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Acceptability and Sensory Characteristics of Moringa Leaf Powder and Moringa Based Spices in Kwara State.

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Acceptability and sensory characteristics of Moringa *Oleifera* leaf powder and available Moringa based spices for conventional cooking were studied. The available Moringa based spices were Moringa-Ginger, Moringa-Garlic, and Moringa mixed spices (Moringa leaf and ginger and garlic). Moringa leaf powder, Moringa-Garlic mix, Moringa-Ginger mix and Moringa mixed spices were labelled as AA1, AA2, AA3, and AA4. A Forty- Man sensory panel divided into eight groups were allowed to evaluate the spices independently using a 5-point hedonic scale questionnaire for parameters such as aroma, colour, taste, texture and general acceptability. All spices were generally accepted scoring above 4.5 on the 9-point hedonic scale, sensory evaluation data obtained were statistically tested using one way analysis of variance (ANOVA), significant differences determined using Duncan Multiple Range Test (DMRT). There was no significant ($p>0.05$) differences in aroma, taste and

texture except the colour which was significantly ($p < 0.05$) different. However, Moringa-Ginger spice scored highest in general acceptability chart. Moringa-Garlic and Moringa-Ginger spice had the highest hedonic value (6.84 and 6.68) for colour and these values were not significantly different from each other, but significantly different from 5.84 obtained for Moringa mixed spices and 5.79 obtained for Moringa powder while the mixed spices had the lowest value (6.68). This study showed that Moringa leaf powder is acceptable as spice and spice based products and recommends that effort should be devoted to the inclusion of Moringa leaf powder to available spices.

Keywords: Moringa leaf powder, Garlic, Ginger, Spices, and Sensory evaluation.

Introduction

Significant role played by plant in maintaining human health and improving the quality of human life for thousands of years cannot be overemphasized, and plants as well as valuable components of seasonings, beverages, cosmetics, dyes, and medicines have served human and will continue to serve human on daily basis. About 80% of human population relies on traditional medicine for their primary health care needs, and most of this therapy involves

the use of plant extracts or their active components WHO, (1999). Ginger, garlic, cinnamon, pepper, turmeric among others are plants that are used in form of spices (Bengmark 2006). Garlic (*Allium sativum*), ginger (*Zingiber officinale*) and pepper (*Capsicum frutescences*) are common spices used in most cuisines all over the world and have been reported to have hypolipidemic, antibacterial, antifungal, antidiabetic effects as well as the ability to mitigate the negative

effect of alcohol (Barrie *et al.* 1987; Srinivasan 2005; Ugwuaja *et al.* 2010).

Immense benefit of Moringa *Oleifera* plant has been reported (Omotesho *et al.*, 2013) among those reported were the fact that Moringa leaves acts as a good source of natural antioxidant due to the presence of various types of antioxidant compounds such as ascorbic acid, flavonoids, phenolics and carotenoids (Anwar *et al.*, 2007; Makkar and Becker, 1996). Makkar and Becker (1996). It has also been stated that Moringa leaves is an ideal dietary supplement because it contains a highly quality of ascorbic acids, oestrogenic substances and β -sitosterol, iron, calcium, phosphorus, copper, vitamins A, B and C, α -tocopherol, riboflavin, nicotinic acid, folic acid, pyridoxine, β -carotene, protein, and in particular essential amino acids such as methionine, cystine, tryptophan and lysine (Anwar *et al.* 2003). Despite all these attribute of Moringa

Oleifera plant its use as spices has not been reported, therefore the use of this wonder leaf powder on daily cuisine inform of spices will be an indirect way of getting the numerous benefit of the leaf. This study focused on overall acceptability and sensory characteristics of Moringa leaf and Moringa based spices among the Kwara State indigene.

Materials and Method

Sources of Moringa leaf powder and Moringa Based spices.

The Moringa leaf powder and Moringa based spices used were obtained from Ilesanmi Moringa Farm Tanke, Ilorin, Kwara state, Nigeria. The available Moringa based spices were Moringa-Ginger, Moringa-Garlic, and Moringa mixed spices.

Preparation of Samples

10 grammes of each product were scooped, put on a flat plate and coded. Moringa leaf meal, Moringa-Garlic mix, Moringa-Ginger

mix and Moringa mixed (Garlic and Ginger) spices were labelled as AA1, AA2, AA3, and AA4.

Sensory Evaluation Procedure

A Forty- Man sensory panel were divided into eight groups (A five –man per group) and were allowed to evaluate the spices independently for parameters such as aroma, colour, taste, texture and general acceptability using a hedonic scale.

Results and Discussion.

The results of this findings indicated that Moringa leaf powder and Moringa based spices studied were generally accepted as shown in Figure 1, none of the products scored less than 4.5 in the hedonic scale. And there was no significant difference ($p < 0.05$) in the general acceptability. However Moringa- Ginger base scored the highest in general acceptability with a value higher than 7 while Moringa mixed spices scored the least (6.68). Moringa powder and

Moringa- Garlic scored 7.00 and 6.74, respectively.

Table 1 shows that Moringa leaf powder, and other Moringa-base spices studied showed no significant ($p > 0.05$) difference score in Aroma, Taste and Texture. However, Moringa- Ginger base scored the highest in Aroma and Taste, (6.29 and 6.00, respectively) while Moringa- Garlic base scored the highest in Texture (7.32). Significantly ($p < 0.05$) different value were obtained for colour in the range of product studied Moringa-Garlic and Moringa-Ginger base had the highest score for colour and these scores were not significantly ($p < 0.05$) different from each other (6.84 and 6.68), followed by Moringa –mixed spices (5.84) and Moringa powder (5.79).

The results of these findings confirm the use and acceptability of Moringa powder as reported by Makkar and Becker (1996) and Anwar *et al.* (2007).

Table 2 showed the results of proximate composition in the spices evaluated and it showed varying moisture content, ash, crude protein, crude fibre and ether extract content. Moringa – mixed spices (Moringa ginger and Garlic mixture) had the highest moisture content (11.01%), ash (15.16%), crude protein (23.41%) and crude fat (10.98%), while moringa ginger has the highest crude fibre content of 17.45 %.

In conclusion, Moringa leaf powder can be effectively used as spice for cuisines, and also can be a major ingredient and form the base for other spices that are used in

different cuisine, this will not only promote the production of Moringa but will also makes it available to all. Moringa leaf powder can be added to other products such as condiments, seasoning, beverages, table salts etc., as well as available spices to enhance its consumption as well as availability of Moringa leaf powder to human body because of its numerous benefit to humans' health as reported by a lot of researcher. This study however recommends sensory evaluation of cuisines prepared from Moringa leaf powder and Moringa-base spices.

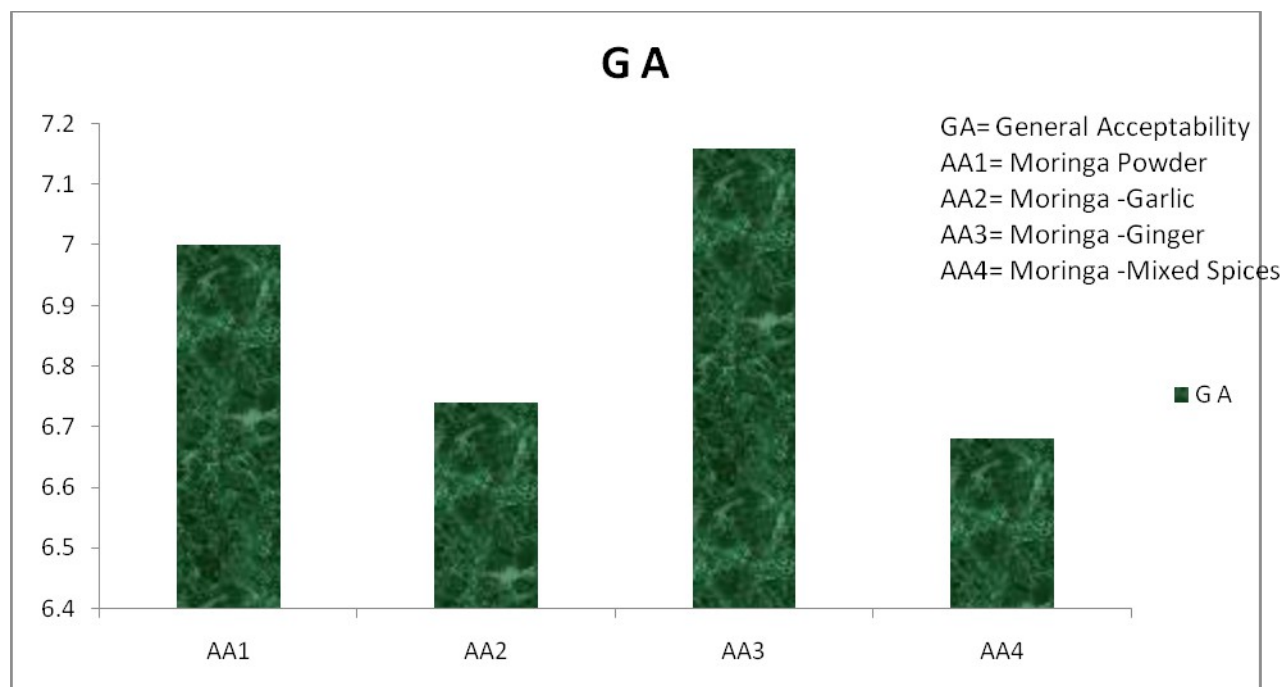


Figure 1: General acceptability of Moringa leaf powder and Moringa – based spices

Table 1: Sensory Evaluation of Moringa leaf powder and Moringa based spices

PARAMETERS	SAMPLE AA1	SAMPLE AA2	SAMPLE AA3	SAMPLE AA4	± SEM
AROMA	6.00	5.79	6.29	5.84	0.01
COLOUR	5.79 ^a	6.84 ^{ab}	6.68 ^{ab}	5.84 ^b	0.18
TASTE	5.84	5.42	6.00	5.42	0.02
TEXTURE	6.79	7.32	7.05	7.37	0.01

Means in the same row with different superscript are significantly different (P<0.05)

*AA1 Moringa leaf powder; AA2 Moringa- Garlic Base

AA3 Moringa- Ginger Base; AA4 Moringa –Mixed Spices

Table 2. Proximate Composition of Moringa Oleifera Leaf Powder and spices Examined

Parameters	MOL	Moringa-Garlic	Moringa-Ginger	Moringa-Mixed Spices (Garlic and Ginger)
Moisture	9.40	10.08	8.75	11.01
Ash	14.98	13.98	13.99	15.16
Crude Protein	20.12	19.45	18.45	23.41
Crude fat	7.85	8.35	9.87	10.98
Crude fibre	14.25	12.14	17.45	15.23

MOL =Moringa Oleifera Leaf Powder

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