Evaluation of oat syrup, from oat beverage by-products for sugar reduction in food products

GOMES A. (1), GONLVES J. (1), PAUPIO A. (1), ALVES V. (2), PINTADO M. (1)
1 Universidade Catica Portuguesa, CBQF - Centro de Biotecnologia e Quica Fina Laboratio Associado, Escola Superior de Biotecnologia, Porto, Portugal
2 Frulact, Maia, Portugal

The agro-food industry is responsible for the annual production of millions of tons of food waste. At the same time, consumers are more informed and conscious about their food choices, seeking convenient, healthy, and sustainable products. In response, the industry proposes to provide natural products with limited additives, while still meeting sensory, nutritional, and safety requirements. Oats (Avena sativa L.) are the sixth largest cereal crop worldwide, becoming increasingly popular with health-conscious consumers because of their exceptional nutritional profile. They are particularly rich in dietary fibre, phytochemicals and essential nutrients such as vitamins and minerals. In this context, oats are chosen by consumers who prioritize health-promoting properties, as well as sensory appeal. This study aimed to transform an oat drink by-product into a new added-value product, that can be used as a sugar-replacement ingredient in food products. To release the by-product sugars, different hydrolysis processes were carried out. Thermal hydrolysis using water was carried out with proportions of 4:10 and 1:1 (residue: solvent). From this by-product hydrolysis, the supernatant residue was separated by centrifugation (10,000rpm, 10min) and the concentrations of sugars (mono and disaccharides) were analysed from the liquid fraction using the HPLC. The Brix for the obtained supernatant was also determined, as well as the sweetness index as a function of sucrose. Aqueous thermal hydrolysis (1:1 ratio, temperature of 121 ºC for 15 minutes, and pressure of 1 atm) was found to be the most effective process, resulting in fibres with good sweetening power. According to sugars HPLC profiles, the resulting supernatant liquid exhibited a sucrose concentration of 72.35 ± 8.13 g, glucose concentration of 56.59 ± 6.23 g, and fructose concentration of 2.89 ± 0.05 g per 100 g of sample, with a sweetness index of 1.24. The liquid fraction was then concentrated to produce an oat syrup with a Brix value of approximately 67º, indicating high levels of dissolved solids. In conclusion, this oat syrup exhibits promising sweetening properties and could potentially serve as a substitute for sucrose in certain food products, contributing to reducing food waste and promoting further a circular economy.