

Nutritive Value of Kanzi Rice—A Traditional Fermented Foodstuff of Bangladesh

Khan Mohammad Golam Hafiz and A. B. M. Moslehuddin

Institute of Nutrition and Food Science, University of Dhaka, Dhaka, Bangladesh

Introduction

Rice is considered to be the most important and leading food crop in the world from the stand point of energy which they contribute. It has been the stuff of life for nearly half of the world's population including Bangladesh. No other crops are equal to rice in making it possible for man to provide his food with a minimum of labour, land and equipment. The importance of rice in the diets of those living in the Bangladesh is apparent by the production of more than 18.8 million metric tons in 1992 and 0.5 kg consumption per day¹. Rice plays a very important role in fulfilling caloric intake and the requirement of other nutrients. About 90% of milled rice consists of starch. It is the main source of calorie for the people of our country. Rice is also a prominent supplier of protein. The protein content ranges from about 5% to more than 13% for milled rice, contributing 7.4% of total calories. The Protein Efficiency Ratios (PER) of

milled rice is 1.38 to 2.56 which is the highest among the cereals².

In every country there are traditional food stuffs, which are handed down through generations. Such traditional food stuffs includes preparation not only prized by epicures but also consists of dishes for common people. In Bangladesh we have a long lasting tradition of fermented food stuffs like Kanzi, Jalapitha (fermented cake), Yoghurt, Dahi (fermented milk) etc. which pervades our land; their daily consumption is common amongst the inhabitants, and the wide choice gives pleasure to gastronomes who appreciated the finer differences in their quality. The advantages of acid food fermentation are: (1) they make the foods resistant to microbial spoilage and the development of food toxins, (2) they make the foods less likely to transfer pathogenic microorganisms, (3) they generally preserve the foods between the time of harvest and consumption, and (4)

they modify the flavour of the original ingredients and often improve the nutritional value³. Since canned or frozen foods are unavailable or too expensive for the hundreds of millions of the world's economically deprived and hungry people, acid fermentation remains one of the most practical methods of preserving and often enhancing the organoleptic and nutritional quality of fresh vegetables, cereal gruels, and milk-cereal mixtures⁴. The Kanzi Rice is widely eaten specially for its unique taste and easy and low cost preparation method. Kanzi Rice is usually prepared in simple earthenware pots. In some areas, where Kanzi is regularly prepared, this pot is never washed thoroughly for some residues containing microorganism from previous batches are essential for proper fermentation. Rice grains are first washed with water. Before this rice is put on the stove for cooking, some of the rice are transferred to the earthenware pot in enough water just to inundate the rice. Then this pot is kept covered beside the stove for incubation for the desired number of days. The rice to water ratio is usually 1 : 1.4 (w/v). Then each day, some rice are added to it. After fermentation, they are consumed with spices, fish, meat, milk, vegetables etc. Some times all the water is drained off, and Kanzi

Rice is grinded to powder and Pithas are made of it.

Materials and methods

Collection of Sample: Kanzi Rice samples were collected from Kapashia of Tongi. Three different periods of fermented rice (3, 5 & 10 days) along with control were collected. All the samples were fermented in earthenware pot.

Thiamine: The samples were hydrolysed with 0.14 N hydrochloric acid and autoclaved at 15 psi for 30 minutes. After extraction, the samples were cooled to room temperature and the pH was adjusted at 4.5 using 2.5 M sodium acetate. Then the samples were incubated overnight with diastase enzyme suspension. Then the samples were filtered and the thiamine was determined according to the method of Kennerley and Peters, (1932)⁵.

Niacin: The samples were hydrolysed with 1 N H₂SO₄ and was autoclaved for 30 minutes at 15 psi. Then the pH was adjusted to 4.5 and filtered. The filtrate was used for the determination of niacin spectrophotometrically at 470 nm using cyanogen bromide according to the method of AOAC methodology (1984)⁶.

Phytic acid: Phytic acid was determined according to the method of AOAC (1975)⁷. 1g of dry sample

was shaken with 10% Na₂SO₄ for 2 hours. Then they were centrifuged and heated with H₂SO₄ and H₂O₂. In this way sample solutions were prepared. Then the absorbance readings were taken at 515 nm using hydroxylamine-HCL, buffer acetate and α - α -dipyridil⁷.

Results and Discussion

The experiments were done taking 3, 5, and 10 days fermented Kanzi Rice samples. 3 and 5 days fermented Kanzi Rice are most widely consumed. The highest fermentation period is 10 days. After that period, Kanzi develops undesirable sourness and odour and becomes unpalatable. The thiamine content of control rice and fermented Kanzi Rice are shown in the fig-1. Thiamine content of the control Kanzi Rice was found to be 0.32 mg/100g (dry basis). Thiamine first increased in 3 days of fermentation, then decreased by 5 days of fermentation. After 10 days, this vitamin increased again. Thiamine increased 2.56 times in 3 days of fermentation, 1.09 in 5 days of fermentation and 1.6 in 10 days of fermentation.

The increase of thiamine was observed by Cronk *et al.* (1977)⁸ in the traditional cereal foodstuffs of Indonesia. This increase of thiamine is of great nutritional importance of people subsisting principally on polished rice.

Niacin content of control rice and fermented Kanzi are shown fig-2. Niacin contents of the control rice was found to be 1.5 mg/100g. The increase of niacin was 1.14 times. During the longer period of fermentation (i.e., during 5 days of fermentation), niacin content was seen to decrease slightly, but was found to be 1.1 times higher than the control rice. This value of niacin was seen to remain unchanged during the longer period of fermentation i.e., up to 10 days of fermentation. The importance of these vitamins in curing and preventing beriberi and other field of nutrition are well recognised⁹.

Grains are rich in minerals, specially calcium, phosphorus and iron, but in a form unavailable for absorption largely due to the presence of phytic acid¹⁰. In Kanzi Rice, phytic acid was seen to decrease because of fermentation. The phytic acid contents of control rice and fermented Kanzi rice are shown in the fig-3. Phytic acid was seen to decrease 1.47 times during 3 days of fermentation. During longer period of fermentation, phytic acid decreased further and in 5 and 10 days of fermentation, it decreased by 1.83 and 2.15 times. As a result, the bioavailability of the minerals increased¹¹.

In our rural system of medicine, Kanzi Rice has been recommended

for curing dyspepsia, dysentery, and other intestinal disorders. Antibacterial compounds formed by the fermenting flora, a lower pH induced in the intestine that prevents the growth of putrefactive by and other undesirable organisms,

and increased digestibility either because of enhanced retention of nutrients of partial breakdown of indigestible components are believed to contribute to Kanzi's beneficial effects, like other acid fermented cereal foods¹².

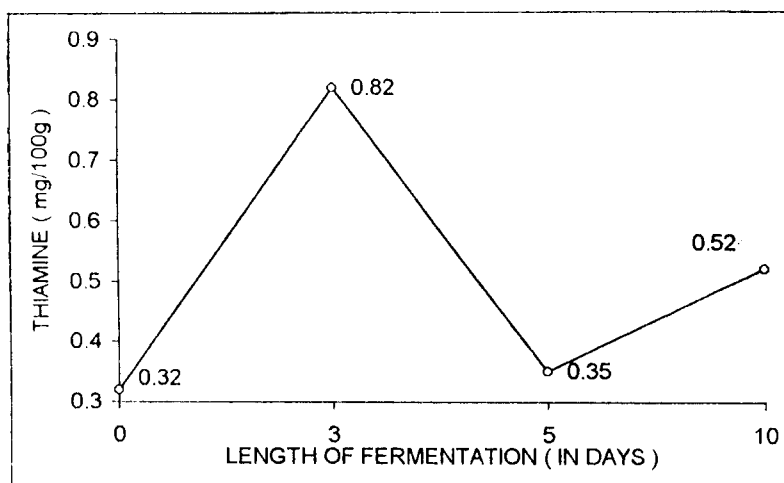


Fig-1. Changes in thiamine content of Kanzi Rice

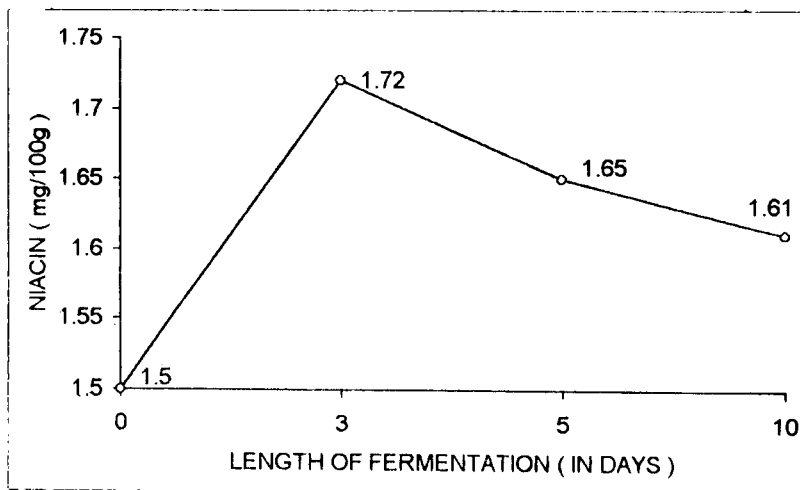


Fig-2. Changes in niacin content of Kanzi Rice

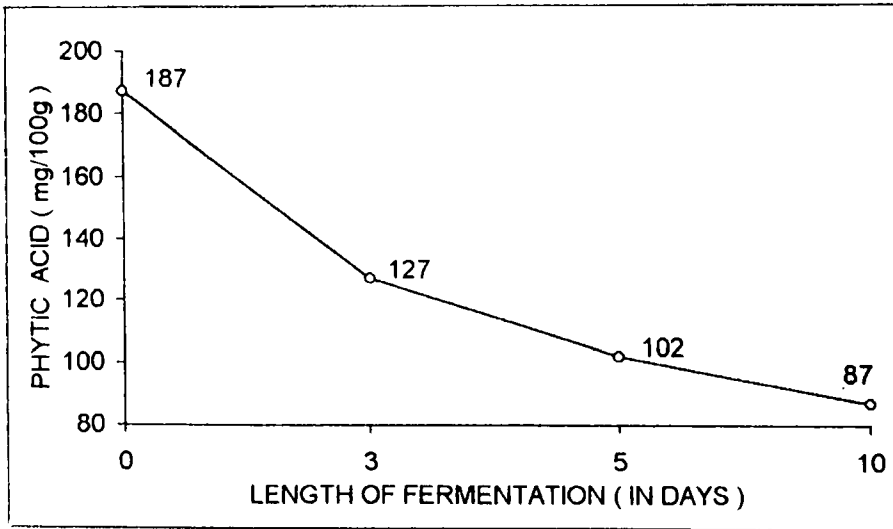


Fig.-3. Changes in phytic acid content of Kanzi Rice

Summary

Thiamine and niacin of the unfermented rice and fermented Kanzi Rice were analysed in this experiment. The vitamins were found to be increased during 3,5 and 10 days of fermentation. Thiamine increased by 2.56 times after 3 days of fermentation, 1.09 times after 5 days of fermentation and 1.6 times after 10 days of fermentation. Niacin increased by 1.14 times after 3 days of fermentation, 1.1 times after 5 days of fermentation and 1.07 times in 10 days of fermentation, Anti-nutrient phytic acid was also analysed. Phytic acid decreased 1.47 times in 3 days of fermentation, 1.83 times in 5 days of fermentation and 2.15 times during 10 days of fermentation. In our country 3 days of fermented Kanzi Rice is most widely consumed

and it can be concluded that 3 days fermented Kanzi Rice is most nutritious in the stand point of thiamine and niacin content than the other fermented Kanzi Rice. Such increase in vitamins is very significant in nutritional context of Bangladesh.

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