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Investigation of pseudo-cereal-based beverages enriched with antioxidants, protein and fibre

Dorottya Krisztina Vajdovich ; Zsanett Bodor ; Csilla Benedek dr.

Semmelweis University, Faculty of Health Sciences, Department of Dietetics and Nutritional Sciences

Adequate hydration, protein and fibre intake, and dietary antioxidants are essential in the support of healthy aging. Our research focuses on a self-developed functional beverage consisting of several ingredients (quinoa, fibre, protein, red berries, green tea, chestnut honey) that can help to prevent the decline in the health status of aging population. Our aim was to investigate the influence of these effects (fibre, protein and heat treatment) on the antioxidant properties by applying an in vitro digestion model. In total 33 different beverage samples were prepared, then their polyphenol content (Folin-Ciocalteu assay) and antioxidant capacity (copper-ion reduction /CUPRAC/ method) was determined spectrophotometrically. The bioaccessibility of the antioxidants through the gastrointestinal tract was studied by an in vitro digestion model. We also investigated the antioxidant properties upon heat treatment. In addition to descriptive statistical methods, ANOVA and Pearson's correlation were used to evaluate the data. The in vitro digestion model was found to be suitable for the determination of free and bound antioxidants in the complex food matrix. Based on the results, our initial hypotheses were partly confirmed: the proteins and fibres used, as well as the heat treatment have a significant impact on antioxidant properties. As a result of our research a beverage was developed in which the proteins, fibres and the heat treatment have significant impact on antioxidant properties. Fibres and proteins enhanced, and heat exposure had negative impact on the antioxidant capacity. The most favourable composition was found to be the drink prepared with brown rice protein and inulin. The amount of bioaccessible polyphenols in the small intestine model decreased depending on the composition of the beverage, but it still remained significant. Our work is intended to provide key information supporting the development of the target product.