

P1030 Composition and labelling of electrolyte drinks

**Response to consultation
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About Dietitians Australia

Dietitians Australia is the national association of the dietetic profession with over 7500 members, and branches in each state and territory. Dietitians Australia is the leading voice in nutrition and dietetics and advocates for food and nutrition for healthier people and healthier communities. Dietitians Australia appreciates the opportunity to provide feedback FSANZ regarding composition and labelling of electrolyte drinks.

The Accredited Practising Dietitian (APD) program provides an assurance of safety and quality and is the foundation of self-regulation of the dietetic profession in Australia. Accredited Practising Dietitians have an important role in the food system to support consumers in making healthy food choices and companies with product formulation, marketing, consumer education and compliance.

This submission was prepared by members of the Dietitians Australia Food Regulatory and Policy Committee following the [Conflict of Interest Management Policy](#) and process approved by the Board of Dietitians Australia. Contributors include Dietitians Australia members with wide ranging expertise in areas including public health, food systems, food industry, academia and sports nutrition.

Recommendations

1. Adoption of the proposed amendment to reduce the minimum requirement for CHO in 'electrolyte drinks' from 50 g/L to 20 g/L.
2. Rather than limiting the maximum fructose content of electrolyte drinks to a defined absolute threshold, the amount of fructose permitted in electrolyte drinks should be set relative to the amount of total CHO in the beverage.
3. Greater education for consumers about the use of electrolyte drinks and the role of various forms of CHO as substrate for physical activity (and appropriateness for different exercise durations).
4. Messaging on electrolyte drinks should enhance transparency for consumers and indicate the fructose content within the product to provide appropriate information for those individuals that are intolerant to fructose.
5. Adoption of the proposed, more targeted approach to the claims that can be made on electrolyte drinks, including those specific to 'hydration'; 'rehydration'; and 'hydration to maintain performance'.
6. Adoption of the proposal to extend the scope of the 'permitted claim permission' to ensure it applies to both isotonic and hypotonic electrolyte drinks, including the following changes:
 - a. **Deleting:** 'promote the availability of energy'
 - b. **Changing:** '*prevent or treat mild dehydration*' to remove associations with 'prevention' and 'treatment' of dehydration
 - c. **Adopting:** 'contribute to the maintenance of performance'
 - d. **Retaining:** 'strenuous exercise' but replace 'exercise' with 'physical activity'
 - e. **Replacing:** 'sustained' with '60 minutes or more' and 'may occur as a result of' with 'during and after'
7. Adoption of the proposed approach to permit health claims specific to 'hydration during **prolonged** strenuous physical activity'; 'rehydration after **prolonged** strenuous physical activity'; and 'hydration to maintain performance'.
8. Terminology is kept consistent throughout any documentation to avoid confusion.
9. Adoption of the proposed approach to limit nutrition content claims to those associated with the intended purpose and regulatory composition of electrolyte drinks; including permission for a 'reduced sugar' type claim.
10. Further clarification of electrolyte drinks be provided by including the term 'immediately after' in reference to the 60 minutes or more of sustained strenuous physical activity.
11. The definition of 'electrolyte drink' prescribed in the code retain reference to the term CHO.
12. Adoption of the proposal to amend the units of osmolality to 'per kilogram' for all compositional requirements, but retain the 'per litre' units for labelling declaration.
13. Adoption of the proposed change in the lower osmolality bound threshold from 250 mOsm/kg to 200 mOsm/kg.
14. Retaining the maximum osmolality threshold for isotonic electrolyte drinks at 340 mOsm/kg.
15. Adoption of the proposal for Standard 2.6.2 to continue for regulation of electrolyte drinks.

Discussion

Electrolyte drinks have a significant market share in Australia and New Zealand, with recent evidence suggesting an annual increase of ~4% in sales volume (per capita) between 2011 and 2016 across major retail outlets in Australia.¹ Sports drinks were originally developed to be consumed by individuals undertaking prolonged, strenuous physical activity as a means of providing both 'fluid consumption to support hydration' and 'carbohydrate (CHO) ingestion to support substrate utilisation.'² However, sports drinks are often marketed to and consumed by a much broader population group. This includes individuals that do not engage in prolonged strenuous physical activity, where electrolyte drinks for hydration and delivery of exogenous substrate (ie carbohydrate) is most likely not necessary. As such, the sugar content provided in these beverages may contribute to excess dietary energy consumption and abate broader public health efforts to combat the increasing prevalence of overweight/obesity and associated cardiometabolic complications. For these individuals, the provision of electrolytes is also likely to be unnecessary; especially if a well-balanced diet is maintained.²

Dietitians Australia has considered the proposed changes to the Australia New Zealand Food Standards Code in relation to the composition and labelling of electrolyte drinks (Consultation Paper – Proposal P1030) based on the best available scientific evidence (regarding CHO and electrolyte solutions for hydration/rehydration and exercise performance) and with consideration for broader population and public health interests (with respect to energy/sugar intake).

Minimum carbohydrate requirement

FSANZ proposal: Reduce the minimum requirement for carbohydrate in electrolyte drinks from 50 g/L to 20 g/L

Dietitians Australia recommends:

1. Adoption of the proposed amendment to reduce the minimum requirement for CHO in 'electrolyte drinks' from 50 g/L to 20 g/L.

The proposed change will provide manufacturers with an opportunity to produce a wider variety of 'electrolyte drinks' with varying CHO concentrations and offer greater choice to consumers without compromising hydration and exercise performance effects associated with consuming these beverages. However, we recognise that fluid, substrate (ie CHO) and electrolyte requirements are likely to be highly individualised and dependent on many contextual factors (ie physiological and practical challenges unique to particular sports, athlete subgroups, individuals and environmental conditions). As such, Dietitians Australia suggests that greater education is needed for consumers about the use of these products and the role of CHO (including the influence of CHO concentration) in hydration, rehydration and exercise performance.

Severe dehydration leading to hypohydration, and its deleterious effects on athletic and cognitive performance are well documented.³⁻⁵ Likewise, the importance of being adequately fuelled to optimise exercise performance is also well recognised.⁶ To understand the influence of the proposed changes to the food standards code, Dietitians Australia has undertaken a review of existing evidence investigating the role of CHO to influence 'hydration status' and exercise performance.

CHO CONCENTRATIONS \leq 2% IN ELECTROLYTE DRINKS DO NOT APPEAR TO INFLUENCE 'HYDRATION STATUS':

Dietitians Australia has conducted a comprehensive review of relevant post-exercise rehydration literature in an attempt to understand the influence of changing CHO concentration on fluid retention (summarised in Figure 1). The collective data from this review demonstrates that there is no clear difference in post-exercise fluid retention between electrolyte drinks containing <50 g/L

CHO and those containing ≥ 50 g/L CHO. It should, however, be noted that there is a high degree of methodological heterogeneity in this group of studies. Nonetheless, of the 38 trials (from 29 studies⁷⁻³⁵) identified in our literature review, 10 provided post-exercise rehydration solutions containing < 50 g/L CHO (fluid retention = $66 \pm 14\%$, mean \pm SD) and 28 provided solutions containing ≥ 50 g/L CHO (fluid retention = $61 \pm 16\%$). Three studies provided a solution containing $\leq 2\%$ CHO^{8, 10, 21} with varying proportions of mean fluid retention observed (85%, 52% and 40% respectively). Seven studies used solutions containing $> 2\%$ but $< 5\%$ CHO,^{12, 17, 22-26} again with varying levels (ie between 52% and 79%) of fluid retention observed. Based on the collective evidence, Dietitians Australia agrees with the statement outlined in the FSANZ consultation paper (Proposal P1030) that lower carbohydrate (< 50 g/L) electrolyte drinks have similar effects on re/hydration as those currently permitted by Standard 2.6.2 (50-100 g/L) and supports the proposed amendment to reduce the minimum requirement for CHO in electrolyte drinks from 50 g/L to 20 g/L.

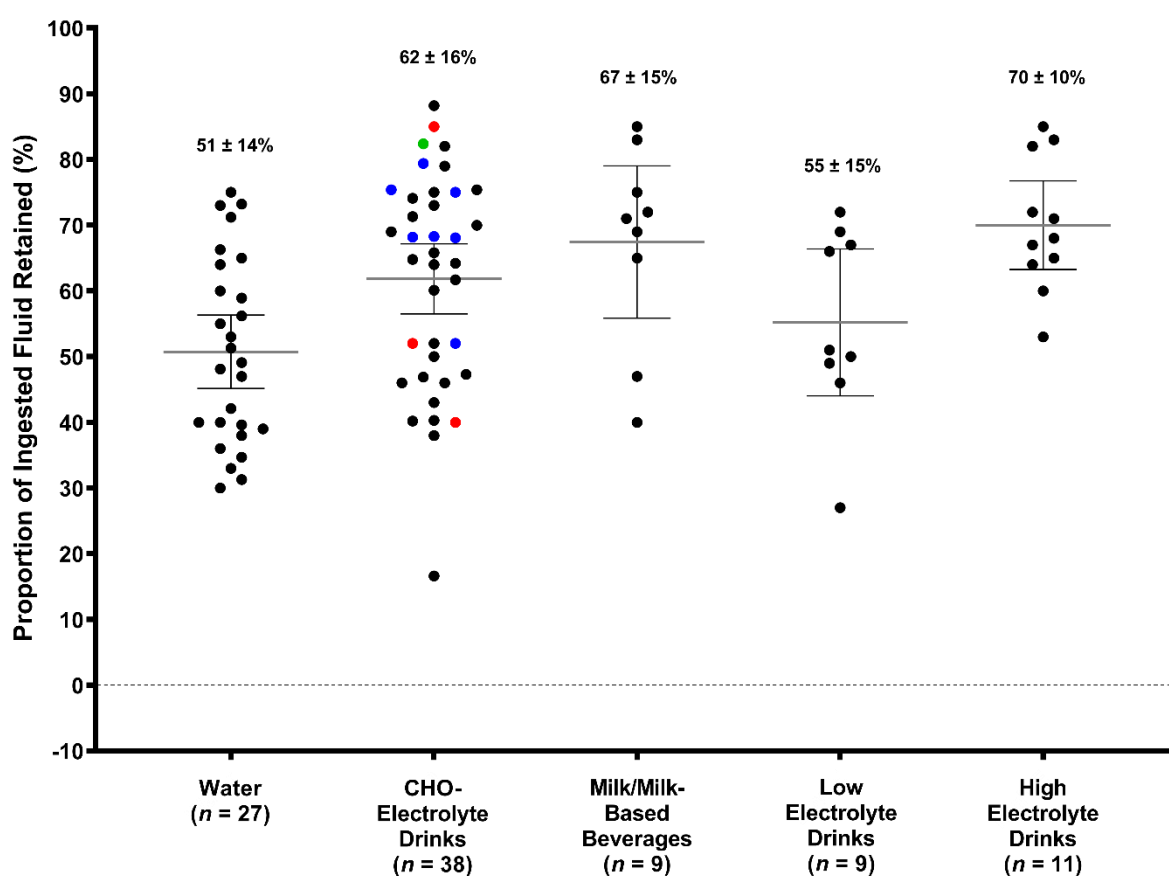


Figure 1. Fluid retention for various beverages. The studies presented in this figure administered a volume of fluid $\geq 100\%$ of exercise-induced BM loss. For CHO-Electrolyte Drinks, red symbols are drinks with ≤ 20 g/L CHO, blue symbols are drinks with > 20 g/L but < 50 g/L CHO, black symbols are drinks with ≥ 50 g/L but ≤ 100 g/L CHO, green symbols are drinks with > 100 g/L CHO. Low Electrolyte Drinks are those with no CHO and have 'low' Na^+ and K^+ concentration (i.e. < 35 and < 25 $\text{mmol}\cdot\text{L}^{-1}$, respectively). High Electrolyte Drinks are those with no CHO and have a 'high' Na^+ or K^+ concentration (i.e. ≥ 35 or ≥ 25 $\text{mmol}\cdot\text{L}^{-1}$, respectively). Bars are Mean \pm 95% CI, Text values are Mean \pm SD.

CHO CONCENTRATION IN ELECTROLYTE DRINKS AND EXERCISE PERFORMANCE

With regards to the CHO content of electrolyte drinks and exercise performance, we note that benefits associated with exogenous CHO ingestion are also likely to be dependent on many contextual factors (ie mode, duration and intensity of exercise, individuals' gastrointestinal tolerance,

and environmental conditions). Nonetheless, several review articles have summarised the ergogenic effects of consuming CHO during exercise,^{6, 36} and that performance benefits have been observed with small amounts of CHO (i.e. 16 g/h), irrespective of the form/source (ie solid or liquid).³⁷

The performance benefit associated with CHO ingestion appears to be evident even when the activity is of relatively short duration (~1 hour).^{37, 38} It is also noted that the underlying mechanism/s for the ergogenic effect of CHO are not necessarily isolated to metabolic effects and may also be centrally derived.³⁹ In a meta-analytic review, positive effects on exercise performance have been observed even when the CHO-containing beverage is not swallowed but is instead rinsed in the mouth (at CHO concentrations between 6 and 10%).⁴⁰ There is preliminary evidence suggesting that lower doses of CHO (eg 3-4%) are less likely to elicit these centrally-mediated effects.⁴¹ Thus, beverages with lower CHO concentrations may not provide benefits if used as a mouth rinse. On balance, Dietitians Australia supports the statement outlined in the FSANZ consultation paper (Proposal P1030) that lower carbohydrate (<50 g/L) electrolyte drinks are likely to have similar effects on exercise performance as those currently permitted by Standard 2.6.2 (50-100 g/L); but reiterate that this is likely to be dependent on numerous contextual factors.

Dietitians Australia suggests that further education for consumers about the use of these products and the ergogenic effects associated with different CHO concentrations is needed; especially if a larger range of products (providing greater variability in CHO concentrations) become readily available in the marketplace.

FSANZ proposal: Reduce the maximum fructose permitted in electrolyte drinks from 50 g/L to 20 g/L, consistent with the reduced minimum carbohydrate

Dietitians Australia recommends:

2. Rather than limiting the maximum fructose content of electrolyte drinks to a defined absolute threshold, the amount of fructose permitted in electrolyte drinks should be set relative to the amount of total CHO in the beverage. For example, no more than 50% of the total amount of CHO in the drink. This removes any possible inconsistency between the total CHO and fructose amounts permissible, while reflecting the evidence of CHO utilisation during prolonged strenuous physical activity.
3. Greater education for consumers about the use of electrolyte drinks and the role of various forms of CHO as substrate for physical activity (and appropriateness for different exercise durations).
4. Messaging on electrolyte drinks should enhance transparency for consumers and indicate the fructose content within the product to provide appropriate information for those individuals that are intolerant to fructose.

While Dietitians Australia appreciates the desire to reduce the maximum permitted fructose content in electrolyte drinks (while retaining a maximum CHO content of 100 g/L) as a means of ensuring consistency with the reduction of the minimum amount of CHO, this may be counter-productive with regards to CHO availability during prolonged strenuous physical activity.

During short bouts of exercise (ie ≤1 hour in duration), a mouth rinse or small amounts of CHO can benefit performance.³⁷ During more prolonged physical activity (ie up to 2 hours), a single CHO source (ie glucose) can be oxidised at rates up to ~60 g/hour and this is likely to be sufficient as an exogenous substrate source. Thus, inclusion of fructose is not necessary under these circumstances. When intakes of CHO are >60g/hour, there may be some benefit from CHO being delivered in a multiple transportable form (ie glucose + fructose) to support high oxidation rates. However, individual assessment of substrate type is warranted due to varying tolerance of fructose between individuals, irrespective of the fructose to glucose ratio.⁴²⁻⁴⁴ Further, reducing the CHO content

overall (either glucose and/or fructose and/or maltodextrin, etc) will reduce the likelihood of developing gastrointestinal symptoms during and after exercise.^{45, 46}

From a post-exercise recovery standpoint, providing CHO in the form of glucose + fructose mixtures does not appear to enhance muscle glycogen repletion rates over glucose ingestion alone.⁵² However, liver glycogen repletion rates are approximately doubled with ingestion of glucose + fructose mixtures compared to isocaloric ingestion of glucose alone.⁴⁸ From a gastrointestinal perspective and to ensure reduced CHO malabsorption and gastrointestinal symptoms in the post-exercise period, individuals should aim to reduce any large acute CHO intake bolus and spread their intake over the recovery period, irrespective of the CHO type.^{45, 53, 54}

Health and nutrition claims

FSANZ proposal: Prohibit health claims on electrolyte drinks, including self-substantiated health claims, other than for three specific claims.

The three exceptions would be health claims for: hydration during strenuous physical activity; rehydration after strenuous physical activity; and hydration to maintain performance. Each claim would be required to refer to effects occurring under conditions of strenuous physical activity for a minimum time period of 60 minutes. These three health claims would be permitted on electrolyte drinks with an average osmolality of 200-340 mOsm/kg.

Dietitians Australia recommends:

5. Adoption of the proposed, more targeted approach to the claims that can be made on electrolyte drinks, including those specific to 'hydration'; 'rehydration'; and 'hydration to maintain performance'.
6. Adoption of the proposal to extend the scope of the 'permitted claim permission' to ensure it applies to both isotonic and hypotonic electrolyte drinks, including the following changes:
 - a. **Deleting:** 'promote the availability of energy'
 - b. **Changing:** 'prevent or treat mild dehydration' to remove associations with 'prevention' and 'treatment' of dehydration
 - c. **Adopting:** 'contribute to the maintenance of performance'
 - d. **Retaining:** 'strenuous exercise' but replace 'exercise' with 'physical activity'
 - e. **Replacing:** 'sustained' with '60 minutes or more' and 'may occur as a result of' with 'during and after'
7. Adoption of the proposed approach to permit health claims specific to 'hydration during **prolonged** strenuous physical activity'; 'rehydration after **prolonged** strenuous physical activity'; and 'hydration to maintain performance'.
8. Terminology is kept consistent throughout any documentation to avoid confusion.

The proportion of Australians who participate in physical activity at an intensity level (ie strenuous) and duration (≥ 1 hour) sufficient enough to require 'rapid CHO and fluid delivery/replenishment' from electrolyte drinks is small.⁵⁵ For sedentary individuals and those who are only moderately active, consumption of electrolyte drinks may contribute a significant source of dietary energy without providing health benefits other than fluid intake. Health claims made on food/beverage labels and in advertising may promote an impression that a product is a 'healthier choice'. Health claims may not be carefully considered by individuals, particularly those with limited health/nutrition literacy (including children), and therefore have potential to mislead consumers.⁵⁶ As such, we

support a more targeted approach to the claims that can be made on electrolyte drinks, including those specific to 'hydration'; 'rehydration'; and 'hydration to maintain performance'.

Severe dehydration leading to hypohydration, and its deleterious effects on athletic and cognitive performance are well documented.³⁻⁵ Recent meta-analytic evidence suggests that fluid intake during exercise is associated with significant improvements in aerobic exercise performance, irrespective of whether fluid is consumed in prescribed volumes or *ad libitum*.⁵⁷ Further, another recent meta-analytic review demonstrated that fluid intake after a bout of dehydrating exercise is associated with significant performance improvements on a subsequent aerobic exercise task, with the volume and timing of fluid consumption not influential on the magnitude of this effect.⁵⁸ Even fluid intakes that do not match the fluid losses induced by exercise appear to be efficacious. Therefore, we support the proposed approach to permit health claims specific to 'hydration during 'prolonged' strenuous physical activity'; 'rehydration after 'prolonged' strenuous physical activity'; and 'hydration to maintain performance'.

Dietitians Australia also suggests that terminology is kept consistent throughout any documentation to avoid confusion. The terms indicated as exceptions for health claims should include the term 'prolonged' immediately before 'strenuous physical activity'. For example, hydration during prolonged strenuous physical activity; rehydration after prolonged strenuous physical activity; and hydration to maintain performance during prolonged strenuous physical activity.

We note there is some evidence suggesting that performance benefits can be observed with the ingestion of relatively small amounts of CHO (16 g/hour⁵⁹ and 22 g/hour⁶⁰) during exercise. These concentrations are similar to levels that would be available in electrolyte drinks formulated at the low CHO threshold under the proposed revised minimum CHO requirement (ie 20 g/L). Dietitians Australia appreciates that electrolyte drinks would continue to be permitted to carry nutrition content claims about energy and does not have concerns with the proposed changes associated with deletion of specific text for health claims regarding energy.

Dietitians Australia acknowledges the attempts made with the reworded definition to improve clarity over the appropriate identification and use of an electrolyte drink by removing elements such as CHO and minerals and defining physical activity duration. However, CHO is still a compositional requirement in these beverages. We acknowledge that for some individuals, these beverages may provide an important, and potentially their only, source of substrate and fluid for physical activity. This can be the case particularly when individuals are unable to tolerate ingestion of other dietary sources of CHO (ie solid foods) prior to physical activity. In addition to the proposed changes, Dietitians Australia suggests further clarity be provided by including the term 'immediately after' in reference to the 60 minutes or more of sustained strenuous physical activity. The addition of 'immediately' will recognise that for some individuals, electrolyte drinks provide a convenient and well-tolerated source of fluid and electrolytes. However, beyond the acute post-exercise period (~30 minutes), after which individuals have access to and tolerance to eat food, the type of recovery drink ingested has a more of an influence on daily nutrient intake rather than acute measures of fluid recovery.^{61, 62}

FSANZ proposal: Restrict nutrition content claims in relation to electrolyte drinks

Dietitians Australia recommends:

9. Adoption of the proposed approach to limit nutrition content claims to those associated with the intended purpose and regulatory composition of electrolyte drinks; including permission for a 'reduced sugar' type claim given the proposed approach to reduce the minimum CHO content in electrolyte drinks.
10. Further clarification of electrolyte drinks be provided by including the term 'immediately after' in reference to the 60 minutes or more of sustained strenuous physical activity.

11. The definition of 'electrolyte drink' prescribed in the code retain reference to the term CHO. For example: 'electrolyte drink' means a drink formulated for the rapid replacement of fluid, carbohydrates and electrolytes before, during or immediately after prolonged strenuous physical activity'.

Nutrition content claims on electrolyte drinks should be limited to those about: carbohydrate; sugar or sugars; energy; and/or any one of five substances classified as electrolytes for the purposes of nutrition content claims and nutrition labelling under Standard 2.6.2. These substances would be calcium, sodium, magnesium, potassium and chloride. Declaration of any of these substances as % Recommended Dietary Intake (%RDI) on electrolyte drinks would also be prohibited as such a declaration is not relevant to electrolyte function in these products.

Dietitians Australia notes that content and health claims about CHO, sugar/s and energy must comply with the applicable conditions in Standard 1.2.7 and Schedule 4. Sports drinks were developed for individuals engaging in prolonged, strenuous physical activity as a means of promoting 'fluid consumption to support hydration' and 'CHO ingestion to support substrate utilisation'. However, sports drinks are often marketed to and consumed by individuals who do not engage in endurance exercise (including children) and where their use for hydration and delivery of exogenous substrate (ie carbohydrate) is not necessary. As such, the significant sugar content provided in these beverages may contribute to excess dietary energy consumption, and overweight/obesity. For these individuals, the provision of electrolytes is also likely to be unnecessary; especially if a well-balanced diet is maintained. As such, Dietitians Australia agree that the proposed approach would reduce the potential for claims to mislead consumers about the purpose and place of electrolyte drinks in the diet.

The Code would prescribe the name 'electrolyte drink' to enable identification of electrolyte drinks among similar products not regulated as electrolyte drinks and amend the definition of 'electrolyte drink' to align with compositional amendments by removing the definition's reference to 'carbohydrates' and 'minerals', and removing the need for electrolyte drinks to be 'represented as'.

FSANZ proposal: The units of osmolality would be amended to 'per kilogram' for compositional requirements. However, current labelling declaration unit requirements using 'per litre' would be retained.

Dietitians Australia recommends:

12. Adoption of the proposal to amend the units of osmolality to 'per kilogram' for all compositional requirements, but retain the 'per litre' units for labelling declaration.
13. Adoption of the proposed change in the lower osmolality bound threshold from 250 mOsm/kg to 200 mOsm/kg.
14. Retaining the maximum osmolality threshold for isotonic electrolyte drinks at 340 mOsm/kg.

'Per litre' units should be retained for labelling declaration, given that other units of measure on electrolyte drinks are likely to be in litres or millilitres and the difference in tonicity for electrolyte drinks on a kilogram basis compared to a litre basis is no more than about 3%, and likely to be insignificant when rounding is taken into account.

The change in the lower osmolality bound threshold will support the proposed changes to lower the minimum CHO requirement to 20 g/L and permit 'hypotonic' and 'isotonic' electrolyte drinks to carry the permitted health claims.

FSANZ proposal: Standard 2.6.2 would continue to regulate electrolyte drinks. Moving the provisions that regulate electrolyte drinks from Standard 2.6.2 to 2.9.4 of the Code can, if required, be considered in Proposal P1010 – *Review of Formulated Supplementary Sports Foods*.

Dietitians Australia recommends:

15. Adoption of the proposal for Standard 2.6.2 to continue for regulation of electrolyte drinks.

We acknowledge that a shift to Standard 2.9.4 can be further considered in Proposal 1010 - *Review of Formulated Supplementary Sports Foods*.

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