Optimisation of gluten-free pasta – improvement of the nutritional quality

Christine Flurya, Mathias Kinnera, Selçuk Yildirima, Michael Kleinerta, Regine Schönlechnerb

*www.ilgi.zhaw.ch / e-mail: mathias.kinner@zhaw.ch

Gluten-free (GF) pasta are often characterised by low nutritional value and unsatisfying functional properties as they are mainly starch based and lack gluten as a structuring agent. Therefore the main goal of this work was to enrich GF pasta with different types of soluble and insoluble dietary fibre originating from rice bran. Quality analyses of pasta included texture firmness, cooking loss, -weight and sensory. It was possible to show that GF pasta can be enriched up to 10 % with all tested types of dietary fibre by keeping or even enhancing functional properties.

Introduction

Rice bran is obtained from the outer kernel layers and is used for oil production. However, a large amount of defatted rice bran (DFRB) is accumulated as a by-product. Since it is a good source of dietary fibre and essential nutrients, it has a great potential to enhance the nutritional quality of GF pasta. As its application in GF rice pasta has not yet been investigated the objective of this study was to determine the effect of four different rice bran fractions on the functional properties of GF rice pasta while further optimising them with the aid of powdered egg albumen and an emulsifier.

Materials and Methods

Tagliatelle (refined rice flour (Ca), Strobi Naturmühle GmbH, Austria), egg albumen (B.V. Nive, Netherlands), emulsifier Dimodan (Danisco A/S, Dänemark) were produced using a laboratory scale noodle press. Essential recipe parameters (dough moisture, egg albumen and emulsifier) were adapted with statistical experimental designs. The fibre sources used were DFRB (Thai Edible Oil Co., Ltd., Bangkok, Thailand), Risolubles (soluble fibre, NutraCeaTM, Arizona, USA), Rifiber (insoluble fibre, NutraCeaTM, Arizona, USA) and Ribran (whole rice bran + germ, NutraCeaTM, Arizona, USA). For all samples, texture firmness (Fmax), cooking loss and -weight were determined according to AACC 60-50.01 (1). For the most promising samples a sensory consensus profile (DIN 10967-2) was elaborated. As a reference an Asian Rice noodle (“Rice Noodles”, origin: Thailand, imported by Heuschen & Schrouff OFT B.V., Landgraaf, Holland) was tested.

Results and Discussion

Generally, addition of rice bran (5−15%) alone did not change the physical properties of the noodles indicating that this represents a technologically feasible approach to enhance their nutritional value. The noodles with 10% Risolubles showed significantly (p<0.05) the highest firmness and thus were comparable to wheat pasta (Fig. 1). With increased firmness, cooking weight of all noodles was reduced. Regarding their sensory properties, the samples differed mainly in colour and flavour depending on the type of rice bran used (Fig. 2).

Outlook

More research is necessary to determine the levels of essential nutrients in these rice noodles. Using pregelatinised rice starch or flour from different varieties of rice may also bring further technological and sensorial advantages.

References:


a Institute of Food and Beverage Innovation, Zurich University of Applied Sciences, Department of Life Sciences and Facility Management, Switzerland
b Institute of Food Technology, Department of Food Science and Technology, University of Natural Resources and Life Sciences, Vienna, Austria