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(54) Title: MINERAL WATER COMPOSITION

(57) Abstract: The present invention provides a mineral water composition comprising 0.0002 to 0.01 wt% of calcium ions, 0.0001 to 0.005 wt% of magnesium ions, 0.0008 to 0.005 wt% of potassium ions, 0.00035 to 0.002 wt% of sodium ions, 0.0005 to 0.05 wt % of bicarbonate ions; and at least 95% of water.



MINERAL WATER COMPOSITION

Field of the Invention

The invention relates to a mineral water composition, more particularly to a mineral water composition which is palatable.

Background of the Invention

Water is very important for life. It is well known that water makes up about 60% of the body weight in men and 55% of weight in women. It is important to drink at 2 to 3 litres of water in a day. However, most people working in air-conditioned environments find it difficult to consume the adequate quantity of water due to decrease in thirst. A way to drink more water could be to make it more palatable. It will also be of great advantage if the palatability comes with a benefit.

However, dosing of additives into water comes with many problems such as the water not tasting good on the palate and may taste bitter or may have a metallic taste. Also, it is difficult to incorporate various minerals because of their incompatibility and likelihood of precipitating out.

EP2565165 is directed to a process for remineralization of water comprising the steps of providing feed water, providing an aqueous solution of calcium carbonate comprises dissolved calcium carbonate and reaction species thereof, and combining the feed water and the aqueous calcium carbonate solution. The document involves mixing CaCO_3 with RO water that was pre-dosed with carbon dioxide (CO_2).

Therefore, it is required that the drinking water is mineral enriched as well as palatable to the consumer.

Summary of the Invention

The present invention provides a mineral water composition which is palatable and in fact very good tasting.

First aspect of the present invention provides a mineral water composition having a pH value of 7.0 to 9.5, the composition comprising,

- a. 0.0002 to 0.01 wt% of calcium ions
- b. 0.0001 to 0.005 wt% of magnesium ions
- c. 0.0008 to 0.005 wt% of potassium ions
- d. 0.00035 to 0.001 wt% of sodium ions,
- e. 0.0005 to 0.05 wt% of bicarbonate ions; and
- f. at least 95% of water.

Second aspect of the present invention provides use of mineral water composition of the present invention to provide palatable water.

Third aspect of the present invention provides a method of preparing composition according to the first aspect, the method comprising:

- a. obtaining water having TDS less than 50 ppm;
 - b. adding calcium and magnesium salts; and
 - c. adding bicarbonate salts comprising the bicarbonate salts to obtain the composition according to the first aspect;
- wherein, steps b and c are interchangeable.

It should be understood that the present invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the following drawings. The invention is capable of other embodiments and of being implemented in various ways.

The terms “including”, “comprising”, “containing” or “having” and variations thereof as used herein are meant to encompass the items listed thereafter as well as additional items. Unless specified or limited otherwise, the terms “mounted,” “connected,” “supported,” and “coupled” and variations thereof are used broadly and encompass direct and indirect mountings, connections, supports, and couplings.

The description below is intended to clarify the invention and are not intended to limit the invention to those examples per se. Similarly, all percentages are weight/weight percentages unless otherwise indicated. Except in the operating and comparative examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts of material or

The conditions of reaction, physical properties of materials and/or use are to be understood as modified by the word "about".

Numerical ranges expressed in the format "from x to y" are understood to include x and y. When for a specific feature multiple preferred ranges are described in the format "from x to y", it is understood that all ranges combining the different endpoints are also contemplated.

Detailed Description of the Invention

It should be understood that the present invention is not limited in its application and is capable of other embodiments and of being implemented in various ways.

The present invention provides mineralized water which is very palatable.

While preparing a mineral composition, it was observed that mineral salts of various ions such as those of the first aspect are incompatible in nature, as when they are mixed together they precipitated out. Even when they were mixed in the solid state and when added in water they precipitated out as magnesium and calcium salts. While they are mixed in the solution format also they precipitate out. Some mineral salts have low solubility in water and some desirable mineral salts are not available in stable solid or liquid state.

The present inventors surprisingly found that the mineralized water obtained according to composition and method of the present invention was appreciated by the consumers and it was surprising to find a way to add minerals and retain the delectableness of water too.

Mineral water composition

The mineral water composition of the present invention having a pH value of 7.0 to 9.5, the composition comprises,

- a. 0.0002 to 0.01 wt% of calcium ions
- b. 0.0001 to 0.005 wt% of magnesium ions
- c. 0.0008 to 0.005 wt% of potassium ions
- d. 0.00035 to 0.001 wt% of sodium ions,
- e. 0.0005 to 0.05 wt% of bicarbonate ions; and
- f. at least 95% of water.

Calcium:

Calcium ions can be obtained from rocks such as limestone, marble, calcite, dolomite, gypsum, fluorite and apatite or may be obtained synthetically. Calcium is a determinant of water hardness and can be found in water as Ca^{2+} ions. In a water solution calcium is mainly present as Ca^{2+} (aq), but it may also occur as CaOH^+ (aq) or $\text{Ca}(\text{OH})_2$ (aq).

Calcium ions can be obtained from salts such as calcium chloride, calcium citrate, calcium hydroxide, calcium diphosphate, calcium carbonate, calcium bicarbonate, calcium sulphate, their combinations and mixtures thereof. More preferred salts are calcium chloride, calcium citrate and calcium sulphate, their combinations and mixtures thereof. Most preferred is calcium carbonate, calcium bicarbonate, combinations and mixtures thereof.

It is preferred that calcium ions range from 0.0002 to 0.01 wt% in the mineral water composition and more preferably in the range of 0.0005 to 0.006 wt% and most preferably in the range of 0.0005 to 0.001 wt%.

Magnesium:

Magnesium ions can be obtained from natural sources such as dolomite (calcium magnesium carbonate; $\text{CaMg}(\text{CO}_3)_2$) and magnesite (magnesium carbonate; MgCO_3) or may be obtained synthetically. Magnesium is mainly present as Mg^{2+} (aq) in watery solutions, but also as MgOH^+ (aq) and $\text{Mg}(\text{OH})_2$ (aq).

Magnesium ions can be obtained from salts such as magnesium chloride, magnesium sulphate, magnesium carbonate, magnesium oxide, combinations and mixtures thereof. Most preferred is magnesium oxide and magnesium carbonate, combinations and mixtures thereof.

It is preferred that magnesium ions range from 0.0001 to 0.005 wt% in the mineral water composition and more preferably in the range of 0.0001 to 0.0015 wt% and most preferably in the range of 0.0001 to 0.0005 wt%.

Potassium:

Potassium ions can be obtained from naturally occurring minerals such as feldspars (orthoclase and microcline), carnalite and sylvite. Some clay minerals also contain potassium. Potassium ions may also be obtained synthetically.

Potassium can be obtained from salts such as potassium chloride, potassium persulfate, potassium carbonate, potassium bicarbonate, combinations and mixtures thereof. Most preferred salts are potassium chloride, potassium bicarbonate, combinations and mixtures thereof.

It is preferred that potassium ions range from 0.0002 to 0.005 wt%, more preferably 0.0008 to 0.005 wt% in the mineral water composition and further more preferably in the range of 0.001 to 0.003 wt% and most preferably in the range of 0.001 to 0.002 wt%

Sodium:

Sodium ions can be obtained from available from various rocks or obtained synthetically.

Sodium ions can be obtained from sodium chloride, sodium sulfate, sodium carbonate, sodium bicarbonate, combinations and mixtures thereof. Most preferred salts are sodium chloride and sodium bicarbonate, combinations and mixtures thereof.

It is preferred that sodium ions range from 0.00035 to 0.002 wt% in the mineral water composition and more preferably in the range of 0.00035 to 0.001 wt% and most preferably in the range of 0.00035 to 0.0006 wt%.

Bicarbonate:

Bicarbonate or Hydrogen carbonate is an intermediate form in the deprotonation of carbonic acid. It is a polyatomic anion with the chemical formula HCO^{-3} .

Bicarbonate ions can be obtained from potassium bicarbonate, sodium bicarbonate, ammonium bicarbonate, calcium bicarbonate combinations and mixtures thereof. Most preferred salts are potassium carbonate, calcium bicarbonate, combinations and mixtures thereof.

It is preferred that calcium ions range from 0.0005 to 0.05 wt% in the mineral water composition and more preferably in the range of 0.003 to 0.03 wt% and most preferably in the range of 0.003 to 0.005 wt%.

Water:

Total dissolved solids (TDS) and pH of water play important role in the taste of the water.

Preferred range of TDS is 20 to 500 ppm, more preferably 25 to 300 ppm and most preferably 30 to 200 ppm.

It is preferable that pH of water is in the range of 6.5 to 8.5 and more preferably in the range of 7 to 8.5.

The weight percentage of water in the mineral water composition is at least 95 wt%, more preferably at least 97 wt% and most preferably at least 98.5 wt%. It is further preferred that 95 wt% water in the composition has less than 50 ppm of TDS.

Method

The present invention provides a method of preparing composition of the first aspect, the method comprising:

- a) obtaining water having TDS less than 50 ppm;
 - b) adding calcium and magnesium salts; and
 - c) adding bicarbonate salts comprising the bicarbonate salts to obtain the composition according to the first aspect;
- wherein, steps b and c are interchangeable.

It is preferable that in the method of the present invention the water having TDS less than 50 ppm is obtained by treating water in a reverse osmosis unit.

It is preferable that in the method of the present invention the calcium and magnesium salts are added by dosing dry solids into the water.

It is preferable that in the method of the present invention the bicarbonate salts are added by dosing in liquid form into the water.

It is preferable that in the method of the present invention the bicarbonate salts are selected from potassium, calcium, magnesium and sodium, mixtures and combinations thereof. Most preferred salts are potassium carbonate, calcium bicarbonate, combinations and mixtures thereof.

It is preferable that in the method of the present invention the calcium and magnesium salts are selected from oxides, carbonates, hydroxides, sulphates, mixtures and combinations thereof, more preferred are the salts of oxides, carbonates, bicarbonates, combinations and mixtures thereof.

EXAMPLES

Technical benefits of the disclosed invention will now be explained further with the help of a non-limiting example.

Example 1:

Consumer data:

Water gets taste due to combination of various salts in it. To obtain the best tasting composition, consumer panel conducted with combination of desired salts with trained panelists.

To achieve desired combination, salts of magnesium oxide, magnesium carbonate, calcium carbonate and bicarbonate of potassium and sodium were mixed in RO water. The bicarbonate salts were prepared in a solution format before adding into the RO water.

Composition:

Composition	Details of composition in RO water	TDS (ppm)	pH	Ratings* given by different panellist			
				P1	P2	P3	P4
1	Magnesium carbonate and oxide, calcium carbonate, potassium and sodium bicarbonate	48	9.4	8	8	7	8
2	Magnesium oxide, potassium and sodium bicarbonate	52.5	9.7	9	7	7	8
3	Magnesium carbonate and oxide, calcium carbonate, potassium bicarbonate	44.3	9.5	8	7	3	7
4	Plain RO water	2	6.97	1	1	1	1
5	Magnesium Oxide	18.8	9.6	7	8	8	5
6	Potassium Bicarbonate	20.6	7.8	7	6	7	5

Rating scale* :

1	Dislike extremely
2	Dislike very much
3	Dislike moderately
4	Dislike slightly
5	Neither like or dislike
6	Like slightly
7	Like Moderately
8	Like very much
9	Like Extremely

The various features of the present invention referred to in individual sections above apply, as appropriate, to other sections mutatis mutandis. Consequently, features specified in one section may be combined with features specified in other sections as appropriate. Any section headings are added for convenience only and are not intended to limit the disclosure in any way.

CLAIMS

1. A mineral water composition having a pH value of 7.0 to 9.5, the composition comprising,
 - a. 0.0002 to 0.01 wt% of calcium ions
 - b. 0.0001 to 0.005 wt% of magnesium ions
 - c. 0.0008 to 0.005 wt% of potassium ions
 - d. 0.00035 to 0.001 wt% of sodium ions,
 - e. 0.0005 to 0.05 wt% of bicarbonate ions; and
 - f. at least 95% of water.
2. A composition according to claim 1, wherein the total dissolved solids (TDS) of the composition range from 20 to 500 ppm.
3. A composition according to anyone of the preceding claims 1 or 2, wherein the 95 wt% water in the composition has less than 50 ppm of TDS.
4. A method of preparing composition according to claims 1 to 3, the method comprising:
 - a. obtaining water having TDS less than 50 ppm;
 - b. adding calcium and magnesium salts; and
 - c. adding bicarbonate salts comprising the bicarbonate salts to obtain the composition according to claims 1 to 3;wherein, steps b and c are interchangeable.
5. A method of preparing composition according to claim 4, wherein the water having TDS less than 50 ppm is obtained by treating water in a reverse osmosis unit.
6. A method of preparing composition according to anyone of the claims 4 and 5, wherein the calcium and magnesium salts are added by dosing dry solids into the water.
7. A method of preparing composition according to anyone of the preceding claims 4 to 6, wherein the bicarbonate salts are added by dosing in liquid form into the water.
8. A method of preparing composition according to claim anyone of the preceding claims 4 to 7, wherein the bicarbonate salts are selected from potassium, calcium, magnesium

and sodium, mixtures and combinations thereof.

9. A method of preparing composition according to anyone of the preceding claims 4 to 8, wherein the calcium and magnesium salts are selected from oxides, carbonates, hydroxides, sulphates, mixtures and combinations thereof.

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/052203

A. CLASSIFICATION OF SUBJECT MATTER

INV. A23L2/52 C02F1/44 C02F1/68 A23L33/16
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 C02F

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ALEMAYEHU E MASRESHA ET AL: "Speciation of selected trace elements in three Ethiopian Rift Valley Lakes (Koka, Ziway, and Awassa) and their major inflows", SCIENCE OF THE TOTAL ENVIRONMENT, ELSEVIER, AMSTERDAM, NL, vol. 409, no. 19, 22 June 2011 (2011-06-22), pages 3955-3970, XP028266852, ISSN: 0048-9697, DOI: 10.1016/J.SCITOTENV.2011.06.051 [retrieved on 2011-06-29] table 4 ----- -/--	1-3



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

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"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

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2020/052203

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	MAPOMA HAROLD WILSON ET AL: "Trace element geochemical evolution and groundwater origin in North Rukuru-Songwe alluvial aquifer of northern Malawi", ENVIRONMENTAL EARTH SCIENCES, SPRINGER BERLIN HEIDELBERG, BERLIN/HEIDELBERG, vol. 75, no. 10, 11 May 2016 (2016-05-11), pages 1-22, XP036369446, ISSN: 1866-6280, DOI: 10.1007/S12665-016-5682-6 [retrieved on 2016-05-11] table 1	1-3
A	----- WO 2007/100599 A2 (BEEMAN DAVID R [US]; WAGNER PHILLIP [US]) 7 September 2007 (2007-09-07) abstract; claim 1	1-3
A	----- EP 2 565 165 A1 (OMYA DEVELOPMENT AG [CH]) 6 March 2013 (2013-03-06) the whole document	4-9
A	----- EP 3 216 768 A1 (RIPRUP COMPANY S A [GG]) 13 September 2017 (2017-09-13) paragraph [0083]	1
A	----- WO 03/086973 A1 (BERTSHELL PTY LTD [AU]; MACQUARIE VETERINARY SUPPLIES [AU] ET AL.) 23 October 2003 (2003-10-23) page 14, line 28	1
A	----- WO 2015/054557 A2 (GLOBAL CUSTOMIZED WATER LLC [US]; BEEMAN DAVID [US] ET AL.) 16 April 2015 (2015-04-16) paragraph [0051]	1
A	----- EP 3 181 521 A1 (NESTEC SA [CH]) 21 June 2017 (2017-06-21) -----	1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2020/052203

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2007100599	A2	07-09-2007	CA 2660072 A1 07-09-2007
			CN 101426383 A 06-05-2009
			EP 1996034 A2 03-12-2008
			KR 20090004886 A 12-01-2009
			US 2009011088 A1 08-01-2009
			WO 2007100599 A2 07-09-2007
EP 2565165	A1	06-03-2013	AR 087720 A1 09-04-2014
			AU 2012301003 A1 27-02-2014
			BR 112014004926 A2 11-04-2017
			CA 2844656 A1 07-03-2013
			CN 103827044 A 28-05-2014
			CY 1118189 T1 28-06-2017
			DK 2565165 T3 05-12-2016
			EA 201490513 A1 30-06-2014
			EP 2565165 A1 06-03-2013
			EP 2751036 A1 09-07-2014
			ES 2601883 T3 16-02-2017
			HK 1181741 A1 28-04-2017
			HR P20161373 T1 02-12-2016
			HU E030551 T2 29-05-2017
			JP 5926803 B2 25-05-2016
			JP 2014525345 A 29-09-2014
			KR 20140054387 A 08-05-2014
			KR 20160085900 A 18-07-2016
			LT 2565165 T 25-11-2016
			MY 161099 A 14-04-2017
			PE 20140940 A1 06-08-2014
			PL 2565165 T3 28-04-2017
			PT 2565165 T 01-11-2016
			SG 2014012041 A 30-07-2014
			TN 2014000052 A1 01-07-2015
			TW 201313621 A 01-04-2013
			TW 201318951 A 16-05-2013
			US 2014209544 A1 31-07-2014
			UY 34297 A 05-04-2013
			WO 2013030185 A1 07-03-2013
EP 3216768	A1	13-09-2017	EP 3216768 A1 13-09-2017
			ES 2698202 T3 01-02-2019
WO 03086973	A1	23-10-2003	US 2005255174 A1 17-11-2005
			WO 03086973 A1 23-10-2003
WO 2015054557	A2	16-04-2015	US 2015101984 A1 16-04-2015
			WO 2015054557 A2 16-04-2015
EP 3181521	A1	21-06-2017	CN 108367952 A 03-08-2018
			CN 108367953 A 03-08-2018
			EP 3181521 A1 21-06-2017
			EP 3390286 A1 24-10-2018
			EP 3390287 A1 24-10-2018
			US 2018362379 A1 20-12-2018
			US 2018370826 A1 27-12-2018
			WO 2017102911 A1 22-06-2017
			WO 2017102913 A1 22-06-2017