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Validation of a laboratory method for hydration assessment in athletes

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Accurate assessment of the hydration status of athletes is essential to ensure optimal performance both during training and competition. Measurement of specific gravity is a cheaper, more convenient laboratory method than osmometry for assessment of hydration. The objective of this study was to validate the specific gravity of urine against urine osmolality for assessment of hydration in National level athletes in Sri Lanka. National athletes (n = 107) were recruited for a study on hydration status. Pre and post training urine samples were collected from each athlete. Osmolality and specific gravity were assessed using an Advanced micro osmometer (Norwood model 3MO, USA) and a portable refractometer "c-6" (COD 5901006, comecta, S.A.) respectively. All assessments were made during a typical training session. The predicted osmolality was calculated from a regression curve between osmolality and specific gravity, and a Bland Altman plot was used to assess the level of agreement between the predicted osmolality and osmolality using the osmometer. Specific gravity and osmolality were correlated ($r = 0.972$, $p < 0.01$). Bland Altman plots for plot difference indicated that 95% of the data points were within the limits of agreement (CI: +148.9, -132.6). In conclusion, the specific gravity of urine measured using a portable refractometer can be used with acceptable accuracy in the assessment of the hydration status of Sri Lankan athletes.