those fed instant noodles prepared with Noodle seasoning (groups 4, 5, and 8), non-significant increases ($p > 0.05$) were observed in the Natural spice-fed groups. Monosodium glutamate is a key spice ingredient in instant noodles, however [Ashaolu *et al.* \(2011\)](#) found that MSG may be harmful to hemoglobin and negatively affect other hematological and biochemical parameters. In this study, the average volume of red blood cells is referred to as mean cell volume (MCV), and all treatment groups showed significant declines ($p > 0.05$) when compared to the healthy control group. Additionally, when compared to animals in all other treatment groups, animals in group 8 (fed with 80% Noodle B prepared with Noodle seasoning) had a significantly lower Mean Cell Volume (MCV) ($p > 0.05$). The decrease corroborated a study by [Ashaolu *et al.* \(2011\)](#) who found that the toxic effects of MSG on red blood cells must have caused a decrease in the life duration of given red blood cells in rats, which may also have resulted in a decrease in MCV of the blood with low dose of MSG, which also could lead to a reduction in MCV of the blood.

However, there were non-significant increases ($p > 0.05$) in groups 4,5, 8 and 9 (all groups fed with noodles prepared with the seasoning) compared to the control group. Percentage Lymphocyte (LYM) did not indicate any significant difference in the treatment groups when

compared to the normal control group. These non-significant ($p > 0.05$) increases may have been brought on by the harmful effects of the MSG in the noodle flavoring. This conclusion was consistent with that of [Ashaolu et al. \(2011\)](#) who demonstrated that MSG treatment significantly affects the neutrophil and lymphocyte numbers, indicating, respectively, a weakened immune system and poisoning in the treated animals.

Low blood platelet counts, commonly known as thrombocytopenia, are caused by the coagulation factor, which works in conjunction with platelets to start blood clotting. Consuming toxic substances or having immune system issues can both cause low platelet counts. When compared to the normal control group in this study, the levels of platelets were significantly lower in groups 4 (fed with 80% Instant Noodle A prepared with noodle seasoning) and group 8 (fed with 80% Instant Noodle B prepared with noodle seasoning). It supported a study by [Ashaolu et al. \(2011\)](#) who found that even modest dosages of MSG had a harmful effect on blood platelets. However, group 6 (fed with 80% Instant Noodle prepared with Natural Spice) experiences a significant increase in platelet counts ($p < 0.05$).

Serum proteins included in blood total protein contribute to the proper operation of the body. Different serum proteins that are found in blood help the immune system to function at its best. The two most important ones are serum albumin and serum globulin. The liver is where these two proteins are made. The total protein content of the animals given noodles and those in the healthy control group did not differ significantly ($p < 0.05$). Rats given instant noodles had non-significant increases ($p > 0.05$) in their total protein content. The coloring ingredient (Tartrazine) used in the production of instant noodles must be to blame for these increases. This outcome was consistent with that of [Amin et al. \(2010\)](#), who discovered that giving male rat's tartrazine at a low dosage for 30 days caused an increase in blood total protein. A concentration of heme brought on by dehydration may be the reason of

the rise in serum total protein (5). When compared to the normal control group, the albumin concentration in all treatment groups did not exhibit any discernible variation. Instead, when compared to the groups fed with 80% instant noodles prepared with Natural spice (groups 2 and 6), the groups fed with 80% instant noodles prepared with Noodle seasoning displayed significant increases ($p < 0.05$) (group 4 and group 8). This rise must have happened as a result of the harmful interactions between tartrazine and the MSG in the instant noodles. This finding backs up a research by [Tawfik \(2012\)](#) who found that even a little amount of MSG consumption can have negative effects on the liver and kidneys. This impact may be brought on by the oxidative stress that MSG causes in the liver and kidney cells. [Amin et al. \(2010\)](#) reported a substantial rise in serum albumin when rats were given modest dosages of tartrazine for 30 days. This outcome was consistent with [Sanni et al.'s \(2013\)](#) research, which found that prolonged instant noodle intake had an adverse effect on the liver and kidney of Wistar albino rats.

CONCLUSION

In general, Wistar rats' growth rates, body weight, hematological parameters, and serum protein levels were negatively impacted by prolonged ingestion of instant noodles. This suggests that making fast noodles without the noodle flavor and instead using natural spices like crayfish and onions can help lessen their detrimental effects. As a result, because they are heavy in carbohydrates and low in protein, fast noodles do not encourage development rate.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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