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Abstract - Chemistry and Technology of Rice flour based products

Several new varieties of rice suitable for cultivation in Sri Lanka have been developed at the Central Rice Breeding Centre, Batalagoda. As a part of the programme to identify alternative uses for rice, a study of the grain composition of some selected rice varieties was undertaken.

The following varieties of rice were subjected to chemical analysis in order to evaluate the grain composition; Bg 400-1; Bg 621-1; H_4; Bg 379-2; Bg 276-5; Bg 380; Bg 573; Bg 11-11; Bg 94-1.

The protein content was determined by micro kjeldhal process using Kjeltec (1) apparatus. The values ranged from 6.1-8.50 by mass. Except for Bg 621-1 and Bg 379-2 the other varieties had a protein content closer to the higher range.

The free lipid content (petroleum ether extracted) of the grains was found to range from 0.5% - 2.0% by mass. Fatty acid composition was determined by GLC techniques after derivatization to methyl esters. The following fatty acids were noted in large quantities. i.e palmitic, oleic and linoleic acids, Bg 621-1 had the highest quantity of palmitic acid (45% of fat), Bg 380 had the highest quantity of oleic acid (45.38% of fat) while Bg 400 - 1 had the highest quantity of linoleic acid 937.54% of fat). All varieties showed very small quantities of lauric, myristic and stearic acids.

The mineral content varied from 0.6 - 1.4% by mass. The mineral composition (calcium, magnesium, iron and zincatomic absorption spectrophotometry; sodium, potassium flame photometry; phosphorous UV/VIS spectrophotometry) of rice varieties were determined. Bg 573, Bg 276-5 and H4 has high levels of magnesium; 99.25, 75.08 and 75.29 (mg/100g) respectively. H4 had a high iron content (4.06 mg/100g) while Bg 94-1 had a low iron content (0.22mg/100g). Bg 94-1 had a low zinc content (0.31 mg/100g) compared to other varieties. Sodium contents of Bg 379-2, 380, 11-11 and 621-1 were higher (above 3%) than other varieties. Bg 379-2 had the higherst potassium content (102.26 mg/100g). Phosphorous content of all varieties ranged from 0.19 to 0.27 mg/100g except for Bg 621-1 which had a low phosphorous value.

The crude fibre content ranged from 0.20-0.63 by mass. It was interesting to note that there is a linear relationship between the amount of bran removed and the percentage crude fibre.

The reducing and non-reducing sugars were determined by the schaffer-Somogyi micro method[1] before and after mild acid hydrolysis of the ethanol extract. The values ranged from 0.04-0.07% for reducing sugars and 0.08-0.18% for non-reducing sugars.

Starch which is the major constituent of rice endosperm was determined by polarimetry after conversion to maltose[2]. The values obtained ranged from 67.2-76.5%. The amylose content of starch was determined colorimetrically[3] and all nine varieties were observed to be high amylose content. (≥25%).

The same varieties were investigated for their grinding properties, rheological behaviour and gelling characteristics. Grinding under different conditions and determinationof median particle size, have enabled to distinguish between hard and soft rice types among these varieties.

The amylograph studies have shown that all varieties have high and intermediate gelatinization tmepratures with variable rheological properties. The peak viscosities were observed to vary between 500-1000 BU. and they were also observed to depend on the particle size and type of grinding. The gel strengths of the different varieties showed that our rice types were mostly medium gel types with a few showing hard gel consistency.