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(54) Title: AGENT AND METHOD FOR IMPROVEMENT OP WATER AND OTHER POTABLE LIQUIDS

(57) Abstract: The invention relates to an agent and a method for improvement of water and other potable liquids. The problem to be solved is to provide an agent which removes chlorine and which causes no undesirable taste. The agent comprises: dolomite, salt(s) of carboxylic acid(s), and a gel forming agent which binds bacteria. Preferably, at least the gel forming agent is present in a container of the type "teabag". A preferred salt is calcium ascorbate and a preferred gel forming agent is chitosan.

AGENT AND METHOD FOR IMPROVEMENT OF WATER AND OTHER POTABLE LIQUIDS

The present invention comprises an agent for the improvement of water and other drinkable fluids. In addition the present invention comprises methods for use of the agent, as well as uses thereof.

The taste and quality of drinking water is of great importance for public health, since the human body consists of about 70 % water. Large amounts of communal and other piped water are imbibed either directly, or indirectly as foodstuffs produced with the addition of water. This means that infected water can be a important source of infection for infectious diseases. The governments and water plants have therefore provided for quality surveillance and treatment of the water. Among other things one has used chlorine as an artificial additive, for instance in the format of hypo chlorite. This treatment can in itself cause a considerable health benefit of some aspects of the water quality, while other aspects to some degree may suffer due to this. It is especially known that the water can develop a unpleasant chlorine taste. There have also been disclosed suspicions of a small increase in the risk of cancer. The possible increase may be related to that some organic chlorine compounds are made as a result of the addition of chlorine. Assertions of other health risks have also been put forth, without gaining common agreement among those skilled in the field. Such dangers may however not be excluded.

From the health authorities point of view the increased risk of cancer is minimal in comparison with the massive danger of infection one may be confronted with if the addition of chlorine is absent. Even in some other countries where the quality of the untreated water often is worse, and the addition of chlorine thus greater, the practice of adding chlorine is therefore continued.

Thus the common consumer is left with a water quality that usually is fairly reassuring as concerns the danger of infection, but which may be unfavourable due to chlorine taste and may possible lead to an increase in the cancer frequency in the long term, or other health risks as for instance cardiovascular diseases. This has probably lead to a certain amount of worry among a share of the consumers. Based on this background there is a need for water improving additives that improve the taste of the drinking water, and possibly also reduce the content of chlorine and possibly dangerous chlorine compounds. Such additions may for example be used in connection with drawing or use off the drinking water.

Even with the relatively strict water control we have in this country, there still remains a certain danger of disease causing bacteria being contained in the drinking water. This concerns among others private wells. Further, there is a danger of mixing of unclean water in the pipe network. The drinking water can construe a danger of infection also when travelling abroad. Thus we are faced with a need for a water improving agent that also may protect against the danger of infection.

On the consumer market there are agents that say they are water-improving additives (water purifying apparatus are not considered among these). Some of these are coral based, more precisely coral polyp based, whale others seems to be based upon, or mainly comprise, shell sand. Closer scrutiny shows that these only to some degree, and for a limited time period, decrease the chlorine level. In addition this only holds for free chlorine. As far as we know, there exists on the market only the applicant's patented water improving agent (among others approved as EP 1 250 291 B1 and US 6,808,650), which remove bound chlorine or organic bound chlorine from drinking water. To avoid confusion, we therefore also mention that ionic chloride, i.e. Cl^-, in this connection is considered as harmless. There is also not presently available any other product than our earlier patented water improving agent which remove disease causing bacteria from drinking water, without adding chloride or some other component.

Of prior art we mentione JP 06.304577A, Hisashi Sato: JP 04 066181 A, Isao Horiuchi; US 4707263A, Nishimori et. Al.; US 4500510A, Goldstein; JP 57159494A, Takeshi Janagisawa, BE 691735A, Serac; WO 9528830A, Aguacenter, Inc, as well as DE 51320C, Love. A considerable problem with the products described in among others the above-mentioned patents, inclusive the applicants patents, is that the

agent add a new and undesirable taste to the water. When selling purified water, for example in bottles, this taste is not acceptable.

Further there exist a number of known solutions, described in among others in JP 561057, US 5,198,114, RU 2135258, US 2004/0020859, WO 00/05178, HU 54694, EP B1 221696, and JP 60064690. In these patents dolomite is used among other things as a filtering medium, as a treatment medium for ice-covered surfaces, or as a nutritional medium for harmless bacteria. Most of these publications use burnt, that is heat-treated, dolomite, or dolomite in combination with one or more other ingredients in order to attain the desired effect.

There is a need for a water-improving additive as mentioned above, for use in connection with imbibing or consuming piped water.

Based upon this, the present applicant has for years experimented with different mixtures of a possible water improving agent, and after considerable work the applicant has arrived at a composition comprising a suitable buffer of dolomite, and a water soluble, reducing compound. The agent in accordance with the present patent application does have the effect aimed for as concerns the removal of chlorine, and does not cause any undesirable taste, in contrast to the applicants' earlier patented product, which contained coral algae/ calk algae.

The present application aims at solving the problem by using dolomite, which is mixed with the water to be purified.

The invention is characterized by the characterizing parts of the independent claims, that is, by the agent comprising dolomite, salt(s) of carboxylic acid(s), and a gel forming agent that binds bacteria in the fluid, where at least the gel forming agent is present in a container that is permeable for liquids, but which keeps the gel apart from the fluid that is to be drunk.

Alternate embodiments are characterized by the dependent claims.

Dolomite consists of magnesium carbonate and calcium carbonate. The magnesium content is about 13 % by weight. The chemical formula is $MgCO_3 \bullet CaCO_3$. Dolomite contains about 56 % by weight of calcium carbonate, and about 44 % by weight of magnesium carbonate. Dolomite may also contain small amounts of calcium oxide,

magnesium oxide, silicone oxide, aluminium oxide, and iron oxide, or other compounds. Dolomite is one of the most common minerals in the crust of the earth.

Some suppliers deliver dolomite containing small amounts of lead, but this cannot be used for the present purpose.

When dolomite only is used to purify the water, the pH value of the water is increased over time. To regulate the pH value to a desired level the dolomite may be filtered out, or a reduction agent may for example be added. Preferred reducing agents are salt(s) of carboxyl acid(s). Other reducing agents, compounds or elements with the same effect can also be used.

As concerns reduction agents, both organic and inorganic reduction agents may in principle be used. However, it is important to avoid a metallic taste, colouring agents and so forth. Reduction agents (preferably antioxidants) approved for use in nutritional compounds are especially of interest in this connection. Here we refer to the lists of additives; so-called "E-compounds", distributed by the Norwegian food enforcement agency; "Statens næringsmiddeltilsyn". Among these special mention is made of ascorbates (salts of ascorbic acid), citrates (slats of citric acid), maltates (salts of malic acid), and lactates (salts of lactic acid). A preferred reduction agent is calcium ascorbate.

The necessary reduction of chlorine and chloride compounds is easiest achieved under certain conditions. In addition the reaction rate is influenced by the possible presence of trace metals, as well as water soluble iron(III) or copper(II) compounds.

When dissolved in drinking water the agent gives a weakly basic solution. Addition of a water-improving agent in accordance with the invention causes a rapid and effective removal of chlorine, and provides an improvement of the taste of the drinking-water, lacking a possible burnt taste of heat treated coral algae.

An expert with extended experience with drinking-water has tested the smell and taste of water treated with dolomite powder. The expert smelled the glasses to be used before they were filled with the finished treated water. He tasted and smelled the water in the same manner as vine tasters do during testing of vine. The conclusion given was that the water purified by dolomite had no undesirable taste,

and this is a considerable improvement in relation to earlier known water improving agents.

The agent in accordance with the present invention, optionally combined with one or more additional components, is suited for addition to improve the quality of drinking water, that is, as a water-improving agent. When dissolved in drinking water it results in a weakly basic solution, as mentioned earlier, and at the same time some salts of carboxyl acids causes an increased uptake of minerals and nutrients, and is important for the energy production in the cells of the body.

A preferred composition utilizes a mixture of dolomite and ascorbate, for example as follows:

0,1-99,9 % by weight dolomite;
0,01-50 % by weight ascorbic acid salt; and
a gel forming agent that removes free bacteria contained in the water.

Among the ascorbic acid salts alkaline and earth alkaline metal salts of ascorbic acid are mentionable.

A very important aspect of the new water-improving agent is that it improves the taste of the drinking water.

Another embodiment of the water-improving agent of the present invention is that it leads to a rapid and effective removal of the total chlorine.

A further aspect of a preferred embodiment of the present invention, is the stabilization of the pH by the water-improving agent to a correct and, for drinking water, advantageous value, in relation to the guidelines for drinking water as put forth by the Norwegian social and health department.

Another aspect of a preferred embodiment of the present invention is that it leads to the removal of the bacteria in the drinking water.

A very essential aspect of the chemical composition of the invention, is that all the components by themselves and together are completely safe as concerns health It is especially interesting if for example magnesium ascorbate or calcium ascorbate is

used. They are a salt of vitamin C, and thus completely safe as regards health in the amounts and for the use intended.

Another aspect of the present invention is that the water-improvement agent's optionally originally wet components may be dried, and as a whole finely ground to a free-flowing powder that does not segregate, as would usually be expected.

An essential aspect of the water improvement agent is that it works quickly, so that it would normally have done its job before consumption.

Yet another essential aspect of the water improvement agent is that is has a stabile composition over time, both as a regards pH and total chlorine.

A further aspect of the agent of the present invention is that only to a small degree increases the pH above a neutral level.

In the present description, certain technical expressions are used. This concerns for instance:

- active chlorine
- free chlorine
- bound chlorine
- total chlorine.

All of the four above mentioned technical expressions are used in concordance with the definitions in NS 4729.

By comparative investigations between our earlier patented water improvement agent and available water improvement agents on the market, it has been shown that our product has a superior ability at removing chlorine. This has been confirmed by laboratories in concordance with NS 4729. The new water improvement agent has the same abilities to remove total chlorine due to the reduction agent.

Results of chlorine tests, bacterial tests, pH tests, and so forth we will return with later when they received from the laboratory. We have, however , ourselves carried out a chlorine test of this product which shows the same very rapid effect of converting free and bound chlorine to chloride ions. We refer to the

earlier mentioned taste test, carried out by a water expert, and to the internal tests which show that the taste of the drinking water is markedly improved.

Patent Claims

1. Agent for improving water and other drinkable fluids, characterized by that the agent comprises:

(a) dolomite;

(b) salt(s) of carboxylic acid(s); and

(c) gel forming agent which binds bacteria in the fluid,

where at least the gel forming agent is present in a container which is penetrable for a fluid, but which keeps the gel separated from the fluid to be consumed.

2. Agent in accordance with claim 1, characterized in that the dolomite (a) is present as a granulate, powder, flakes, cubes, balls, or similar.

3. Agent in accordance with claims 1 or 2, characterized in that the agent further comprised an agent for the removal of chlorine.

4. Agent in according with one or more of claims 1-3, characterized in that in comprises 0.01-50% by weight of salt(s) of carboxylic acid(s) (b), by choosing the composition such that by mixing 0.5-1.2g with 0.5-5L drinkable water gives a resultant pH of between 7 and 8.5.

5. Agent in accordance with one or several of the above claims, characterized in that it comprises:

0,1-99,9 percentage by weight dolomite (a)

0,01-50 percentage by weight salt(s) of carboxylic acid(s) (b).

6. Agent in accordance with one of more of the above claims, characterized in that the dolomite is replaced at least partially by calcite.

7. Agent in accordance with one or more of the above claims, characterized in that it further comprises a smaller amount of one or more trace metals and/or copper(II) and/or iron (III).

8. Agent in accordance with claim 1, characterized by that the gel forming agent (c) is chitosan, and the container is of the type “tea bag”.

9. Agent in accordance with claims 1 or 8, characterized by that it comprises about 0.01-50 percentage by weight chitosan (c).

10. Method of improving water and other drinkable fluids by use of an agent which comprise at least dolomite and salt(s) of carboxylic acid(s), characterized by that the method comprises the following steps: 1) to mix the fluid to be improved with the agent; 2) to monitor pH value of the fluid by measurement; and 3) to remove the agent from the fluid when the desired pH has been obtained.

11. Method of improving water and other drinkable fluids by use of an agent which comprise at least dolomite and salt(s) of carboxylic acid(s), characterized by that the method comprises the following steps: 1) to fill a bag of the type "tea bag" with the agent; 2) to deposit the filled tea bag in the fluid.

12. Method of improving water and other drinkable fluids by use of an agent which comprise at least dolomite and salt(s) of carboxylic acid(s), characterized by that the method comprises the following steps: 1) to place a filter comprising the agent in a pipe for transport of the fluid; and 2) to force the fluid through the filter.

13. Use of an agent for improvement of water and other drinkable fluids, where the agent comprise at least dolomite and salt(s) of carboxylic acid(s).

14. Use in accordance with claim 13, of an agent in accordance wit claims 1-9.

15. Use in accordance with claim 14, characterized in that improvement of the water and other consumable fluids comprises purification of water, wine, coffee, juices, and other drinkable fluids.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/NO2005/000469

A. CLASSIFICATION OF SUBJECT MATTER

IPC: see extra sheet
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)

IPC: C02F, A23L, A23F

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 6808650 B1 (GLENN AGER-WICK ET AL), 26 October 2004 (26.10.2004), column 2, line 10 - line 60, claims 1-7	1-15
X	DATABASE WPI Week 199117 Derwent Publications Ltd., London, GB; Class B05, AN 1991-119835 & HU54694 A, (NOVENY-ES TALAJVEDE) 28 March 1991 (1991-03-28) figures 1-2; abstract	13
Y	GB 714674 A (JOSEF KELLER), 1 Sept 1954 (01.09.1954), page 2, line 95 - line 125; page 4, line 105 - line 115	1-15

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
4 April 2006	07 -04- 2006
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Jens Waltin/MP Telephone No. +46 8 782 25 00

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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A	DATABASE WPI Week 198813 Derwent Publications Ltd., London, GB; Class D15, AN 1988-088389 & JP63039696 A (JGC CORP) 20 February 1988 (1988-02-20) abstract	1-15
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Cited literature, if any, will be enclosed in paper form.

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