



Effect of natural fermentation on protein fractions and in vitro protein digestibility of rice

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Abstract. Changes in pH, titratable acidity, total soluble solids and protein of rice during natural fermentation at 37 °C up to 36 h were monitored. The pH of the fermenting material decreased sharply with a concomitant increase in the titratable acidity. Total soluble solids increased with progressive fermentation time. The crude protein content fluctuated during the first 24 h of fermentation but started to increase thereafter. Non-protein nitrogen was unchanged during the first 12 h of fermentation but increased sharply with progressive fermentation. The in vitro protein digestibility markedly increased as a result of fermentation. The increase in the globulin + albumin fractions constituted the most remarkable increase and were the major proteins in the 36 h fermented rice; the increase was up to 2.7 fold. The prolamin fraction, which was the minor fraction, the G₁-glutelin and G₂-glutelin fractions increased with progressive fermentation time. The G₃-glutelin, which was the major protein fraction of unfermented rice, markedly decreased as a result of fermentation, while insoluble protein fluctuated during the fermentation process.

Key words: Fermentation, In vitro protein digestibility, Protein fraction, Rice, Solubility

Introduction

Rice (*Oryza sativa*), is one of the most important crops in the world, in addition to wheat and maize. More than 500 million tons of paddy rice are produced worldwide per year [1]. Approximately 90% of the world rice is produced in Asia, but only 4–5% enters the global market [2].

The rice crop is grown in the tropics where sunshine is abundant. Although typically a cereal of the swamps, rice can be grown either on dry land or under water. There are varieties of rice adapted to a wide range of environmental conditions. This wide adaptability of the rice plant is the basis for its importance as a food crop [3]. Total world consumption of rice is projected to increase from 356 million metric tons in 1994 to 403 million metric tons by 2005 [4].

Rice is mainly for human nutrition and has historically been perceived as hypoallergenic [5]. In addition to the specific nutritional benefits of rice and