

Consequently, based on these findings and in view of problems with the GI tract of athletes, the consumption of fructose alone cannot be recommended.

Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of common general knowledge in the field.

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

Based on ~~this~~ the above-mentioned prior art it was ~~the-an~~ object of a preferred form of the present invention to provide the art with a formulation that can provide athletes very efficiently with carbohydrates and an increased rate of exogenous carbohydrate oxidation during exercise, while at the same time minimizing the risk of developing problems with the gastrointestinal tract.

The present inventors were surprised to find that they could achieve this preferred object by a carbohydrate bar in accordance with ~~claim 1~~ the invention and by a use in accordance with claim ~~12~~ 1.

According to a first aspect, the present invention provides use of a carbohydrate bar as a food product or for the preparation of a food product to provide an increased performance, or an increased endurance performance, the carbohydrate bar comprising a carbohydrate fraction comprising glucose and fructose in a ratio in the range of 3:1 to 1:1, wherein said carbohydrate bar comprises an energy density of 800-2200 kJ/100g, wherein the increased performance provides an increased gastrointestinal tolerance and/or to treat or prevent problems with the gastrointestinal tract.

According to a second aspect, the present invention provides a method to provide an increased performance, or an increased endurance performance, or an increased gastrointestinal tolerance and/or to treat or prevent problems with the gastrointestinal tract, the method comprising the steps of administering to a subject a food product comprising a carbohydrate bar comprising a carbohydrate fraction comprising glucose

and fructose in a ratio in the range of 3:1 to 1:1, wherein said carbohydrate bar comprises an energy density of 800-2200 kJ/100g.

According to yet a further aspect, the present invention provides a method to allow for enhanced blood sugar maintenance late in exercise, or to provide an increased exogenous carbohydrate oxidation, or to provide faster energy delivery to working muscles, or to provide faster energy delivery to working muscles, or to provide more substantial energy to muscles, the method comprising the steps of administering to a subject a food product comprising the carbohydrate bar according to the invention.

According to another aspect, the present invention provides a method to treat or prevent symptoms of fatigue, to improve cycling cadence and/or to decrease ratings of perceived exertion (RPE), the method comprising the steps of administering to a subject a food product comprising the carbohydrate bar according to the invention.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising", and the like are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

While the subject matter of the present invention is primarily intended for athletes, it is, however, clear, that the carbohydrate bar of the present invention can be used by anybody in need of carbohydrate supply. For example, the bar of the present invention can be very well used as transportable food for people, who do not wish to carry too heavy provisions, for example during long term trips. The bar of the present invention may equally well be used by people to provide the body with carbohydrates for example before or during an examination in school or at the university.

The present inventors have investigated the gastric tolerance of a carbohydrate bar delivering a mixture of glucose and fructose at relatively high rates during a real life situation of either running or cycling outdoors.

It was found that an intake of even 90 grams of carbohydrate per hour in the form of a carbohydrate bar, as well as 30-60 g CHO/-h as recommended by the ACSM, is well

tolerable if ingested as carbohydrate mixture comprising glucose and fructose in a ratio in the range of 3:1 to 1:1, preferably 2:1 in the form of a bar.

5 It was surprisingly found that the ingestion of 90 grams/h of the above carbohydrate mixture will allow to keep the distress of the GI-tract of athletes minimal, and at about a rate of ~15% of subjects. Furthermore it was found that the minimal GI distress was not increased as compared with an intake of 60 grams of a carbohydrate mixture comprising glucose and fructose in a ratio in the range of 3:1 to 1:1, preferably 2:1 per hour.

Claims

1. Use of a carbohydrate bar as a food product or for the preparation of a food product to provide an increased performance, or an increased endurance performance, the Ccarbohydrate bar comprising a carbohydrate fraction comprising glucose and fructose in a ratio in the range of 3:1 to 1:1, wherein said carbohydrate bar comprises an energy density of 800-2200 kJ/100g, wherein the increased performance provides an increased gastrointestinal tolerance and/or to treat or prevent problems with the gastrointestinal tract.
2. Use of a Ccarbohydrate bar ~~in accordance with~~according to claim 1, ~~characterized in that wherein~~ the carbohydrate fraction of the bar comprises at least 30 % glucose and fructose, ~~preferably 50 % glucose and fructose more preferably at least 85 % glucose and fructose.~~
3. Use of a carbohydrate bar according to claim 1 or claim 2, wherein the carbohydrate fraction of the bar comprises at least 50 % glucose, or at least 85 % glucose and fructose.
4. Use of a Ccarbohydrate bar ~~in accordance with~~according to any one of the preceding claims, ~~characterized in that wherein~~ the carbohydrate fraction of the bar provides at least 50 %, preferably at least 70 % of the energy of the bar.
45. Use of a Ccarbohydrate bar ~~in accordance with~~according to any one of the preceding claims, ~~characterized in that wherein~~ the carbohydrate fraction of the bar comprises dextrose and/or maltodextrins.
56. Use of a Ccarbohydrate bar ~~in accordance with~~according to any one of the preceding claims, ~~characterized in that wherein~~ it contains less than 40 g protein per 100g bar and/or less than 20 g fat per 100g bar.
67. Use of a Ccarbohydrate bar ~~in accordance with~~according to any one of the preceding claims, ~~characterized in that wherein~~ it further contains vitamins, ~~such as Vitamin C, Vitamin E, Vitamin B12, Niacin, Vitamin B6, folic acid, biotin, panthotenic acid, Vitamin B₂ and/or Vitamin B6, preferably in amounts that correspond to at least 10 % of the recommended daily dose.~~

8 Use of a carbohydrate bar according to claim 7 wherein said vitamins are selected from Vitamin C, Vitamin E, Vitamin B12, Niacin, Vitamin B6, folic acid, biotin, panthotenic acid, Vitamin B₂ and/or Vitamin B6.

5 9. Use of a carbohydrate bar according to claim 7 or claim 8 wherein said vitamins are included in amounts that correspond to at least 10 % of the recommended daily dose.

710. Use of a Ccarbohydrate bar ~~in accordance with~~according to any one of the preceding claims, ~~characterized in that wherein~~ it further comprises electrolytes and/or minerals, ~~such as sodium, potassium, calcium, iron, magnesium or zinc.~~

10 11. Use of a carbohydrate bar according to claim 10 wherein said electrolytes and/or minerals are selected from sodium, potassium, calcium, iron, magnesium or zinc.

812. Use of a Ccarbohydrate bar ~~in accordance with~~according to any one of the preceding claims, ~~characterized in that wherein~~ it further contains amino acids ~~such as selected from~~ L-leucine, L-valine and/or L-isoleucine.

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~~9. Carbohydrate bar in accordance with one of the preceding claims, characterized in that it has an energy density of 800-2200 kJ/100g.~~

~~1013. Use of a C~~carbohydrate bar ~~in accordance with~~ according to any one of the preceding claims, ~~characterized in that wherein~~ it has a serving size of 10-200 g, preferably or 20-100g, or 3 - 15g, preferably or 5 - 10g.

~~1114. Use of a C~~carbohydrate bar ~~in accordance with~~ according to any one of the preceding claims, ~~characterized in that wherein~~ it further comprises one or more compounds selected from the group consisting of aroma compounds, fiber, caffeine, conservatives, guarana, acidifying agents, binding agents, gel building material, water, fruit juice, fruits, antioxidants, colouring agents.

~~12. Use of a carbohydrate bar in accordance with one of claims 1-11 as a food product or for the preparation of a food product to provide an increased performance, in particular endurance performance.~~

~~13. Use in accordance to claim 12 to further provide an increased gastrointestinal tolerance and/or to treat or prevent problems with the gastrointestinal tract.~~

~~1415. Use in accordance with claim 13~~ any one of the preceding claims, wherein the problems with the gastrointestinal tract are selected from the group consisting of upper abdominal problems such as selected from reflux, heartburn, bloating, upper abdominal cramps, vomiting, nausea; lower abdominal problems such as selected from intestinal cramps, flatulence, urge to defecate, left abdominal pain, right abdominal pain, loose stool, diarrhoea; or systemic problems such as selected from dizziness, headache, muscle cramp or urge to urinate.

~~1516. Use in accordance with any one of the preceding claims 12-14~~ to allow for an enhanced blood sugar maintenance late in exercise.

~~1617. Use in accordance with~~ according to any one of the preceding claims ~~12-15~~ to provide an increased exogenous carbohydrate oxidation, to provide faster energy delivery, ~~in particular~~ to working muscles, and/or to provide more sustained energy to muscles.

~~17~~18. Use ~~in accordance with~~according to any one of the preceding claims ~~12-16~~ to further treat or prevent symptoms of fatigue, to improve cycling cadence, and/or to decrease ratings of perceived exertion (RPE), ~~for example measured in revolutions per minute and/or to decrease ratings of perceived exertion (RPE).~~

19. Use according to claim 18 wherein said cycling cadence improvement is measured in revolutions per minute.

~~18~~20. Use ~~in accordance with~~according to any one of the preceding claims ~~12-16~~, wherein the carbohydrate bar is used in an amount that corresponds to an ingestion of at least 30g CHO/h, preferably or at least 50g CHO/h, more preferably or at least 65g CHO/h, and most preferably between 80g CHO/h and 110g CHO/h.

21. Use according to any one of claims 15 to 20 wherein the carbohydrate bar is used in an amount that corresponds to an ingestion of between 80g CHO/h and 110g CHO/h.

22. Use of a carbohydrate bar as a food product or comprising the steps of administration of a food product to a subject to provide an increased performance, or an increased endurance performance, or an increased gastrointestinal tolerance and/or to treat or prevent problems with the gastrointestinal tract, the carbohydrate bar comprising a carbohydrate fraction comprising glucose and fructose in a ratio in the range of 3:1 to 1:1, wherein said carbohydrate bar comprises an energy density of 800-2200 kJ/100g.

23. Use according to claim 22, wherein the problems with the gastrointestinal tract are selected from the group consisting of upper abdominal problems selected from reflux, heartburn, bloating, upper abdominal cramps, vomiting, nausea; lower abdominal problems selected from intestinal cramps, flatulence, urge to defecate, left abdominal pain, right abdominal pain, loose stool, diarrhoea; or systemic problems selected from dizziness, headache, muscle cramp or urge to urinate.