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Declarations under Rule 4.17:

— as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))

(54) Title: NUTRITIONAL COMPOSITION

(57) Abstract: A nutritional composition comprising protein, free amino acids, medium chain triglycerides, glucose, isomaltulose, sucrose and maltodextrin, wherein the nutritional composition comprises from 2.5 to 10.5 wt. % of protein, 5.3 to 22.0 wt. % of free amino acids, 4.5 to 9.5 wt. % of medium chain triglycerides, 6.5 to 14.5 wt. % of glucose, 9.5 to 18.5 wt. % of sucrose, 27.5 to 35.5 wt. % of isomaltulose and 11.5 to 20.5 wt. % of maltodextrin relative to 100 wt. % of the total composition. The nutritional composition is usable in muscle tissue regeneration and/or glycaemia control.



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NUTRITIONAL COMPOSITION

Field of the Invention

The invention relates to a nutritional composition comprising macronutrients for
5 optimizing energy intake of an individual under metabolic stress conditions.

Background of the Invention

Currently, the preparation of athletes not only for racing and training performances is energetically handled as based on the results of functional stress laboratory tests. It is
10 a common phenomenon that basically regardless the time of day when the test is running, regardless the sport that the young athletes perform and independently of the meal they eat before the test, athletes enter energy deficits in the second half of the test. The change in the system of preparation of young athletes and the demands made on them regarding the performance have changed so dramatically that it is not possible
15 to ensure a balanced intake and dispensing of basic macronutrients without a perfect and sophisticated energy replenishment throughout the day.

When solving this situation, however, all the assortment on the domestic and foreign markets is based on the assumption that the supplement must be financially interesting and thus very attractively offered in terms of marketing. So the amount of substances
20 that are added to these energy supplements, including the energy of unnecessary micronutrients, is counterproductive, because instead of energizing in the right proportions, in time and use, they tend to burden the digestive tract and slow down the use of energy at the performance itself. From the biochemical point of view, it is necessary to streamline the absorption and metabolism of macronutrients and
25 increase the energy potential of the cell, especially through metabolic pathways of glycolysis and aerobic phosphorylation.

The course of the glycaemic curve is measured as blood glucose (glycaemia) concentration over time, and both the onset and decrease and the slope of the glycaemic curve are important for energy intake optimization purposes. High
30 Glycaemic Index (GI) meals and energy drinks cause a rapid increase in glycaemia,

which is then compensated for by insulin secretion and rapid fall in glycaemia. The result is a short feeling of comfort within 30 minutes, followed by fatigue and hunger. Such a glycaemic curve is undesirable for optimal endurance sport performance and muscle tissue regeneration after exercise. Medium GI foods induce a slower increase
5 in glycaemia shortly after consumption (from 30 minutes to 1 hour), but this is followed by a rapid decrease in blood glucose, thus also unsuitable for optimal endurance sport performance and muscle recovery after exercise.

JPH 03251154 discloses a nutritional composition for patients suffering from muscular dystrophy with a protein and free amino acids component of 10 to 90 wt. %, lipids of 0
10 to 15 wt. %, and saccharides of 10 to 80 wt. %. The protein component comprises a protein hydrolyzate of animal origin and leucine, isoleucine, valine and glutamine in an unspecified amount of individual amino acids, wherein the total free amino acid content is less than 35 wt. %. The lipid component may preferably be vegetable oil or medium chain triglycerides (MCT oil), and the carbohydrate component preferably includes
15 glucose, maltose, sucrose, isomaltose, lactose, fiber, starch or dextrin. The declared contents of these components are relatively broad, thus requiring further research in narrowing the intervals, as well as exemplary compositions having only a high amount of other additives, such as vitamins, minerals, emulsifiers and the like.

20 Summary of the Invention

It is an object of the present invention to provide a nutritional composition comprising protein, free amino acids, medium chain triglycerides, glucose, isomaltulose (also known as pallatinose), sucrose and maltodextrin, comprising from 2.5 to 10.5 wt. % of protein, 5.3 to 22.0 wt. % of free amino acids, 4.5 to 9.5 wt. % of medium chain
25 triglycerides, 6.5 to 14.5 wt. % of glucose, 9.5 to 18.5 wt. % of sucrose, 27.5 to 35.5 wt. % of isomaltulose and 11.5 to 20.5 wt. % of maltodextrin relative to 100 wt. % of the total composition.

Preferably, the nutritional composition comprises 3.0 to 10.0 wt. % of protein, 5.8 to 22.0 wt. % of free amino acids, 5.0 to 9.0 wt. % of medium chain triglycerides, 7.0 to
30 14.0 wt. % of glucose, 10.0 to 18.0 wt. % of sucrose, 28.0 to 35.0 wt. % of isomaltulose and 12.0 to 20.0 wt. % of maltodextrin relative to 100 wt. % of the total composition.

The protein in the nutritional composition preferably comprises the protein of plant or animal origin, for example rice or whey protein concentrate with low lipid content. However, depending on taste or other preferences, any protein may be used.

The free amino acids preferably include isoleucine, leucine, valine (these three also known as branched chain amino acids, BCAA), glutamine, beta-alanine and citrulline. Citrulline is preferably in the form of citrulline malate. Preferably, the nutritional composition comprises 0.5 to 3.0 wt. % of isoleucine, 1.0 to 5.0 wt. % of leucine, 0.5 to 3.0 wt. % of valine, 1.5 to 4.0 wt. % of glutamine, 1.0 to 4.0 wt. % of beta-alanine and 0.8 to 3.0 wt. % of citrulline malate relative to 100 wt. % of the total composition.

Medium chain triglycerides (also known as MCT oil) preferably include esters of glycerol and carboxylic acids of 6, 8, 10 and 12 carbons, for example caproic, caprylic, capric or lauric acids.

Further, the nutritional composition preferably comprises at least one aroma, flavour, colourant, sweetener and/or filler. Useful aromas and flavours include, but are not limited to, chocolate, cocoa, strawberry, raspberry, forest fruit, exotic fruit, and the like. For example, stevia may be used as a sweetener, and the filler may preferably be arabic, xanthan or guar gum.

The nutritional composition is preferably in a liquid, gel, solid or powder form. The nutritional composition can be dissolved in water or other liquid for the preparation of the beverage.

The present invention further provides a use of the nutritional composition as defined above for muscle tissue regeneration and/or glycaemia control.

The claimed nutritional composition will allow an individual to easily replenish their energy during a busy day or before difficult exercise, and the formulation used will result in a stable blood glucose level and eliminate extreme fluctuations caused by the current diet thereby burdening the digestive system. Due to the gradual release of glucose into the blood, it will provide the necessary support during a stressful situation without the feeling of full stomach and subsequent exhaustion, which is usually caused by a decrease in blood plasma glucose. The gradual release of the components of the composition will delay sports fatigue as it slows down the loss of muscle glycogen, which is an immediate source of energy for the muscles. As a result, exhaustion and

pain in muscle tissue are delayed. Products containing this nutritional composition can be used as a substitute for a heavy and irregular diet over the day, which suppresses and reduces both concentration and performance.

In Fig. 1, it can be seen that the glycaemic curve of the present nutritional composition is maintained between 5.0 and 6.5 mmol/L of Glu over 90 minutes, which is the lowest plasma glucose fluctuation from the comparative items (medium GI meal, energy drink, coffee, and nutritional composition).

Description of the Drawings

- 10 The invention will be explained in more detail with reference to the drawings, in which:
- Fig. 1 depicts the course of glycaemic curves over time for medium GI food, energy drink, coffee, and the present nutritional composition.

Exemplary embodiments

- 15 Example 1: Nutritional composition containing whey protein

Component	Content (wt. %)
Whey protein concentrate	8.0
L-isoleucine	1.4
L-leucine	2.9
L-valine	2.3
L-glutamine	1.7
Beta-alanine	1.1
Citrulline malate	1.6
Medium chain triglycerides (MCT oil)	6.0
Glucose	10.5
Sucrose	13.8
Isomaltulose	32.0
Maltodextrin	17.7
Chocolate aroma	1.0

Example 2: Nutritional composition containing rice protein

Component	Content (wt. %)
Rice protein concentrate	3.5
L-isoleucine	2.7
L-leucine	4.4
L-valine	2.6
L-glutamine	3.3
Beta-alanine	2.5
Citrulline malate	3.0
Medium chain triglycerides (MCT oil)	8.8
Glucose	13.0
Sucrose	11.2
Isomaltulose	29.0
Maltodextrin	15.0
Strawberry aroma	1.0

Industrial Applicability

5 The industrial applicability of the nutritional composition is mainly for athletes, for muscle tissue regeneration after exercise and for regulating the glycaemic curve during the day. The nutritional composition is also intended for groups of people with special dietary needs and requirements such as people diagnosed with coeliac disease, people with food allergies, people with lactose intolerance, vegetarians and vegans, pregnant and nursing women.

PATENT CLAIMS

1. Nutritional composition comprising protein, free amino acids, medium chain triglycerides, glucose, isomaltulose, sucrose and maltodextrin, characterized in
5 that it comprises from 2.5 to 10.5 wt. % of protein, 5.3 to 22.0 wt. % of free amino acids, 4.5 to 9.5 wt. % of medium chain triglycerides, 6.5 to 14.5 wt. % of glucose, 9.5 to 18.5 wt. % of sucrose, 27.5 to 35.5 wt. % of isomaltulose and 11.5 to 20.5 wt. % of maltodextrin relative to 100 wt. % of the total composition.
2. Nutritional composition according to claim 1, characterized in that the protein
10 includes a protein of plant or animal origin.
3. Nutritional composition according to claim 1, characterized in that the free amino acids include isoleucine, leucine, valine, glutamine, beta-alanine and citrulline.
4. Nutritional composition according to claim 3, characterized in that it comprises 0.5
15 to 3.0 wt. % of isoleucine, 1.0 to 5.0 wt. % of leucine, 0.5 to 3.0 wt. % of valine, 1.5 to 4.0 wt. % of glutamine, 1.0 to 4.0 wt. % of beta-alanine and 0.8 to 3.0 wt. % of citrulline malate relative to 100 wt. % of the total composition.
5. Nutritional composition according to claim 1, characterized in that medium chain triglycerides include esters of glycerol and carboxylic acids of 6, 8, 10 and 12 carbons.
- 20 6. Nutritional composition according to any of the preceding claims, characterized in that it further comprises at least one aroma, flavour, colourant, sweetener and/or filler.
7. Nutritional composition according to any of the preceding claims, characterized in that it is in a liquid, gel, solid or powder form.
- 25 8. Use of the nutritional composition according to any of the preceding claims in muscle tissue regeneration.
9. Use of the nutritional composition according to any of the preceding claims in glycaemia control.

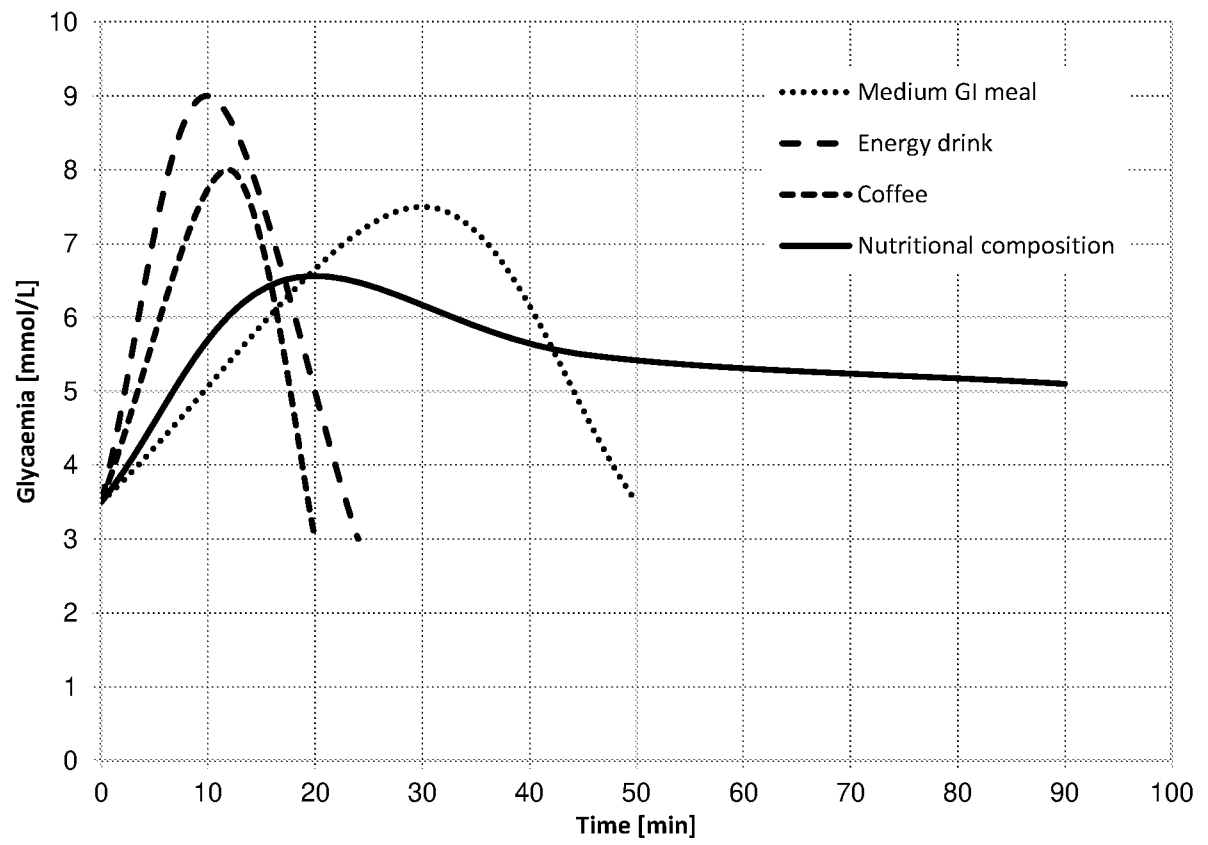


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/CZ2019/050023

A. CLASSIFICATION OF SUBJECT MATTER
INV. A23L33/17 A23L33/175
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A23L

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2007/108827 A1 (NOVARTIS AG [CH]; NOVARTIS PHARMA GMBH [AT] ET AL.) 27 September 2007 (2007-09-27) page 20, line 24; claims 1-4 -----	1-9
X	WO 2016/029074 A1 (ABBOTT LAB [US]) 25 February 2016 (2016-02-25) claims 1, 14, 16, 41 -----	1-9
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A	US 2001/041187 A1 (HASTINGS CARL W [US] ET AL) 15 November 2001 (2001-11-15) the whole document ----- -/--	1-9



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&" document member of the same patent family

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INTERNATIONAL SEARCH REPORT

International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 8 703 719 B1 (ABRAHAM SAL [US] ET AL) 22 April 2014 (2014-04-22) the whole document -----	1-9

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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