

A Technical Note

A Short Note on Processing of Bamboo Juice

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Abstract

Eight to twelve hour old bamboo juice (locally known as 'Ulanzi') was filtered, pasteurized and canned. Samples were sent to Tanzania Bureau of Standards for analysis. Nine chemical parameters were analyzed, including alcoholic content, which was found to be 4.9% v/v. Also analyzed were four microbiological parameters. A taste panel was held and the product was found acceptable although not as good as the unprocessed product. On storage, there was no significant change in taste and/or flavour but signs of corrosion of the containers were evident after one year. Alternatively, the bamboo juice was placed in amber coloured bottles, sealed and pasteurized. The product was found to be comparable to unprocessed Ulanzi. Using the first procedure, TFPV produced 200 crates each containing 24 cans and sent to a farmers' show in Mbeya where the entire consignment was sold out. In subsequent years, TFPV produced bottled bamboo juice using the second procedure and successfully marketed the product in Iringa, Mbeya and Dar es Salaam. Processing of bamboo juice ensures a hygienic product, its availability throughout the year and maintenance of constant prices during all seasons.

Key words: Traditional foods, bamboo juice, *Oxytenanthera abyssinica*, small-scale food processing

Introduction

The bamboo plant is used in many different ways ranging from food, medicine, energy, construction and many other less conventional uses (Mizuta *et al.*, 2004; Zhang *et al.*, 2004; Yang and Xue, 2005). It plays a very important role in the local economies of Far Eastern countries, mainly China, Japan and Vietnam, where it has been shown to transform the livelihoods of small scale farmers (Kants and Chiu, 2000). There is very limited information about the contribution of this plant to local economies in Tanzania (Mhando, 2004). In the South-Western region of Tanzania, the bamboo species *Oxytenanthera abyssinica* is grown by the local people for the production of an alcoholic beverage locally known as *Ulanzi* (Kigomo, 1994; IBRN Newsletter 1993). During the

rainy season (December to May) this bamboo species produces many young shoots. In producing the juice, the tips of the young shoots' are cut off and the stem portion is bruised every morning and evening. The exudates from each cut and bruised shoot are then collected in a container called "*Mbeta*" and allowed to ferment naturally to become *Ulanzi*, the highly cherished alcoholic drink by the people in the vicinities and some townships. There are three main problems associated with traditional production of *Ulanzi*. First, the handling conditions of the product from production to consumption are unhygienic, secondly, there are large price fluctuations dropping to a tenth during the glut seasons and thirdly, it is available for only six months each year.

The objectives of the processing and marketing were to address these problems.

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Materials and Methods

One hundred litres of freshly tapped bamboo juice was purchased from bamboo farmers in Ithemi village which is about 30 km from Iringa town on the road to Mbeya. The juice was allowed to ferment naturally for 8 to 12 hours before batches of 20 litres were heated to 85°C in open electrically heated water baths at Dabaga Fruit Canning Factory in Iringa. While still hot, the juice was dispensed into 450ml cans, sealed and placed in boiling water for about 3 minutes and then transferred to chilled water. Samples were sent to Tanzania Bureau of Standards for chemical and microbiological analysis. The product was also subjected to sensory evaluation. Six individuals (four males and two females) accustomed to the beverage were invited to a taste panel at which six samples, 3 processed and 3 unprocessed were presented. Each individual was asked to taste each of the six samples with water mouth rinsing in between and indicate whether or not the taste and flavour were the same as those in the unprocessed drink.

At about the same time, Traditional Foods Progressing Venture (TFPV) was contracted by organizers of a farmer's day in Mbeya to produce canned *ulanzi* for the event. TFPV produced 200 crates each containing 24 cans and presented at the show. Also TFPV started to experiment on a modified procedure whereby the bamboo juice was placed in amber coloured bottles and sealed. After some time (30-120min.), the bottles were placed in water baths and heated to 85°C. After cooling the product was presented for sensory evaluation and marketed in Iringa, Mbeya and Dar es Salaam.

Results and Discussion

Table 1 presents the results from chemical and microbiological analysis.

Table 1. Results from chemical and microbiological analysis (TZS 471: 1997- Methods of sampling and testing for alcoholic beverages)

(a) Chemical Analysis

1	Ethanol content % (v/v) at 15°C	4.9
2	Methanol content (v/v) at 15°C	0.0000025
3	Specific gravity at 15°C	1.0098
4	Fixed acidity as tartaric acid gms/100 litres	1760.2
5	Volatile acidity as acetic gms/100 litres	1.07
6	Esters as ethyl acetate gms/100 litres	0.25
7	Ash % mg/mg	0.35
8	Aldelydes as acetaldehydes gms/100 litres	215.5
9	Total acidity gms/100 litres	1761.26

(b) Microbiological analysis

1	Total bacteria count/ml	<3x10 ²
2	Coliforms /ml	Not detected
3	E. coli/ml	<1x10 ²
4	Yeast	<1x10 ¹

The amount of alcohol at 4.9%v/v was lower than 6.5% reported by Magingo and Msigwa (1994). However, in their case, the juice was not subjected to heat treatment and thus signifying that the alcohol was not appreciably reduced during the open pasteurisation. The amount of alcohol also compared favourably with the amounts of alcohol in lager beers produced in the country. It is notable that, despite the high temperatures of 85°C, there were low amounts of bacteria and yeast cells.

Table 2 presents the results of sensory evaluation of *ulanzi* processed using the first procedure.

Table 2. Results of sensory evaluation of *Ulanzi* processed using first procedure

Panelist	Samples					
	A	B	C	D	E	F
1	√	√	x	x	√	x
2	√	√	x	x	√	x
3	√	√	x	x	√	x
4	√	√	x	x	√	x
5	√	√	x	x	√	x
6	√	√	x	x	√	x

Samples A, B, E were unprocessed bamboo juice while C, D, F were processed samples. From the results, it was evident that the heat treated samples could be distinguished from the untreated samples. According to the panelists, the treated samples had less tinge and flavour compared to the untreated samples. They observed however that, under scarcity it was drinkable.

Table 3 presents the results of sensory evaluation of the product prepared using the second procedure in which the bamboo juice was sealed in bottles before heat treatment.

Table 3: Results of Sensory Evaluation of *Ulanzi* Produced Using Second Procedure

Panelist	Samples					
	A	B	C	D	E	F
1	√	√	√	√	x	√
2	√	√	√	√	√	√
3	√	√	√	x	√	x
4	√	√	√	√	√	√
5	√	x	x	√	x	√
6	√	√	√	√	√	√

The processed and unprocessed bamboo juice was in this case more or less undistinguishable. This was an encouraging observation. The initial trials of this process did however result in massive bottle breakages. The breakages were ultimately managed by controlling the time between harvesting and bottling and the time between sealing and pasteurizing.

The 200 cartons sent to the farmer's day at Mbeya were sold out fast. The novelty of the product, the time of the year, August, when the traditionally processed *Ulanzi* was not available and the throw away price tag might have contributed to the fast sales given that the sensory

evaluation showed that the product was inferior to the unprocessed *Ulanzi*.

Not surprising, the bottled *Ulanzi* using the second procedure recorded rising sales. Indeed the capacity of TFPV to produce was congruent with demand but signs of TFPV sliding below demand being evident. According to the customers, the hygienic condition of production was the appealing feature of the product.

The price of *Ulanzi* in December and May was about T.sh. 500 per litre. In the glut season around March, the price slid down to about Tshs. 50 per litre. The processing of *Ulanzi* did therefore hold a potential of maintaining higher prices and thus contributing to poverty alleviation.

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