EP-58 - CONVERTING RICE BRAN INTO A HIGH-VALUE FOOD INGREDIENT

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BACKGROUND
Most rice bran is currently used for livestock feed or is discarded. However, rice bran contains nutrients and health-promoting compounds. Thus, it would be desirable to convert it to a high-value food ingredient.
OBJECTIVES
This study was performed to develop a proper manufacturing procedure especially in order to improve mineral availability from rice bran.
METHODS
Crude protein content was calculated (%N x 6.25) after determination of nitrogen content by the Kjeldahl method. Crude fat was determined by the Soxhlet method. Insoluble and soluble fibre contents were quantified by the enzymatic-gravimetric method. Acid value was determined by titration. myo-Inositol phosphates, oryzanol and the vitamins B1, B2, B3, B6, E (α-tocopherol) were analysed by HPLC. Inorganic phosphate was quantified by the ammonium molybdate method and the minerals by ICP-MS.
RESULTS
Because of its oil content (up to 22%) rice bran is an unstable material. Extrusion is a common method used for its stabilisation. The process inactivates lipases and thus prevents lipids from hydrolysis during storage. It was found that rice bran extruded at temperatures above 130°C for more than 20 s could be stored at 25°C for at least 30 days without showing significant changes in acid value. To obtain the highest process efficiency, the shortest processing time (20 s) and the lowest processing temperature (130°C) were used for extrusion. To remove phytate, extruded rice bran was incubated at 40°C with phytases of different origin in a buffered system. Thereafter the suspensions were freeze-dried and ground to obtain a powdered product. The following rice bran components were quantified: crude protein, crude fat, insoluble dietary fibre (IDF), soluble dietary fibre (SDF), oryzanol, vitamins (B1, B2, B3, B6, E), minerals (Fe, Zn, Ca, Mg), phosphate and myo-inositol phosphates. Most of these components were not affected by extrusion. However, 10% of vitamin B2, 6% of vitamin B1 and 8% of SDF were lost during extrusion. Phytate could be removed completely during dephytinization resulting in increased phosphate content. Other components of rice bran are not significantly affected by dephytinization and freeze-drying. In an in vitro digestion system, dialysability of minerals (Fe, Zn, Ca, Mg) was shown to be significantly improved after dephytinization.
CONCLUSIONS
The resulting product contains almost all health-promoting components of the raw rice bran, but only minor amounts of phytate. Thus, it can be used as a new food ingredient.