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Abstract

Index terms—

1 I. INTRODUCTION

Breast milk is a bio fluid which is highly variable that is needed by an infant for nourishment, reduces infantile mortality by tenfold (Hennet and Borsig 2016) and protection against infectious diseases within a specific period while the infant gets matured (Andreas et al., 2015). At birth a baby needs breast milk for his growth, breast milk are known to be rich in protein, micronutrients and which fight against disease in the infant body. As an infant grows and increases in weight he becomes more active, at this stage breast milk can't sustain him to maintain his body functions, and such need extra food. To supplement breast milk he need semi solid food made from cereal, grain and enrich with other things. Weaning is the process of introducing a baby to other nutrient other than breast milk with the intention to boost their intake of wholesome nutrient needed for their growth and development. Adequate weaning food should comprise of high balanced-protein content, high caloric value per unit of food volume, soft texture with low fiber content, adequate vitamin and mineral contents, and absence of ant nutritional factors. In the developed world mothers utilize commercial weaning food stored in cans, tins or packaged food which are convenient however, they are relatively expensive (Sant'Anna, and Keszler 2012).

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Orange fleshed sweet potato is easily digestible and is mainly required for children because of their immature digestive system. Formulation of complementary food are prepared using a mixture of cereals and legumes which guarantee a proper balance of amino acids to provide a complete protein (Wu and XU 2019). Corn jellos (Agidi) is a (cereal starch pudding) prepared from maize, millet or guinea corn by boiling the paste into a thick semi solid form, usually used as a weaning food. To complement the expensive baby food with readily available local resources with high nutritional content with be a better alternative and hence this research findings.

The Objectives of this study are evaluation the organoleptic attribute and vitamin A content of the corn jellos

2 II. MATERIAL AND METHODS

Umuspo 3 (mothers delight) was sourced from National Root Crops Research Institute Umudike while the maize and other ingredient were sourced from Ahia Eke Market in Umuahia. The maize was sorted, washed, boiled for 20 mins. The water was then drained and wet milled in a milling machine. The slurry gotten was sieved with a muslin cloth decanted and pressed using cheese cloth to obtain maize slurry.

3 Preparation of sweet potato flour

The experimental designed used for the analysis was the control design (CD). The orange sweet potato UMUSPO 3 was selected and peeled, washed, and chipped with a chipping machine. The chipped sweet potato was striped in water for 24 hours to remove the sweetness. After it was sun dried for 12 hours, it was then milled into flour and this was used to form a paste by adding water. This was used to form a blend with maize for the preparation of maize sweet potato corn jellos. The maize/ sweet potato corn jellos were used for determination of vitamin A,

4 Formulation of maize / sweet potato corn jellos

The maize and orange sweet potato paste was formed by mixing 400g of maize in 450mls of waters and 100g OFSP of OFSP flour in 110 ml of water separately. From the slurry formed the corn jellos (Agidi) was prepared in 5 different batches of maize / sweet potato paste blend in the following proportions of 100%, 90%/10%, 80%/20%

44 . 70%/30% and 50%/50%. Each of the maize / OFSP slurry were poured in 200ml boiling water containing
45 other ingredients to obtain sample MSC1, MSC2, MSC3, MSC4 and MSC5. It was stirred constantly until a thick
46 paste was formed. The resultant paste were wrapped in leaf and allowed to cool which was used for organoleptic
47 test and vitamin analysis.

5 III. MAIZE / SWEET POTATO BLEND

6 Determination of Proximate Analysis

50 Proximate composition: moisture, ash, crude fiber, protein and carbohydrate was determined as described by
51 Association of Official Analytical Chemist (2012).

7 Determination of Vitamin A

53 Vitamin A was determined by the methods as described by Onwuka (2005) and they were performed in triplicate
54 to give a wider exposure in order to minimize error. London Journal of Research in Science: Natural and Formal

8 Organoleptic Evaluation

56 Randomly selected 30 semi-trained panelists, drawn from breast finding mothers within Umudike, were used
57 to assess the maize/sweet potato corn jellos for appearance, texture (hand feel) taste, flavour and general
58 acceptability. All the selected assessors were familiar with Agidi and could discriminate between and describe
59 different qualities of the food. The assessors were taught and requested to examine the samples and score
60 according to their respective degree of likeness in a seven-point Hedonic scale as described by Iwe, (2002). The
61 hedonic scale was 7 = 'like extremely', 6 = 'like very much', 5= 'like much'; 4 = 'neither like nor dislike', 3 =
62 'dislike much', 2 = 'dislike very much' and 1 = 'dislike extremely'

9 Statistical Analyses

64 The data generated were subjected to statistical package IBM SPSS Programme version 20 to analyze the data.
65 Results were expressed as mean \pm standard error of mean (SEM). One way analysis of variance (ANOVA) with
66 Duncan post hoc test were used to evaluate the statistical difference between the different groups, the results
67 were considered significance at (P \leq 0.05). Also the graph was drawn with the graph pad. Values are mean \pm SD
68 of 3 replications. Means within a column with the same superscripts were not significant difference (P \leq 0.05). Key:
69 MSC1 (maize 100%), MSC2 (maize 90% and 10% sweet potato), MSC3 (maize 80% and sweet potato 20%),
70 MSC4 (maize 70% and sweet potato 30%) and MSC5 (maize 50% and sweet potato 50)

10 IV. RESULT AND DISCUSSION

72 Table 2 shows the proximate parameter of maize/ sweet potato corn jellos The moisture content ranged from
73 15.74 %to 16.43% with sample MSC5 (50% maize /50% OFSP) having the highest value while sample MSC3 had
74 the least value. The samples differed significantly at P $>$ 0.05. There was a reduction in the moisture content from
75 10 %up to 20% inclusion of OFSP but at 30% to 50% inclusion the moisture content increased progressively this
76 is in line with the findings of korese et al., (2021) that as the Orange flesh sweet potato increases the moisture
77 content increases. Also increase or decrease of moisture content in a food is attributed to increase or decrease of
78 water activity ??Cauvain, and Young, 2000). The samples are not storage stable and will not store for a longer
79 time outside suitable storage condition

80 The Ash content which reveals the total mineral content in a food sample ranged from 0.24% to 0.29%. Sample
81 MSC3 had the least value while sample MSC4 had the highest value. The samples differed significantly at P $>$ 0.05.
82 Samples with OFSP inclusion showed no significant difference but scored higher values than the control samples.
83 The increased in the ash content as evidenced in this research study can be attributed to the OFSP flour samples
84 which has been reported to poses more ash content than maize London Journal of Research in Science: Natural
85 and Formal

86 The fat content ranged from 18.40% to 22.13% values recorded in this study is higher than the fat content
87 reported by Nwanagba et al., 2021 in their study evaluation of the Chemical Composition and Sensory Properties
88 of Soy-agidi Fortified with Alternanthera brasiliana Powder. The high value recorded in this study can be
89 attributed the oil used in preparing the maize/ OFSP corn jellos. The high level of fat reported in this study is
90 well needed and in line with the recommendations of FAO/WHO (1998) that vegetable oils be included in foods
91 meant for infants and children, which will not only increase the energy density, but also be a transport vehicle
92 for fat soluble vitamins. As the amounts of OFSP flour substitution in the blend increases, the amount of fat in
93 the maize/ OFSP corn jellos decrease. The reason may be due to the presence of high fat in maize flour which
94 has been reported to contain more fat than orange fleshed sweet potato as indicated by ??dolo (2012).

95 The protein content range from 3.73 % to 4.90 % with MSC1 having the highest value while MSC4 and MSC5
96 recorded the least. There was significant difference in the protein content with a progressive decrease in protein
97 content as the orange fleshed sweet potato inclusion increases. The protein content reported here is similar to the
98 protein content of 3.25 % to 4, 75 % as reported by Kweku and Coad (2014). There was a progressive decrease

99 in the protein content as the OFSP inclusion increase this was in line with the finding of Tadesse et al. (2015)
100 who reported a decrease in protein content from 8.94% to 7.57% in orange fleshed sweet potato /maize blend flat
101 bread.

102 The carbohydrate content ranged from 56.10% to 60.93%, the carbohydrate showed significant difference at
103 $P > 0.05$ with sample MSC1 having the least while sample MSC5 had the highest value. There was a progressive
104 increase in the orange fleshed sweet potato substituted samples this increase can be linked to the OFSP flour.
105 Values are mean \pm SD of 3 replications .Means within a column with the same superscripts were not significant
106 difference ($P > 0.05$).Key: MSC1 (maize 100%), MSC2 (maize 90% and 10% sweet potato), MSC3 (maize 80% and
107 sweet potato 20%), MSC4 (maize 70% and sweet potato 30%) and MSC5 (maize 50% and sweet potato 50)

108 Table 3 shows the sensory evaluation of maize sweet potato corn jellos blend. The appearance ranged from
109 6.00 to 8.75. The result showed that there was significant difference in the appearance content across the samples
110 however, there was no significant difference between sample MSC4 and sample MSC5 , also sample MSC2 and
111 MSC3 showed no significant difference. Sample MSC4, MSC5 and MSC3 and MSC2 being samples with inclusion
112 of sweet potato recorded the highest value, this indicates that London Journal of Research in Science: Natural and
113 Formal the values increases as the sweet potato inclusion increased. This can be attributed to the beta-carotene
114 content of orange sweet potato which give vegetable their bright colour Faber et al., 2013. The appearance of
115 the sample blend was brighter than that of the control sample. The value for the taste ranged from 4.92 to 7.50,
116 showing that there was no significant difference across the samples except in sample MSC5 which has the least
117 value .This indicate that inclusion of sweet potato at 10%, 20% 30% and 50% caused a decrease in the taste of
118 the samples. However, sample MSC3 was more preferred across all samples substituted with sweet potato while
119 sample MSC5 had the least value. The high concentration of the sweet potato must have affected the taste of
120 the corn jellos.

121 The flavor ranged from 5.42 to 8.00, with the control sample MSC1 having the highest score while sample
122 MSC5 had the least values. The sweet potato inclusion caused a decrease in the flavor. Among the sweet potato
123 substituted samples, sample MSC2 had the highest while sample MSC5 had the least in terms of flavor Key:
124 MSC1 (maize 100%), MSC2 (maize 90% and 10% sweet potato), MSC3 (maize 80% and sweet potato 20%),
125 MSC4 (maize 70% and sweet potato 30%) and MSC5 (maize 50% and sweet potato 50)

126 The vitamin A of the samples (maize sweet potato corn jellos (Agidi) are shown in Figure ???. The vitamin
127 A content ranged from 151.10 μ /100g to 193.50 μ /100g. The control sample had the least value of 151.10 μ /100g
128 while sample MSC5 (50% maize and 50% OFSP) had the highest values of 193.50 μ /100g. As the orange fleshed
129 sweet potato flour inclusion increase there was a progressive increase in the vitamin A content this is probably
130 that OFSP has a higher vitamin A content. This can be supported by the finding of Faber and Laurie 2011
131 who reported that orange sweet potato increased the dietary intake and status of vitamin A. This can interprets
132 the progressive increase of vitamin A across the OFSP substituted samples as reported in this research findings.
133 Orange sweet potato is rich in beta carotene which is a precursor of vitamin A that has the ability of eliminating
134 vitamin A deficiency to prevent night blindness in developing Countries Haskell et al., 2016. The value of Vitamin
135 A recorded in the samples substituted with OFSP is higher than the recommended daily allowance of 178 μ /100g
136 to 185 μ /100g and 127 to 132 which are required for a child between 7 to 12 months of age and for adult females
137 respectively as reported by ??Faber and luarie 2013). So the use of the maize / sweet potato corn jallous is
138 recommended as a weaning food to boost the vitamin A requirement of an infant, which is London Journal of
139 Research in Science: Natural and Formal turn needed for functioning of the visual system, the maintenance of
140 cell function for growth, epithelial cellular integrity, and immune function.

141 11 V. CONCLUSION

142 Based on the results generated from this study, it is therefore, concluded that there are significant changes in the
143 organoleptic parameters of the maize/ sweet potato corn jellos evaluated. The sensory Panelists preferred the
144 appearance of the sweet potato substituted samples than the control sample which is 100% maize. There was no
145 significant difference on the taste across all samples evaluated. The general acceptability were rated high by the
146 sensory panelists across all samples except sample MSC5.

147 The vitamin A content of the samples had a progressive increase as the OFSP inclusion increased with the
148 control sample having least value. This making the product a good source of vitamin A thereby, complementing
149 vitamin A from other sources for a weaning infant. ^{1 2 3}

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² © 2023 London Journals Press Volume 23 | Issue 3 | Compilation 1.0 Nutritional Quality and Organoleptic Evaluation of Maize/ Orange Fleshed Sweet Potato Blend Complementary Food

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Figure 1:

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SAMPLES	Maize paste	Orange fleshed sweet potato
		paste
MSC1	100%	0%
MSC2	90%	10%
MSC3	80%	20%
MSC4	70%	30%
MSC5	50%	50%

London Journal of Research in Science: Natural and Formal PLATE1 (100maize&0% OFSP) PLATE 2 (90%maize&10% OFSP) PLATE 3(80% maize &20% OFSP) PLATE 4 70% maize &30% OFSP PLATE 5 (0% maize 50% OFSP)

Figure 2: Table : 1

2

Sample	MC	ASH	FAT	FIBER	PRO	CHN
MSC1	16.33±0.01c	0.23±0.01b	22.13±0.14a	0.31±0.01a	4.90±0.01a	56.10±0.18d
MSC2	15.97±0.01d	0.28±0.01a	20.90±0.14a	0.28±0.01b	4.88±0.02a	57.29±0.15c
MSC3	15.74±0.01e	0.28±0.02a	20.55±0.21b	0.24±0.01b	4.04±0.02b	59.38±0.01b
MSC4	16.37±0.03b	0.29±0.01a	19.75±0.35d	0.27±0.02b	3.68±0.04c	59.66±0.30b
MSC5	16.43±0.04a	0.28±0.01a	18.40±0.14e	0.26±0.02b	3.73±0.01c	60.92±0.15a

Figure 3: Table 2 :

3

Sample	Appearance	Taste	Flavor	Texture	General acceptability
MSC1	6.00±2.45c	7.75±1.14a	8.00±1.28a	7.50±0.90a	8.00±1.28a
MSC2	7.25±0.87b	7.25±1.54a	7.25±1.14ab	7.00±0.74ab	7.75±0.87a
MSC3	7.50±1.17b	7.50±1.17a	7.00±1.28ab	6.50±1.73bc	8.00±0.74a
MSC4	8.75±0.45a	7.25±1.36a	6.25±1.36bc	6.25±0.87b	7.50±0.52a
MSC5	8.75±0.45a	4.92±1.08b	5.42±1.38c	4.00±2.17c	6.17±0.83b

Figure 4: Table 3 :

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151 Imo State Nigeria.
- 152 [London Journal of Research in Science: Natural and Formal] , *London Journal of Research in Science: Natural*
153 *and Formal*
- 154 [Faber and Laurie ()] ‘A home-gardening approach developed in South Africa to address vitamin A deficiency’.
155 M Faber , S M Laurie . *combating micronutrient deficiencies: Food-based approaches. CABI and FAO*, B
156 Thompson , L Amoroso (eds.) (Rome) 2011. p. .
- 157 [Aoac ()] Aoac . *Official methods of analysis*, (Gaithersburg, USA) 2012. AOAC International. (th ed.)
- 158 [Hennet and Borsig ()] ‘Breastfed at Tiffany’s’. T Hennet , L Borsig . *Trends in Biochemical Sciences* 2016. 41
159 (6) p. .
- 160 [Cauvain and Young ()] S P Cauvain , L S Young . *Bakery food manufacture and quality: water control and*
161 *effects*, 2009. John Wiley & Sons.
- 162 [Haskell et al. ()] ‘Daily consumption of Indian spinach (*Basella alba*) or sweet potatoes has a positive effect on
163 total-body vitamin A stores in Bangladeshi men’. M J Haskell , K M Jamil , F Hassan , J M Peerson , M I
164 Hossain , G J Fuchs , K H Brown . *Am. J. Clin. Nutr* 2004. 80 p. .
- 165 [Korese et al. ()] ‘Effect of orange-fleshed sweet potato flour particle size and degree of wheat flour substitution
166 on physical, nutritional, textural and sensory properties of cookies’. J K Korese , S K Chikpah , O Hensel ,
167 E Pawelzik , B Sturm . *Eurp. Fd. Res. and Tech* 2021. 247 (4) p. .
- 168 [Olori-Great and Okpara ()] ‘Effect of Planting Date on Growth, Carotene and Root Yield of three Sweet potato
169 Varieties [*Ipomoea batatas* (L.) Lam.] in South-East Nigeria’. N G Olori-Great , D A Okpara . *Nig. Agric. J*
170 2021. 52 (1) p. .
- 171 [Nwanagba et al. ()] ‘Evaluation of the Chemical Composition and Sensory Properties of Soy-agidi Fortified with
172 *Alternanthera brasiliana* Powder’. N L I Nwanagba , A N Obetta , U R Isaac , A N Nwachukwu . *London*
173 *Journal of Research in Science: Natural and Formal* 2021. 52 (2) p. . (Nig. Agric. J.)
- 174 [Okwu and Josiah ()] ‘Evaluation of the chemical composition of two Nigerian medicinal plants’. D E Okwu , C
175 Josiah . *Afr. J. of Biotech* 2006. 5 (4) p. .
- 176 [Iwe ()] ‘Handbook of sensory methods and analysis’. M O Iwe . *Rojoint Com. Services Ltd* 2002. Enugu, Nigeria.
- 177 [Andreas et al. ()] ‘Human breast milk: A review on its composition and bioactivity’. N J Andreas , B Kampmann
178 , K M Le-Doare . *Early human development* 2015. 91 (11) p. .
- 179 [Kumar and Jhariya ()] ‘Nutritional, medicinal and economic importance of corn: A mini review’. D Kumar , N
180 A Jhariya . *Res J. of Pharm. Sc* 2013. 2 p. .
- 181 [Tadesse et al. ()] ‘Nutritional, microbial and sensory properties of flat-bread (kitta) prepared from blends of
182 maize (*Zea mays* L.) and orange-fleshed sweet potato (*Ipomoea batatas* L.) flours’. T F Tadesse , G Nigusse
183 , H Kurabachew . *Int. J. of Fd. Sci. and Nutri. Engr* 2015. 5 (1) p. .
- 184 [Francis ()] ‘Orange-fleshed sweet potato-based infant food is a better source of dietary vitamin A than a
185 maize-legume blend as complementary food. Fd and Nutr’. K A Francis , Jane , O . *The Nevin Scrimshaw*
186 *International Nutrition Foundation* 2014. 35 (1) . (Bulletin)
- 187 [Fao and Who ()] *Preparation and use of Food-Based Dietary Guidelines*, Fao , Who . series 880. Geneva. 15.
188 1998. (WHO Technical Report) (Report of a Joint FAO/WHO Consultation)
- 189 [Idolo ()] ‘Sensory and nutritional quality of Madiga produced from composite flour of wheat and sweet potato’.
190 I Idolo . *Pakis J. of Nutri* 2011. 10 (11) p. .
- 191 [Wu and Xu ()] ‘Sprouted Grains-based Fermented Products’. F Wu , X Xu . *Sprouted grains*, 2019. AACC
192 International Press. p. .
- 193 [Onwuka and Onwuka ()] ‘The effects of ripening on the functional properties of plantain and plantain based
194 cake’. G Onwuka , N Onwuka . *International Journal of Food Properties* 2005. 8 (2) p. .
- 195 [Faber et al. ()] ‘Total β -carotene content of orange sweetpotato cultivated under optimal conditions and at a
196 rural village’. M Faber , S M Laurie , P J Van Jaarsveld . *African Journal of Biotechnology* 2013. (25) p. 12.
- 197 [Sant’anna and Keszler ()] ‘Weaning infants from mechanical ventilation’. G M Sant’anna , M Keszler . *Clinics*
198 *in perinatology* 2012. 39 (3) p. .
- 199 [WHO guideline: use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young chil
200 *WHO guideline: use of multiple micronutrient powders for point-of-use fortification of foods consumed by*
201 *infants and young children aged 6-23 months and children aged 2-12 years*, 2016. World Health Organization.