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Production and evaluation of the physico-chemical and sensory qualities of mixed fruit leather and cakes produced from apple (*Musa Pumila*), banana (*Musa Sapientum*), pineapple (*Ananas Comosus*)

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Abstract

Mixed fruit leathers were produced from purees of apple, banana and pineapple. The proximate composition, physico-chemical and organoleptic properties of the samples were evaluated. Furthermore, the samples were used as ingredients in producing cakes and sensory evaluation were carried out on them. The physico-chemical parameters studied were total soluble solids (TSS), total titratable acidity (TTA), fixed acidity (FA), volatile acidity (VA), pH, and vitamin C. There were significant differences ($p < 0.05$) in the TSS of the samples. However, sample 819 (40% banana: 40% pineapple: 20%: 40% apple) had the highest TSS (20.07 g) and TTA (0.42 g/l) and significantly differed from other samples ($p < 0.05$). Sample 443 (20% banana: 40% pineapple: 40% apple) had the highest fixed acidity (5.6 g/l), volatile acidity (26.00 g/l) and vitamin C (22.33 mg/100 g) and differed significantly ($p < 0.05$) from other samples. The proximate compositions studied showed that sample 819 (40% banana: 40% pineapple: 20%: 40% apple) was significantly higher in ash (1.20%), protein (0.71%) and carbohydrates (84.77%) than other samples, while sample 443 (20% banana: 40% pineapple: 40% apple) was however, higher than other samples in moisture content (4.14%) and fat content (2.32%). The highest fiber content (12.47%) was observed in sample 314 (60% banana: 20% pineapple: 20% apple) while the least was in sample 819 (40% banana: 40% pineapple: 20%: 40% apple). There were no significant differences ($p > 0.05$) among the mixed fruit leather and cakes samples. The general acceptability of the cake samples were the as that of the control (commercial fruit cake), they were moderately liked by the panelists.

Keywords: Mixed fruit leather; Physico-chemical; Sensory; Cake

1. Introduction

Fresh fruits are known to be excellent sources of energy, vitamins, minerals, and fibres. The nutritional value of fruits greatly depends on the quality and quantity of its nutritive substances. Banana, pineapple and apple are important fruits crops in Africa, and when ripe, are highly digestible, and a good sources of vitamins and minerals (Huang and Hsieh, 2005).

Banana belong to the family of *Musa* is very rich in carbohydrates, vitamins C (also A and some B vitamins) and several important minerals, including potassium, copper, magnesium, calcium and iron. Pineapples have many nutritional benefits providing several essential mineral, vitamins (B1, B2, C) and fibre. They are also low in calories, rich in carbohydrates, fat free and versatile. Raw, juiced, cooked dried or canned pineapples offer tremendous nutritional value (U. S. Department of Health and Human Services: Dietary Guidelines for Americans, 2005). The U.S. National library of medicine lists bromelain as a poteolytic digestive enzymes. When taken with meals, bromelain aids in the digestion of proteins down into amino acids. On an empty stomach, bromelain has anti-inflamatory properties. Certain conditions such as sinusitis, burns, pancreatic insufficiency and skin rashes seem to benefit from the ingestion of bromelain, according to the national library of medicine. Both the fruit and stem of pineapple contain bromelain. Fig. 1.

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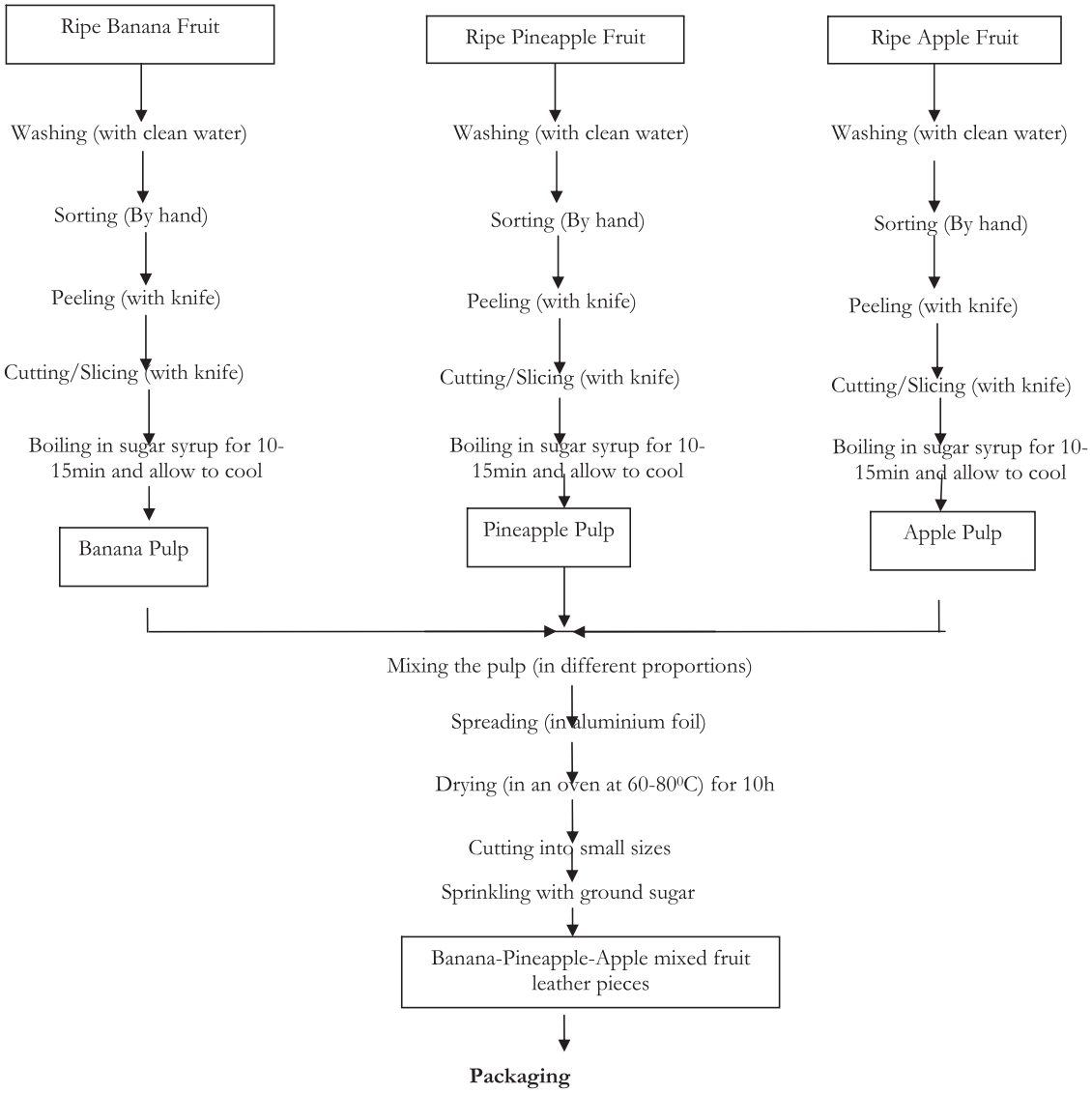

Fig. 1. Process showing the production of mixed fruit leather from Banana, Pineapple and Apple fruits.

Apple, among the temperate fruits is the most widely consumed, taking second place only to grapes. The annual world apple crop is on the other of 40 million tons. http://www.singer.com. They are a member of the rose family and come in many varieties. Apples like all fresh fruits are naturally cholesterol-free.

They are good food source of vitamin C, providing 8 mg per fruit or 13% of the recommended daily value for this nutrient. Vitamin is important for supporting a healthy immune system, forming collagen and enhancing from absorption (http//www.singer.com).

Fruits are produced in considerable quantities and consumed locally, but are seldom processed. The main causes are physiological (wilting, shriveling, chilling injury), inadequate storage facilities, transportation, poor road networks, and processing capacity accelerate deterioration. Due to high moisture content and low processing capacity, the country loses 30–50% of fruits annually (GNA, 2010).

Fruits exhibit relatively high metabolic activity compared with other plant derived foods such as seeds. These metabolic activities continues after harvesting, thus making most fruits such as Banana, pineapple, apple, highly perishable commodities (Atungulu et al., 2004). Thus, there is need for diversity in commercial utilizations. There are numerous ways of utilizing and processing fruits such as processing into juice, jams, concentrates, pulp, dehydrated products, jellies and fruit leather.

Fruit leather refers to fruit purees or a mixture of fruit juice concentrate and other ingredients which are cooked, dried on a non-sticky surface and rolled (Bryk, 1997; Huang and Hsieh, 2005). A variety of fruits can be used to produce leathers (Raab and Oehler, 1999). Leathers have been developed from fruits such as guava, pawpaw, jack fruits and durian (Cheman and Sin, 1997; Babalola et al., 2002).

Fruit leathers are mainly eaten as snacks (http://www.ucce.ucdavis.edu). They can however, also be made into beverages by blending with water or into sauces (Raab and Oehler,