Erratum: Hurst, Saunders, & Coleman (2020)

Several expressions of concern have been received with regard to a paper published in the International Journal of Sport Nutrition and Exercise Metabolism (IJSNEM) (Hurst et al., 2020a). Specifically, readers have questioned the accuracy of the nitrate dose reported in that paper (4.1 mmol), since the formulation of the stated product (Beet It Sport ®; James White Drinks Ltd) would have provided 400 mg of nitrate in the 70 ml volume that was ingested (i.e. ~6.4 mmol). The paper describes data for 70 participants, who are a subset taken from a wider sample of 103 participants whose data were presented at an earlier conference (Hurst et al., 2015)—although those conference proceedings in BJSM describe a dose of only 4 mg purportedly ingested 2 h prior to exercise (as opposed to 2.5 h pre-exercise as was reported in IJSNEM). Whilst certain demographic data match either exactly or very closely between these two reports (e.g. previous running experience and personal best performances), other data vary considerably. For example, participants in the earlier report are almost 10 years older than those in the IJSNEM paper, with little change in the standard deviation (mean [SD] age: 41 [11] versus 33 [12] years, respectively). A further report of data from this same study but using a different subset of 41 participants (although reported as n=70) was published in EJSS (Hurst et al., 2020b) and demonstrates further inconsistencies (e.g. mean [SD] age: 32 [10] years).

Regarding the first issue about nitrate dose, the authors of the study located photographs and supplier records to find that it was indeed the Beet It Sport ® product they had used in their study, rather than the original less-concentrated version that had a manufacturer-reported dose of 4.1 mmol per 70 ml shot. Thankfully other researchers who were studying these products at the time of that study (November 2014) have independently verified that the measured nitrate content of the product in question is generally close to that advertised by the manufacturers. More recent papers in IJSNEM have also assessed this particular supplement using ozone-based chemiluminescence or high-performance liquid chromatography, reporting mean [SD] concentrations between 6.25 and 6.41 [0.6] mmol, respectively (Gallardo & Coggan, 2019; Lowings et al., 2017). Therefore, although the concentration of nitrate was not checked in the study by Hurst et al. (2020a) and was seemingly underreported both in IJSNEM and (more substantially) in BJSM, it seems likely that the quantity of nitrate ingested was in fact approximately 50% higher than originally stated.

As for the various other inconsistencies between the report in IJSNEM and those published elsewhere, it remains unclear when exactly the nitrate was ingested or why different timings have been reported for the same study. The authors have attributed the inconsistencies in results between their publications partly to a number of transcription errors and partly to the different sample sizes between studies, since certain participants were included in some reports but not others (i.e. only participants who completed both parts of the cross-over design were included in the IJSNEM paper). However, even with the removal of some participants’ data, it seems improbable that some values but not others should differ so markedly between reports and, ultimately, no corrected data that adequately address these concerns could be provided. Some of the data published in Table 1 of Hurst et al. (2020a) are therefore known to be incorrect and so the study should be interpreted with caution.

The above issues clearly have general implications for what inferences may be drawn from this study, since it transpires both that the nitrate dose was actually within the recommended range for ergogenic effects (i.e. 5-9 mmol) rather than below it (Maughan et al., 2018), whereas the characteristics of the sample population remain uncertain (i.e. to whom can the findings be generalized?). Beyond these broader considerations, a further two specific errors have been noted in relation to the study interpretation. Firstly, the authors had stated that “. . .the benefits of beetroot juice supplementation are more likely to be shown for highly trained competitive athletes than recreational athletes. . . (Burke & Peeling, 2018)”, yet the paper cited states exactly the opposite. Secondly, the authors had concluded that “. . .beetroot juice may not exert an ergogenic effect on 5-km running performance for recreational runners”, yet the results of their own study show that performance was improved relative to the control trials on both occasions that beetroot juice was ingested (irrespective of whether that beetroot juice contained nitrate). Readers may therefore come to different conclusions from those reached by the authors regarding the effects of beetroot juice and/or nitrates.

In summary, this erratum was deemed necessary in the interests of transparency, consistent with the standards of reporting expected in IJSNEM. Fortunately it was possible in this instance to retrospectively estimate how much nitrate was ingested, so the original paper still provides useful information and need not be retracted. Nonetheless, it remains cause for concern when published research requires correction, which in this case highlights the need for researchers to consider whether the composition of ready-made supplements should be verified (as per our author guidelines; Betts et al., 2020).

James A. Betts
University of Bath
Editor-in-Chief, IJSNEM

References


