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Allulose-Sweetened Beverage Maintains Glycemic Stability During Post-Exercise Rehydration in the Heat

Gopalakrishnan, S.T. [1], Kooima, P.K. [2], Kavouras, I.E.[1], Wasserbeck, A.F., Srikanth, O[1], Cervantes, V. [1], Wardenaar, F. C.[2]Akram, A. [1], Muro R.J. [1], Lelko, M.M.[3], Kavouras, S.A. [1]

[1] Hydration Science Lab, College of Health Solutions, Arizona State University, Phoenix, AZ, USA
[2] Athleat Field Lab, College of Health Solutions, Arizona State University, Phoenix AZ, USA
[3] Liquid I.V., El Segundo, CA, USA

Background: Oral rehydration solutions (ORS) based on carbohydrates are widely used to improve hydration, which often results in elevated plasma glucose levels, an undesirable effect for individuals managing glycemic control. Allulose, a rare, low-calorie monosaccharide, may offer a novel alternative by supporting hydration without impacting blood glucose. This study evaluated the effects of allulose-sweetened ORS on rehydration and plasma glucose compared to water.
Methods: Twenty healthy adults (11M/9F; 26±5 y) completed two randomized trials of a 2-hour EID protocol in the heat (30.7ºC, 31.9% RH), followed by a 4-hour ad-libitum rehydration period. Participants consumed either a sugar-free ORS (SF-ORS) sweetened by allulose or water (W). Blood samples were collected throughout rehydration to assess plasma glucose, plasma volume and plasma osmolality.
Results: Ad libitum fluid intake following a -2% dehydration was 1.60±0.57 and 1.88±0.72 L for W and SF-ORS, respectively. At the end of the 4-h rehydration, net fluid balance was significantly greater for SF-ORS (0.8±0.7%) vs. W (0.2±0.8%, $P<0.05$). Plasma glucose at the beginning and end of SF-ORS (94.3±24.4, 80.3±14.1 mg/dL) and W (94.8±20.9, 77.5±16.6 mg/dL) did not differ significantly ($P>0.05$). SF-ORS resulted in significantly greater plasma volume restoration compared to W at 2, 3 and 4-h rehydration ($P<0.05$). SF-ORS also demonstrated significantly greater plasma osmolality compared to W during the rehydration period ($P<0.05$).
Conclusion: These findings demonstrate that the allulose-based SF-ORS supports effective rehydration without increasing plasma glucose, presents a promising alternative to traditional carbohydrates in ORS formulations, particularly for populations requiring glycemic management.