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Production and Fortification of Kwash Pap Weaning Foods for Malnourished Child

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Abstract: *This study is aimed at Production and fortification of Kwash Pap Weaning Foods for Malnourished Child. The study will be conducted at state specialist hospital Maiduguri, Mala Kachala baby friendly hospital Maiduguri, Umaru Shehu ultra-modern hospital and Mamman Shuwa memorial hospital Maiduguri. A samples of kwash pap as weaning foods for a child from 6 months old that severally malnourished will be produce as sample A, B, C and D respectively. The samples was subjected to proximate analysis, which are; Moisture content analysis, Ash content analysis, protein content analysis, fats content analysis, crude fibre analysis, minerals analysis, followed by distribution of questionnaires to 30 respondents each of the samples to test its acceptability after practical presentation or rate assessment of the kwash pap used as weaning food.*

INTRODUCTION

Breast milk feeding from child birth up to 18 months to (20) twenty months and is being supported by various health personnel in most part of the world, especially in African countries are very vital or important and essential towards the development of a child's mental ability and healthy mental growth (Hassan *et al.,* 1989)

Weaning refers to introduction of food other than mother's milk or complete discontinuation of breast milk or introduction of solids to diet. Generally, the term weaning is used to denote the process in which infant changes from breast milk to mixed diet (Bressani, Harper, and Wickstrom. 1984).

In some various communities a societies most African children are subjected to quit from breast milk feeding at the early stage which make them too vulnerable to child several diseases which result in mental disabilities. Even though commercial classes of food are available and most of them are priced beyond the reach of children in societies and communities of the majority of the

population in our societies manufactured using technology are varied and are sold at a high price in sophisticated packaging. (John, 1988)

In the history of weaning, weaning in many concepts simply means to accustom and it denotes the process by which the infant child gradually becomes accustomed to the full adult diet. Simply in usually during the weaning period the young child's diet change from the milk along to one based on the regular family meals, weaning starts at a different time in different societies (Mash (1970). Weaning are important to babies in most societies are from your out grown baby clothes, you can properly guess a lot. It also improves baby's birth weight double by 6 months and triple by one year. To support these growth babies needs a nutrients diet. From 6 months of age neither human breast milk nor infant formular milk along a sufficient to make babies growing need and introduction of solid to the diet is essential

When your baby is 6-month-old you noticed that is starting to show you signs of being ready to wean like hand sucking toy chewing increasing the demand of breast milk, night waking asking for nutrition and increase interest in adult food as he tries to grab some of your plate (John., 1987).

It is true the WHO recommence exclusive breast feeding for 6 months at least bat every child is different and if you see these signs in a baby before this time come, we recommend you to consult the doctor prior to making any step towards introducing him to a solid food. Babies are like adult; they need a healthy balance diet and support their growth and increases their health intelligence due to abundance of nutrient food belonging to the following groups

Carbohydrates which include rice, potatoes, bread, couscous, cereals etc. upper your baby while saving of this food groups at every meals and some lack times, as it will provide him with energy need for growth and develop his capacity, in addition to a public acid, vitamin B, iron and calcium in groups of 3getable these groups consist of fresh frozen, packaged and dried vegetables id fruit that have high in multiple vitamins and minerals deemed necessary for babies growth and it will be better if you can save your baby a small amount of these foods with each meal or snacks.

Diary product which helps to grow with high level of calcium and protein, along with few types of vitamins and minerals such as vitamin D, that helps build bones and make teeth stronger. It also serves a baby these types of food 3 times a day at least except for egg butter and cream (Genigeorgis., 1981).

Meat and fish is alternatives your babies dietary system must include one having of fish a day or 2 service of alternative vegetable products, like beans: seeds and nut, for these types of food provide your kid with omega 3 acids, protein, iron, zinc and other minerals and vitamins known for their major role in growth (Barrell et.al.,1980).

Fats and sugars: this group includes: butter, oil, cakes, biscuits and other types of sweets. It provides your babies with energy and small number of vitamins and minerals, that's why it's important that you limit his daily consumption of some and substitutes it as much as possible with other types of; healthy foods. As each food group has its own specifications and his own role in your child's growth and development, we ask you to make food diversification your priority and make sure not to exceed the limitations and precautions when it comes to adding sugar and salt to his meals and avoiding food allergens like honey, cow milk and nuts, until his immunity is in complete readiness for them, according to doctors

Statement of the Problem

Lack of consumption of rich food was reported to cause potential health hazards to the child's growth and development in Nigeria and Africa as general. Protein energy malnutrition (PEM) has been identified as one of the most endemic notational problems in sub-Saharan Africa including Nigeria (Asha., 1991).

Attempts have been made to device certain strategies for combating this menace. Highly nutrition's foods rich in proteins and high calorie value promoted this research. Cereal grain and legume complementation has been suggested. In Africa traditional food with adequate nutritional values like ndalaye is recommended. Nutritional deficiency disease like kwashiorkor and marasmus can be equally controlled (UNICEF., 2008).

Moderation refers to having the proper amount of nutrient having the proper amount of having neither too little or no too much. A healthy diet in cooperates all nutrient in moderation. Low protein intake has several health consequences and a severe lack of protein in the diet causes death (UNICEF., 2008). This the motive for production and fortification of kwash pap weaning foods for malnourished child to ascertain whether or not the formulation is up to the nutritional standard.

Objectives of the study

The aim of this research is to produce and fortify kwash pap weaning foods for malnourished children.

The specific objectives of the study are;

i. To produce the product kwash pap
ii. To mix the raw materials and produce the finished produce
iii. To determine the proximate composition of the raw materials and products
iv. To carry out the sensory evaluation of the products

LITERATURE REVIEW

The study was based on the research carried out by Nkama *et al.* (1994) who determined the traditional method of Ndaleye and kwash pap for weaning food production from millet as a fermented sun-dried agglomerated powder made from millet or sorghum

It also carried out chemical analysis involving protein, ash, moisture content, fats, crude fibre and carbohydrate by difference, (AOAC 1994). This research was different because of the instruction of soybean as a complement to enhance the nutritional amino acid i.e. methionine and lysine are both essential amino acids for the finish product.

Production of weaning foods from soybean and groundnuts which have helped many infants to address the problems of kwashiorkor and marasmus in developing countries is advocated (Pawar and Dhanvijay, 2007).

Bina *et al.* (1985) reported that weaning infant is potentially at risk in developing countries and many nutritional problems arise with the introduction solid foods.

Malnutrition is one of the major cause morbidity and mortality among young children and hence balance diet of high nutritional content is advisable to be introduced in weaning foods (Harper and Jansen, 1985). Macrae *et al.* (1993) developed protein requirement of 1.5, 0.6 and 4g per kg body weight per day for the age group of 1-2, 5-6- and 9-12-months old children.

METHODOLOGY

The study was conducted at state specialist hospital Maiduguri, Mala Kachala baby friendly hospital Maiduguri, Umaru Shehu ultra-modern hospital and Mamman Shuwa Memorial Hospital, Maiduguri.

A sample of kwash pap as weaning foods for a child from 6 months old that severally malnourished it will be produced as sample A, B, C and D respectively. The samples were subjected to proximate analysis, which are; Moisture content analysis, Ash content analysis, protein content analysis, fats content analysis, crude fibre analysis, mineral followed by distribution of questionnaires to 30 respondents each of the samples to test its acceptability after practical presentation or rate assessment of the kwash pap used as weaning

RESULTS AND DISCUSSION

Table 1: Effect of Dehulling on the Mineral content of samples (Mg/100g)

Sample (Code)	Mg	P	Ca	Mn	K	Na	Fe	Zn
DMF	42.560±0.0100	3.85.15±0.0100	175.33±0.0100	11.230±1.00E.02	231.31±0.0153	41.603±0.4706	4.3500±0.0100	1.886±0.0153
UMF	47.703±4.333E.04	391.35±0.0153	182.03±1.000E.02	18.823±0.0153	260.71±0.0100	47.129±0.0153	4.5633±5.774E.03	1.969±5.774E.03
DSF	37.340±0.0100	265.62±0.0153	141.21±0.0100	20.735±1.000e.02	391.11±1.000e.02	31.513±0.0153	2.6533±5.774E.03	1,85±0.0100
USf	38.110±1.000E.02	265.33±0.0100	124.62±0.0153	21.105±5.774E.03	384.33±1.000E.02	37.825±1.000E.02	2.9233±0.0115	1.8800±1.000E.02
DSOF	675.12±0.0153	137.34±0.0200	335.84±0.0115	65.657±5.774E.03	675.12±0.000	64.298±0.0115	12.350±1.000E.04	4.553±5.5774E.03
USOF	74.613±0.0404	154.32±0.0153	310.01±0.0173	58.613±0.0153	682.83±0.0115	62.435±1.000E.02	13.228±0.0115	4.6433±0.0153

Key: DMF = Dehulled Mlllet Flour; UMF = Undehulled Millet Flour; DSF = Dehulled Sorghum Flour; USF = Undehulled Sorghum Flour

DSOF = Dehulle Soybean Flour; USOF = Undehulled Soybean Flour

The result of the mineral elements composition in the dehulled and undehulled samples were potassium (231.31mg, 50.79mg) for millet, (3911.11mg), (384.32mg0 for sorghum and (675.12mg; 682.84mg) for soybeans respectively in which were higher in potassium content.
The magnesium content for dehulled and undehulled sample were (42.55mg, 47.70mg) for millet, (37.34mg, 38.13mg) for sorghum and (65.65mg, 74.59mg) for soybean respectively. The magnesium content of sample is also high.
Calcium, phosphorus and sodium content of the sample were at the high side. The concentration of zinc, iron and manganese content of the sample were low in dehulled and undehulled millet, sorghum and soybean respectively.
The result obtained shows the negative decline in mineral concentration in favour of undehulled samples of millet, sorghum and soybean than the dehulled samples. This is due to the reduction of the pericarp, endosperm, bran and other anti-nutritional factors e.g. oxalates, tannins, etc during dehulling but improves the bioavailability and palatable content of the food sample (Joseph, et al. 2021).
The high iron content of the soybean sample for both dehulled and undehulled samples at 12.35mg to 13.26mg as a remedy for iron deficiency in diseases, that is,. anaemia.

Table 2: Effect of Dehulling on the Functional Properties of Samples

Samples (CODE)	Oil Absorption Capacity (OAC) (g)	Bulk density (BD) (g.m3)	Water Absorption Capacity (WAC) (%)	Swelling Capacity (SC) (g)	Gelatinization Capacity (GC) (%)	Viscosity (CP)
DMF	80.645±1.000E.02	0.5667±0.0153	83.401±0.0153	16.566±0.0265	14.347±0.0252	375.30±0.000
UMF	76.963±5.2802	0.6367±0.0153	86.287±0.0252	17.730±1.000E.02	18.535±1.000E.02	387.33±0.0115
DSF	84.250±0.0100	0.6133±0.0153	82.58±0.0200	18.930±0.0173	17.127±0.0115	331.36±0.0153
USf	87.623±5.774E.03	0.6433±5.774E.03	84.360±0.0100	20.487±0.0153	18.343±0.0252	342.61±0.0153
	Oil Absorption Capacity (OAC) (g)	**Bulk density (BD) (g.m3)**	**Water Absorption Capacity (WAC) (%)**	**Foaming Capacity (fc) (%)**	**Emulsification Capacity (EC) (%)**	**Viscosity (CP)**
DSOF	78.143±0.0153	0.8067±0.0252	80.177±1.000E.02	6.277±0.0153	8.3467±0.0252	462.73±1.000E.02
USOF	80.807±02.0252	0.8500±0.0100	83.595±1.000e.02	17.330±1.000e.02	6.556±0.0115	481.34±0.0153

Key: DMF = Dehulled Milllet Flour; UMF = Undehulled Millet Flour; DSF = Dehulled Sorghum Flour; USF = Undehulled Sorghum Flour
DSOF = Dehulle Soybean Flour; USOF = Undehulled Soybean Flour

Table 4..2 functional properties of the sample shows the six sample are dehulled millet flour (DMF), undehulled Millet Flour (UMF), dehulled sorghum Flour (DSF), undehulled sorghum flour (USF), dehulled soybean flour (DSOF) and undehulled soybean flour (USOF) respectively. The result were taken in triplicate samples of mean and standard deviation is determined on the ANOVA table.

The result of the functional properties of samples of millet, sorghum and soybean flour was determined for oil absorption capacity, bulk density, water absorption capacity, swelling capacity, gelatinization capacity, foaming capacity, emulsification capacity and viscosity was analysed for all the samples.

The oil absorption and water absorption of the samples increased from dehulled to undehulled samples of millet, sorghum and soybean flours from (80.63% to 82.97%) and to (84.26% to 87.63%) for water absorption capacity and (83.37 to 86.30%) (0.16% to 83.63%) respectively. The samples exhibit high degree of viscosity and low bulk density as shown on Table 3. The swelling capacity (%) of the sample increases as the samples are dehulled for millet, sorghum and soybean flours respectively. Gelatinization capacity of samples of millet, sorghum and soybean increasing from dehulled to undehulled flour, foaming and emulsification capacities also reduced as the sample are dehulled, likewise increases for the undehulled samples

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