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Survey and Evaluation of Some Physiological Properties of Some Spices of Sokoto, North West, Nigeria.

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Abstract: *The use of spices for seasoning food and beverages is an age long practise. Some of these spices are also known to have some medicinal values but there is paucity of information on the spices that are commonly used in this part of the country.A survey was therefore conducted to identify the spices, their medicinal uses, culinary uses and methods of preparation as seasoning agents. The survey has identified twelve (12) spices used for various purposes.Three of these spices (onion, garlic and ginger) were evaluated for their effects on haematological parameters (PCV, Hb, WBC and RBC) using 10% and 50% treatment in mice diet. The result shows that 10% treatment was better than 50% because there was significant weight gain and slight improvement on the haematological parameters studied especially with the ginger group.*

Keyword: *Spices, Haematology, Weight gain, Sokoto, Physiological properties.*

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I. Introduction

Broadly speaking, spices are aromatic vegetable products of the tropical origin that are used in a pulverised state, primarily for the seasoning or garnishing food and beverages. They are characterised by pungency, strong odour, and sweet or bitter taste majorly in powdery forms[1,2]They have both nutritional and medicinal importance.[3] They consist of rhizomes, bulbs, barks flower buds, stigma fruits, seeds and leaves. They are commonly spoken of loosely as spices, spice seeds [4,5,6].

Spices are grown in many parts of the world and according to the climatic conditions may be dried out-doors. In ancient times they were valued as basic components of incense, embalming preservative, ointments, perfumes, antidotes against poison, cosmetics and medicines, and were of little used in food [5,6,7,8,9]. It was only in the first century A.D. that spices found their way into the kitchen.

II. Materials And Method

A cross section of the spices sellers and herbalists within Sokoto Metropolis were interviewed using structural questionnaire to obtain answers on the types of spices their uses and preparation. Sample of such spices were collected and kept for analysis later.

Twenty one mice, chick mash, weighing scale, microscope, a centrifuge machine, heparinised capillary tubes, sample bottles containing EDTA, distilled water, cotton wool, scalpel blade, oven, plasticin, Hyem's solution, Turk's solution, white cell pipette, micro-haemocytometer, cover slip, Red cell pipette, Drabkin's diluents solution, calorimeter, Handlen and scissors were used.

a) Preparation Of The Spices

Onion, garlic and Ginger were bought from the market oven dried and the made into powdered. Two different concentrations of each of the test samples (Onion, garlic and Ginger) were used for the study i.e. 50% and 10%. These were prepared by mixing 50% or 10% of the test samples with 50% of the feed used (chick mash) and 90% respectively.

The mixture were then made into pellet and sundried

b) Methodology

The 21 mice were divided into group A, B, C, and D. Group A, B, and C were divided into A1 and A2, B1 and B2, C2 and C2 with each having three miles including group D.

Group A1 was fed with feed containing 10% onion and A2 was fed with feed containing 50% onion.

Group B1 was fed with feed containing 10% garlic and B2 was fed with feed containing 50% garlic.

Group C1 Was fed with 10% ginger and C2 with 50% ginger all for 15 days.
Group D was fed with chick mash only and serve as control.

c) Collection Of Blood For Analytical Procedure

After 15 days of feeding with the spices blood was collected through the tale vain by cutting the tip of the tail with a scalpel blade. The blood was collected into a sample bottles containing EDTA (anti coagulant)
Later the animals were sacrifice by using a scalpel blade, the jugular and carotid vessels were severed at the neck region and blood was also collected into sample bottles containing EDTA (anti coagulant)
The mice were dissected; placing them on dorsal decumbency with the limbs extended sideways and fastened to the table by pins. And using a sharp scissors and forceps, the organs were excised and observed for gross change.

A. Haematological Analysis

a. Total Erythrocyte (Rbc) Count

These were determined by the haemocytometer method. The total RBC count was done by drawing the blood in a read pipette, until it was level with the 0.5 mark. The outside of the pipette was wiped with cotton and then diluting fluid (Hyem's solution) drawn upto the 101 (i.e. final dilution of one in 200). The pipette then wiped again from outside and the tip closed with the thumb and mixed by shaking. The counting chamber was cleaned and covered with cover glass placed. The chamber was then filled by holding the pipette at an angle of 45 degree after discarding about a quarter of the mixture and the counting was done using microscope and the result was multiplied by 10,000 (1×10^4). Count all the erythrocyte in 5 of the 25 small squares in the central area, beginning at the left of the top row of four small squares, then from right to left for the next row, and so on.

b. Total White Blood Cell Count (Wbc)

The total white blood cell count was done in a similar manner to erythrocyte. The blood was drawn to the 0.5 mark on the stem of a white cell pipette, and diluting fluid (Turk's solution) to the 11 mark immediately above the bulb. The cells were counted in the 4 corner square millimetre. The result was then multiplied by 50.

c. Haemoglobin Concentration

The haemoglobin concentration (Hb) was determined by cyanmethaemoglobin method using the Beckman model spectrophotometer, with the use of this method, 0.02ml of blood was added to the 5ml of Drabkins solution and mixed. The reading was done with spectronic photometer at wave length of 540nm.

d. Pack Cell Volume (Pcv)

The estimation of the PCV (haematocrit, PCV) was done by the micro haematocrit method with method, the blood was collected into the capillary tube and sealed with the cristaseal and then kept into micro haematocrit centrifuge which moves about 5000 revolutions for 5minute (i.e 1000 revolution per minute) and then removed. The percentage reading was done using the microhaematocrit reader

e. Statistical Analysis

Result were expressed as men ± standard error of the men (i.e mean S.E.). Student T test was used to compare result from various treatment with the control and P 0.05 was accepted as significant.

III. Results

Table 3.1, 3.2 and 3.3 show summaries of the types of spices, uses and methods of preparation obtained from our survey.
Table 3.4, 3.5 3.6 showed effects of the spices on the weight of the texted animals. Generally, there was a net weight loss at 50% of the spices tested or fed, while at 10% there was net weight gain as in the control without the spices.
The results of the effect of spices evaluated on haematological indices are in the table 3.7, 3.8, and 3.9. Generally 50% of the treatment significantly (P 0.05) reduced the haematological values studied except for ginger where there was an increase PCV.
Similarly 10% of the treatment does not show any significant different (P 0.05) in all the parameters investigated except ginger were there was a significant increased (P 0.05) when compared with the control.

Table 3.0: showing Spices found in Sokoto and its culinary uses**.**

S/N	Hausa name	Scientific name	Culinary uses
1.	Masooroo	*Piper guineense*	Soup , pepper soup, meat rice and yam pourage
2.	Yajigora	*Aframomum melgueta*	Soup and kaya mai jigo
3.	Kanufari	*Eugenea calophylloides*	Tea, pourage, soup, joloof rice, meat and fura
4.	Kimba	*Xylopia aethiopicum*	Kunu, fura, and pap.
5.	Diyanmiya	*Monodora myristica*	Pepper soup, stew, joloof rice, beans soup, and yam pourage, meat.
6.	Tafranuwa	*Allium sativum*	Joloof rice, pepper soup, beans soup, stew, yam pourage
7.	Citta	*Zingiber officinale*	Pepper soup, soup, joloof rice, pap, pourage, meat, tea, yam pourage
8.	Fasakwari	*Fagara zanthopxyloides*	Fancy meat
9.	Brokonu	*Capsium spp*	Pepper soup, soup, joloof rice, beans spourage, kunu, papand fura
10.	Albasa	*Allium cepa*	Pepper soup, soup, joloof rice, bean pourage, yam pourage, fancy meat
11.	Kulla	*Thonningia sanguinea*	Kunu, pap.
12.	Daddawa	*Parkia biglobosa*	Soup, it takes the place of magi

Table 3.1: showing the local spices and method of preparation

S/N	HAUSA NAME	SCIENTIFIC NAME	METHOD OF PREPARATION
1.	Masooroo	*Piper guineese*	Dried and ground into powder
2.	Yaji gora	*Afromomium melgueta*	Dried and break the external shell to remove the seeds. The seeds are then ground into powder.
3.	Kanufari	*Bugenea calophylloides*	Dried and ground into power
4.	Kimba X	*Xylopia aethiopica*	Comes in dried form can be used in a state or ground into powder depending on the requirement of the dish
5.	Diyanmiya	*Monoderia myristica*	Dried and exshelled the external covered and ground into powder.
6.	Fasakwari	*Fagara zanthoxyloid*	Remove the bark of the plant. Dried and ground powder.
7.	Tafarnuwa	*Allium sativum*	Used fresh or dehydrated, dried and ground into powder of granulated form
8.	Albasa	*Allium cepa*	The leaves and bulb is used fresh or inb dehydrated form ground into powdered and used instead of fresh onions.
9.	Citta	*Zingiber officinale*	The rhizome is carefully scraped, dried and ground into powder.
10.	Brokunu	*Capsicum annum(hot) frutescense*	Can be use fresh by cutting itinto smaller pieces or dried and ground into powder.
11.	Kulla	*Thonningia sanguenea*	Dried and ground together into powder

Note: These spices are used in the whole state or ground, depending on the requirements of the dish.

Table3.3 showing spices found in Sokoto and its medicinal uses.

S/N	LOCAL NAME	SCIENTIFIC	MEDICINAL USE NAME
1.	Masooroo	*Piper guineense*	Preserving herbs decoctions add taste to herbs decoction. Treatment of the hypertension
2.	Yaji gora	*Afromomum melgueta*	It gives energy. Given to women who have just delivered to help flush out clotted blood in the womb. Treatment of curious teeth.
3.	Kanufari	*Eugenea calophylloides*	Preserving herbs decoctions add taste to herbs decoction. Treatment of tooth of pneumonia in chicken.
4.	Kimba	*Xylopia aethiopicum*	Treatment of dysentery and pile when mixed wih other herbs. Treatment of pneumonia in chicken
5.	Diyanmiya	*Monodora myristica*	Plus other herbs to improve libidoin men
6.	Tafranuwa	*Allium sativum*	Plus honey and used in treatment of ulcer and hypertension. Plus other herbs and used in treatment of asthma
7.	Citta	*Zinziber officinale*	Used in treatment of cold. Plus garlic it cure catarh pulsplus honey it cure headech accompany catarrh.
8.	Fasakwari	*Fagara zanthoxyloides*	Treatment of cold and sickle cell anaemia. Improve libido in men. Plus other herbs used in dysentery fever and also to preserve herbs decoction. Treatment of gonorrhoeic occhitis rheumatism and hydrocells.
9.	Brokonu	*Capsicum annum frutescense*	Treatment of rheumatism. Neuritis inflammation and diarrhoea. The leaves are used in treatment of endoparasites.
10.	Albasa ceps	*Allium cepa*	Treatment of hypertension and asthma. Plus fasakwari, kulla and lemon orange both used to relieve menstrual pain and abnormal menstrual flow.
11.	Kulla	*Thonningia sanguine*	Improve libido in man
12.	Daddawa	*Parkia biglobosa*	Not known

Table3.4: Showing the effect of The Diet Supplemented Onion On Weight Of The Mice. Generally, there was a net weight loss at 50% of the spices tested or fed, while at 10% there was net weight gain as in the control without the spices.

% of treatment	No. Of animals	Day	Day	Day	Day
		0	5	10	15
0	3	28.8±5.2	28.6±3.6	29.4±3.4	32.0±3.6
10	3	10.2±1.4*	12.1±2.0*	12.3±2.4	15.8±1.1*
50	3	22.1±0.9*	20.1±0.9*	19.7±1.1*	18.1±1.4

*= $p < 0.05$
*= $p > 0.05$

Table3.5 Showing the effect of the diet supplemented with garlic on weight of the mice. Generally, there was a net weight loss at 50% of the garlic tested or fed, while at 10% there was net weight gain as in the control without garlic.

% treatment	No. of animals	Day	Day	Day	Day
		0	5	10	15
0	3	28.8±5.2	28.6±3.6	29.4±3.4	32.0±3.6
10	3	13.9±0.8*	15.2±1.1*	15.4±1	15.6±1*
50	3	24.8±1.1*	22.0±0.9*	21.6±0.4*	19.4±0.6

*= $p < 0.05$
*= $p > 0.05$

Table3.6 Showing the effect of the diet supplemented with ginger on weight of the mice. There was a net weight loss at 50% of the ginger tested or fed, while at 10% there was net weight gain as in the control without ginger.

% of treatment	No. Of animals	Day	Day	Day	Day
		0	5	10	15
0	3	28.8±3.6	28.6±3.6	29.4±3.4	32.0±3.6
10	3	8.9±1.4*	9.7±1.8*	9.9±1.5*	10.2±1.5*
50	3	12.6±1.2*	10.5±1	11.0±0.9*	9.8±0.8

*=$p<0.05$
* =$p>0.05$

Table3.7: Showing the effect of the diet supplemented with onion on haematological parameters. Fifty percent of the treatment significantly (P 0.05) reduced the haematological values studied.

%of treatment	No. of animals	PCV (%)	Hb(gm/dl)	RBC(mm^3)	WBC(mm^3)
0	3	44.67±1	15.63±0.6	$6.90x10^6$±0.7	$5.97x10^3$±0.7
10	2	46.50±0.4	15.50±0.8	$6.23x10^6$±0.6	$5.86x10^3$±0.1
50	3	42.0±0.5	10.43±0.7	$4.74x10^6$±0.3	$4.6x10^3$±0.7

*=p<0.05
*=p>0.05

Table3.8: Showing the effect of the diet supplemented with garlic on haematological parameters. Fifty percent of the treatment significantly (P 0.05) reduced the haematological values studied.

% treatment	No. of animals	PCV (%)	Hb(gm/dl)	RBC(mm^3)	WBC(mm^3)
0	3	44.67±1	15.63±0.6	$6.90x10^6$±0.7	5.97x103±0.7
10	3	47±0.5	15.17±0.6	$6.7x10^6$±0.3	$5.47x10^3$±0.5
50	3	41±0.5	10.63±1.1	$4.49x10^6$±0.5	$5.70x10^3$±0.4

*=p<0.05
*=p>0.05

Table3.9: Showing the effect of the diet supplemented with ginger on the haematological parameters. The PCV was markedly increased with 10% treatment.

% of treatment	No. of Animals	PCV(%)	Hb(gm/dl)	RBC(mm^3)	WBC(mm^3)
0	3	44.57±1	15.63±0.6	$6.90x10^6$±0.7	$5.97x10^3$±0.7
10	3	4.9±0.6	17.75±0.3	$7.57x10^6$±0.2	$5.90x10^3$±0.1
50	3	48.33±0.7	13.0±0.3	$5.65x10^6$±0.4	$6.97x10^3$±0.4

*=p<0.05
*=p>0.05

IV. Discussion

Out of the 34 spices reported to be available in the country [10].twelve of them have been identified within Sokoto metropolis from our survey which represent about 50% of the spices [11] reported in their survey in Kaduna state this may be attributed to the cosmopolitan nature of Kaduna which has more non indigene compare to Sokoto state. The survey also revealed that apart from the culinary uses, spice were considered also important medicines in the treatment of various ailment (Table3.3).

The effect of the spices was also studied on weight, our result showed that 10% of all the spices used (onion, garlic and ginger) caused a significant increase ($p<0.05$) in weight gain by the test animal when compared with the control, while 50% of the spices resulted in significant decrease ($p<0.05$) in weight. The implication of

this is that caution should be exercise in quantity of spices consumed. It is also known that experimental feeding of onion to pregnant ewes has resulted in loss of appetite and weight. This is an agreement with our result especially at 50% of the onion to the mice (Table 3.4).

The effect of the three spices studied on haematological parameters are shown in table 3.7, 3.8 and3.9. At 10% the treatments appear not to have significant effect on the parameters studied except in the ginger group where there was a significant increase in PCV, Hb and RBC values when compared with the control. This may probably suggest that ginger may be increasing haemopoiesis.

Data in the 50% treatment for all the groups shows a common trend, here there is a general decrease in all the parameters studied, this is however still within the normal range reported in standard test book [12, 13].This value is however at the lowest end of the range. This suggest that caution must be exercised in the use of these spices especially at this concentration to prevent anaemia that may result from the reductions in these vital haematological values.

In conclusion, this study shows that inclusion of 10% garlic, onion and ginger in mice diet is better than 50% of the spices in the diet and more specifically 10% of diet may increase haemopoiesis.

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