

PROXIMATE COMPOSITION AND SENSORY QUALITY OF MORINGA-FORTIFIED KUNNU ZAKI POWDER

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Introduction

Kunnu is a famous non-alcoholic fermented beverage consumed throughout Nigeria, by both adults and children, as a refreshing drink. It is traditionally produced from cereal grains like sorghum, millet, maize, rice, or their mixture. The trend in *kunnu* production has however moved from crude to improved traditional methods with the aim of adding value to the beverage. One of such improvements is in the area of protein and micronutrient fortification [1, 2] as well as preservation and convenience through modern drying [3]. There is however no information on the effect of drying on the consumer acceptability of the product as well as the use of sun-drying. This study therefore aimed at determining the effect of sun-drying on the quality attributes of *moringa*-fortified *kunnu zaki* powder.

Materials and methods

Millet (*Pennisetum* spp), maize (*Zea mays*), sorghum (*Sorghum bicolor* (L) *moench*), spices and sugar were purchased from *Ipata* market in Ilorin, Kwara State, Nigeria. The *Moringa oleifera* seeds were procured from a *moringa* farm in Ilorin, Kwara State, Nigeria. *Moringa*-fortified *kunnu zaki* slurry was produced following the procedure earlier described [4], with few modifications. The obtained thicker slurry was sun-dried for three days and pulverized into powder, packaged in high density polythene bags and stored in a cool dry place for further analyses. The proximate composition (moisture, ash, crude fibre, crude protein, and crude fat) of the various *Moringa*-fortified *kunnu zaki* samples was determined using AOAC method [5] and the carbohydrate contents were determined by difference. The ready-to-drink beverage prepared from the *kunnu* slurry and powder were evaluated by a 50 member panel for appearance, aroma, taste, mouth feel and general acceptability, using a 9-point hedonic scale. Data generated from the various analyses above were subjected to Analysis of Variance and Multiple Range of Comparison Test using the Statistical Package for Social Sciences (SPSS), version 16.0

Results and Discussion

The moisture content of the *kunnu* slurry ranged from 62.72 to 64.42% while those of the powders ranged between 8.37 and 8.53%. The significantly ($p < 0.05$) lower moisture content of the *moringa*-fortified *kunnu zaki* powder is an indication of a relatively longer shelf life [6]. The high carbohydrate content (62.68 – 69.32%) of the *moringa*-fortified *Kunnu zaki* samples is an indication that it will be a good energy-giving drink for both children and adults. *Moringa*-fortified *kunnu zaki* powder from sorghum had the highest ash content while fresh *moringa*-fortified *kunnu zaki* from maize had the least. Though drying brought about a significant reduction in sensory qualities - maybe due to loss of volatile flavour compounds, the various *Moringa*-fortified *kunnu zaki* powders were accepted by the panelists.

Table 1. Proximate composition and sensory scores of fresh and dried moringa-fortified kunnu zaki

	Millet		Sorghum		Maize	
	Fresh ± 0.03	Powder	Fresh	Powder	Fresh	Powder
Moisture (%)	1.53 ^b ± 0.01	8.37 ^a ± 0.01	63.59 ^d ± 0.01	8.42 ^a ± 0.02	64.42 ^c ± 0.02	8.53 ^b ± 0.01
Ash content (%)	1.65 ^b ± 0.01	2.43 ^e ± 0.01	1.73 ^d ± 0.01	2.65 ^f ± 0.1	1.43 ^a ± 0.01	6.7 ^c ± 0.02
Crude Fat (%)	1.13 ^c ± 0.01	4.16 ^c ± 0.01	1.54 ^a ± 0.01	4.07 ^d ± 0.01	1.96 ^c ± 0.01	6.13 ^c ± 0.01
Crude Fibre (%)	7.63 ^b ± 0.01	1.16 ^d ± 0.01	1.07 ^a ± 0.01	1.09 ^{ab} ± 0.01	1.11 ^{bc} ± 0.01	1.11 ^{bc} ± 0.01
Crude Protein (%)	25.35 ^b ± 0.01	19.15 ^c ± 0.01	9.77 ^c ± 0.01	21.11 ^c ± 0.01	4.65 ^a ± 0.01	11.11 ^d ± 0.01
Carbohydrate (%)	7.16 ^b ± 1.33	64.74 ^e ± 0.01	22.27 ^a ± 0.01	62.68 ^d ± 0.02	26.45 ^c ± 0.01	69.32 ^d ± 0.02
Appearance	6.80 ^b ± 1.50	6.16 ^a ± 1.81	6.98 ^b ± 1.60	6.74 ^{ab} ± 1.61	7.22 ^b ± 1.15	6.36 ^c ± 1.98
Aroma	7.00 ^c ± 1.75	6.04 ^a ± 1.60	7.04 ^b ± 1.170	6.06 ^a ± 1.70	6.90 ^b ± 1.18	6.00 ^c ± 1.43
Taste	6.76 ^b ± 1.80	5.88 ^b ± 1.92	6.90 ^c ± 1.67	6.46 ^{bc} ± 1.71	6.82 ^c ± 1.67	5.72 ^a ± 1.50
Mouth Feel	7.24 ^c ± 1.62	5.90 ^a ± 1.92	6.74 ^b ± 1.55	6.08 ^{bc} ± 1.87	6.54 ^{bc} ± 1.59	5.88 ^c ± 1.64
General Acceptability		5.90 ^a ± 2.13	7.08 ^c ± 1.46	6.30 ^{ab} ± 1.75	6.78 ^{bc} ± 1.73	6.04 ^c ± 1.69

Values are means $\pm$ standard deviation of triplicate determinations (proximate composition). Means within the same row having different superscripts are significantly ($p < 0.05$) different

Conclusion

The study revealed the feasibility of producing kunnu zaki powder using sun-drying method. The various moringa-fortified kunnu zaki powders had good nutritional and sensory quality. This represents a cheap technique of adding value to kunnu zaki.

References

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