

Consumption of Oral Rehydration Solutions and Sports Drink Solutions Among the Sports Community and Formulation of a Sports Drink Powder for Rehydration

S. Steeban*, H.A.C.O. Hettiarachchi

*Department of Food Science & Technology, Faculty of Livestock, Fisheries & Nutrition,
Wayamba University of Sri Lanka, Makandura, Gonawila, 60170, Sri Lanka
selvarajsteeban2@gmail.com

Commercial sports drinks are often low in sodium and contain artificial ingredients, which goes against the growing consumer demand for natural products. Recent studies show increasing interest in sports drinks made with natural ingredients, highlighting the need for healthier options. This study aims to formulate a sports drink powder for athletes that contains no artificial ingredients and offers enhanced electrolyte replenishment. It began with a market survey to identify currently available sports drink products and their nutritional profiles, which identified three available sports drink solutions (SDS). Among these, SL Sport had the highest carbohydrate content (7.30 ± 0.14 g/100 mL), while 100 Plus contained the highest sodium concentration (44.33 ± 1.16 mg/100 mL). A questionnaire-based survey was then conducted among 85 national-level athletes, selected through random sampling, which revealed that 96.5% consumed oral rehydration solutions (ORS), while only 22.4% consumed SDS. The average daily consumption was 1180.72 ± 368.98 mL for ORS and 565.79 ± 163.34 mL for SDS. Based on these findings, this research focused on the formulation of a drink using king coconut water, beetroot juice, and pineapple juice. Through sensory analysis, a blend of 55 mL of king coconut water, 25 mL of pineapple juice, and 20 mL of beetroot juice was selected for spray drying. The resulting powder was evaluated for its physicochemical properties, mineral content, functional properties, and microbiological safety. The powder exhibited $98.77 \pm 0.40\%$ solubility and a water activity of 0.119 ± 0.001 . Proximate analysis showed total ash ($5.56 \pm 0.18\%$), moisture ($5.01 \pm 0.09\%$), protein ($1.16 \pm 0.07\%$), fat ($0.78 \pm 0.04\%$), and total carbohydrate content ($83.22 \pm 2.26\%$). Sodium (24.29 ± 0.37 mg/g) and potassium (24.86 ± 0.38 mg/g) were significantly higher than other minerals. The powder was analysed for its antioxidant potential, including total phenolic content (6.73 ± 0.06 mg GAE/g), total flavonoid content (1.16 ± 0.06 mg RE/g), total antioxidant capacity (149.06 ± 3.50 mg AAE/g), and DPPH radical inhibition activity ($50.18 \pm 3.00\%$). In conclusion, this sports drink powder may be a promising natural alternative for athletes, offering effective hydration along with additional health benefits.

Keywords: Athletes, carbohydrate, sodium, spray drying