



International Conference of Sabaragamuwa University of Sri Lanka 2015 (ICSUSL 2015)

Development of a method for manufacturing noodles from finger millet

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Abstract

Available methods of preparing foods from finger millet at home are laborious, time consuming, and people are reluctant to prepare foods from finger millet even though finger millet is a nutritionally important food item. Also, there are hardly any food items prepared from finger millet in the market, and less attention has been given to finger millet. As a solution for this problem, a study was carried out to develop a medium scale method for manufacturing of noodles from finger millet with maximum substitution, and tests were conducted by using a process line used to manufacture rice noodles with modifications. Based on the results of the preliminary experiments, main tests were carried out with blending ratios of finger millet to rice flour percentages of 50:50 and 100:0 with three replicates. Flours were mixed with water to increase the moisture content up to 35% and pellets were formed. Paste prepared by steaming the pellets was extruded to make sheets, and they were sent to an extruder to form noodles. Formed noodles were sterilized at 100°C, cut to 4 inches length pieces and sent to a dryer. Temperature of drying air was maintained about 40-45°C. It was found that the moisture content and percentage total solids in gruel of both types of produced noodles were satisfied the maximum allowable level for rice noodles i.e. 12% and 8% according to SLS 858. Sensory evaluation results revealed that both types of noodles produced with finger millet were highly acceptable and 100% finger millet noodles were shown a higher acceptability in colour than 50% finger millet noodles. Developed finger millet noodles packed in PET/LDPE bags can be stored more than 1.5 years without any deterioration of quality. Hence, the developed method can be used to manufacture 100% finger millet noodles commercially on a medium scale level. Cost of production is 250 SLR per kg.

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Peer-review under responsibility of International Conference of Sabaragamuwa University of Sri Lanka 2015 (ICSUSL 2015).

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Keywords: Finger millet; Flour manufacture; Noodles; Qualities

1. Introduction

Finger millet, known as kurakkan in Sri Lanka, is an annual plant widely grown as a cereal in the arid areas of Africa and Asia. Finger millet is especially valuable as it contains the amino acid methionine, which is lacking in the diets of hundreds of millions of the poor who live on starchy staples such as cassava, plantain, polished rice, or maize meal¹. Finger millet has good nutritional value including moisture 13.2%, protein 7.6%, carbohydrate 74.4%, fiber 1.5%, minerals 2.4%, fat 1.4%, and energy 341.6 cal/100g². Finger millet has been a popular cultivation among Sri Lankan Chena farmers since ancient time and it was a major component in their meal. At present, the demand for the finger millet is increasing due to health concern. Finger millet cultivation in Sri Lanka was 5251 ha in 2011³ and average yield was 3.0 -3.5 t/ha.

Although finger millet is a nutritionally important food item, there are no more food products in the market for consumers. There are few traditional food items such as *rotti*, *thalapa* etc., prepared at home with finger millet flour, but since the preparation methods are laborious, and time consuming people are reluctant to prepare these foods. There are few bakery food items in the market prepared with finger millet and these foods have been manufactured with wheat flour blended finger millet flour and not totally with finger millet. Hence, a less attention has been given to this nutritionally important food item. As a solution to this problem, a study was conducted to develop a medium scale method for manufacturing of noodles from finger millet. Noodles were selected since it is the simplest cereal product presently used in the human diet which has become popular in the diet of Sri Lankans. Noodles are widely consumed throughout the world and their global consumption is second only to bread⁴.

2. Methodology

For the development of a method for manufacturing noodles from finger millet, the available rice flour noodles manufacturing process (IPHT) with modifications was adopted. The flow diagram of rice noodles manufacturing at IPHT is given in Fig.1⁵.

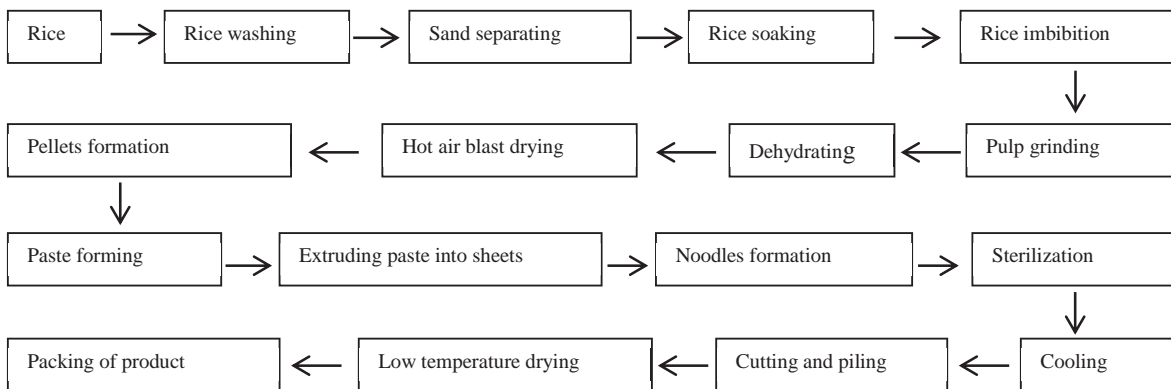


Fig.1. Flow diagram of rice noodles plant available at IPHT

Starting from the pellets formation in the above process (Fig.1), preliminary tests were carried out with different blending ratios of finger millet to rice flour percentages as 25:75, 50:50, 75:25 and 100:0. It was found that the most important properties i.e. percentage of total solid in gruel and moisture content of manufactured noodles were in an accepted level according to SLS requirement. Sensory evaluation results of preliminary tests samples were shown a higher acceptability. Noodles of the ratio of 50:50 (finger millet: rice flour) was shown a higher acceptability in colour

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