

Development of Functional Isotonic Beverages Using Synthetic and Natural Ingredients to Enhance the Performance of Athletes

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Isotonic beverages have the same osmolality as body fluids, which results in rapid absorption and delaying exhaustion. In isotonic solutions, neither the size nor the shape of the cell changes because the concentrations of impermeable solutes on either side of the membrane are equal. Therefore, the application of isotonic fluids is a new advancement in sports beverage formulation due to its advantage over the replenishment of lost fluids as perspiration during physical exercise. As dehydration reduces physical endurance and increases the risk of injury, the functional beverage should ensure rapid absorption of required energy and electrolytes. To standardize isotonic sports beverages, there are international standards to be met. This study intends to develop formulations of isotonic beverages containing natural and synthetic ingredients which are economically feasible and commercially viable. One synthetic formula and two natural formulas (based on coconut water) are inferred from the research. The study was conducted in two trials preliminary and final. At the preliminary trial, base formula configuration and adjustments of osmolality were conducted. The final trial was to determine the final formula according to sensory perceptions, analysis of mineral contents, and physicochemical characteristics. The synthetic sample contains an osmolality of 284 ± 1 mOsmol/kg and sodium content of 688.2 ± 17.7 mg/L. Additionally, the natural formula with artificial sweetener and the natural formula with bee honey contains an osmolality and sodium content in the ranges of 307 ± 11 mOsmol/kg, and 716.6 ± 5.8 mg/L, respectively. Data were analyzed through SPSS software. The final formulations through the research met standards set by international regulations for isotonic beverages for osmolality (270–330 mOsm/kg) and sodium content (460–1150 mg/L). Coconut water and bee honey are significant sources of minerals and energy, with a high potential to be used in producing beverages, that improve dehydrated athletes' performance.

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