

### Abstract

Malting has been reported to enhance the nutritive value of the grains, hence the present study was planned to use malted grains in the preparation of a snack, together with a dried green leafy vegetable and to investigate the effect of heat treatment on the nutritional quality of the malted grains in the preparation of a snack.

Optimal conditions for malting of grains were determined and changes in carbohydrate profile and protein content studied. Biscuits were prepared from malted or raw wheat and bengal gram mixes with or without colocasia leaf powder and tested for acceptability on 3 to 6 year old children and their mothers. Nutritive composition, keeping quality and protein quality of the mixes and biscuits were determined.

In order to determine the optimal soaking time for maximal germinative capacity of wheat and bengal gram, grains were soaked for 4 to 24 h and germinated for 24 or 48 h. It was observed that 12 h of soaking and 48 h of germination for both the grains were optimal as the grains exhibited cent percent germination all having measurable (more than 0.2 cm) sprout lengths.

In addition, changes in carbohydrate profile and protein content were monitored over a germination period of 72 h in 12 h soaked wheat and bengal gram grains. The starch contents of wheat and bengal gram grains consistently decreased while the total and

reducing sugar contents increased until 48 h of germination, thereafter the values tended to decrease. The protein content of wheat and bengal gram had shown increases of 8 and 5%, respectively, over the germination period of 72 h probably due to losses in dry matter. The changes in total and reducing sugars of wheat and bengal gram grains confirmed that the grains be germinated for 48 h.

Biscuits containing 2 or 3%, 3 or 5% and 5 or 10% colocasia leaf powder were prepared and subjected to sensory evaluation. The results of the triangle test showed that the biscuits containing 2, 3 or 5% colocasia leaf powder were not differentiated; while those of the composite scoring test and hedonic scale revealed that biscuits containing 10% colocasia leaf powder were less accepted than those containing 5% colocasia leaf powder. Hence the colocasia leaf powder was incorporated at 7.5% level so that at this level the biscuits met the RDA of a 4 to 6 year old child for iron and beta carotene and half of that of calcium (Gopalan et al 1985). Raw mix biscuits and malted mix biscuits with or without colocasia leaf powder were tested for acceptability on balwadi children. Analysis of variance showed that all the types of biscuits were equally acceptable with respect to their mean intakes at one sitting. The mothers of these children had also liked the biscuits containing colocasia leaf powder.

The nutrient analysis of mixes and biscuits revealed that malting had not markedly improved the nutritive composition of

the mix except for iron and riboflavin contents, consequently the nutritive composition of malted mix and raw mix biscuits, and colocasia-malted mix and colocasia-raw mix biscuits was comparable. But the addition of dried colocasia leaf powder had markedly increased the contents of protein, calcium, phosphorus, iron - total, soluble and ionizable, carotene, thiamine and riboflavin.

For determination of keeping quality of mixes and biscuits, these were stored under accelerated and room conditions. It was observed that the malted and raw mixes can be kept for 28 days and may be longer at both accelerated and room conditions based on moisture gain, alcoholic acidity and peroxide value. While biscuits had a keeping quality of nearly 14 days at accelerated conditions and of 28 days and may be more under room conditions with respect to moisture gain and loss of crispness.

Animal experiments conducted to determine the growth promoting ability and protein quality of mixes and biscuits showed that malting of grains significantly improved the NPU and BV values of the malted mix in comparison to those of the raw mix although the PER values were comparable. The rats fed biscuit diets exhibited growth arrest which was larger in case of malted mix biscuit diet fed group. Addition of colocasia leaf powder increased the loss of weight in rats.

The findings suggest that malted grains should not be subjected to heat treatment as in preparation of biscuits and

that biscuits containing colocasia leaf powder although were well accepted, nutritionally superior and could stay in good condition for a month under room conditions but failed to improve the growth of rats in comparison to those fed biscuits without colocasia leaf powder.