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(54) Title: APPLICATION OF NATURAL MINERAL WATER WITH SPECIAL QUALITIES IN PROPHYLAXIS, HYGIENE  
AND TREATMENT OF TEETH AND PARADONTIUM.

(57) Abstract: The invention refers to a new application of mineral water in prophylaxis of dental and paradontium diseases,  
when water has the following physiochemical and biological properties : Ph 7,6 - 8, 1; electrolytic conductivity 180 - 210  $\mu$ S/cm  
at 20°C, hardness 110 — 150 mg Ca C(M); chlorides 0,5 - 2,5 mg Cl/l; fluorides 0,01 - 0,03 mg F/l; sodium 0,6 - 1,6 mg Na/l;  
potassium 1,2 - 2,2 mg K/l; calcium 30 - 40 mg Ca/l; magnesium 5 - 14 mg Mg/l; faecal coli bacteria (thermotolerant) 0 in 100  
ml; coli bacteria 0 in 100 ml; enterococcus 0 in 100 ml; Clostridium perfringens 0 in 100 ml; total number of bacteria at 37°C after  
24 hours from 1 to 2 in 1 ml and total number of bacteria at 22°C after 72 hours from 3 to 5 in 1 ml.



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Application of natural mineral water with special qualities  
in prophylaxis, hygiene and treatment of teeth and paradontium.

The subject of the invention is application of natural mineral water with special qualities in prophylaxis, hygiene and treatment of teeth and paradontium. This water can be used in all kinds of paradontopathy and it can also be used to prevent dental caries, and to stop development of existing dental caries.

Nowadays in everyday hygiene procedures, including oral hygiene procedures, we commonly use chemically conditioned water from water-pipe network or directly from natural surface and deep water intakes. Almost all the above mentioned sources of water, with few exceptions, can pose biological and chemical threats to our oral health. Although European Union standards are rather strict, they allow the presence of chemical compounds which increase acidity and some pathogenic bacterial colonies in the first class cleanliness.

This invention aims at using appropriate, cheap mineral water in everyday oral hygiene procedures.

Spring water acknowledged as mineral water, in various surface water and ground water reservoirs and natural water bodies existing on various continents has been examined. The research aimed at finding water which would be suitable for usage in everyday hygiene procedures, and which could help to treat illnesses of oral cavity, and to prevent new oral cavity illnesses like those enumerated at the beginning.

Unexpectedly natural mineral water has been discovered. Its physical, chemical and biological properties can efficiently help to solve the above mentioned problems.

The properties of natural mineral water are as follows :

1. Ph – from 7,6 to 8,1
2. Electrolytic conductivity – from 180 to 210  $\mu\text{S}/\text{cm}$  at 20°C
3. Hardness – from 110 to 150 mg  $\text{CaCO}_3/\text{L}$
4. Chlorides – from 0,5 to 2,5 mg  $\text{Cl}/\text{l}$
5. Fluorides – from 0,01 to 0,03 mg  $\text{F}/\text{l}$
6. Sodium – from 0,6 to 1,6 mg  $\text{Na}/\text{l}$
7. Potassium – from 1,2 to 2,2 mg  $\text{K}/\text{l}$
8. Calcium – from 30 to 40 mg  $\text{Ca}/\text{l}$
9. Magnesium – from 5 to 14 mg  $\text{Mg}/\text{l}$

10. Faecal coli bacteria (thermotolerant) – 0 in 100 ml
11. Coli bacteria – 0 in 100 ml
12. Enterococcus – 0 in 100 ml
13. Clostridium perfringens – 0 in 100 ml
14. Total number of bacteria at 37°C after 24 hours – from 1 to 2 in 1 ml
15. Total number of bacteria at 22°C after 72 hours – from 3 to 5 in 1 ml

Biological, chemical and/or physical properties of the above components of the water are described below :

**Re para 1/p** According to the research conducted for years in most cases reaction Ph in oral cavity is from 5 to 7,5. Hence the reaction is acid or slightly above neutral level. Such Ph environment creates favourable conditions for the growth of microorganisms, mainly Streptococcus and Actinomyces, which cause dental caries. The lower Ph level, the more pathogenic bacteria in dental plaque and the higher is the risk of dental caries incidence. Paradontium diseases also develop in the above described Ph environment. Microorganisms Actinobacillus, Porphyromonas, Bacteroides, Fusobacterium, Peptostreptococcus and Treponema, which cause paradontium diseases, develop well in acid environment –  $\text{Ph} < 7$ . Pathogenic bacteria colonies in oral cavity could be reduced by introduction of basic environment. Mineral water which is the essence of this invention fulfills this task.

**Re para 2/p** . Electrolytic conductivity level depends on the amount of carbohydrates and sulfates in the substance examined. The more carbohydrates and sulfates there are in the solution, the higher are acidity and conductivity. As it is mentioned in point re para 1/p the essence of the invention is reduction of acidity in oral cavity and introduction of basic environment. The standard for the I class cleanliness is  $400 \mu\text{S}/\text{cm}$  at  $20^\circ\text{C}$ . At this level of conductivity water's Ph is about 6,5. Water, according to the invention, has electrolytic conductivity in range of 180 to  $210 \mu\text{S}/\text{cm}$  at  $20^\circ\text{C}$ , and due to this it increases the Ph of the oral cavity environment up to the value in range of 7,6 to 8,1.

**Re para 3/p** Hardness of water determines the level of  $\text{CaCO}_3$  in 1000 ml. The standard for I class of cleanliness is maximum  $250\text{mg CaCO}_3/\text{l}$ . The lower is the water hardness level, the better is action of detergents contained in toothpastes. Low level of hardness facilitates dissolution of carbohydrates and fats which are medium for pathogenic microorganisms in oral cavity. Preparation facilitates cleaning of teeth surface and mucous membrane in oral cavity and improves action of detergents (tensides) contained in toothpastes. Amount of foam created during tooth brushing is an additional organoleptic indication. The more foam is created during cleaning an oral cavity with solution of water and detergent (toothpaste) the

softer water becomes, therefore cleaning procedure is more effective. Water, according to this invention fulfills this task.

**Re para 4/p** Chlorides – The standard for I class cleanliness is 25mg Cl/l. The water according to the invention, contains trace amounts below allowable values.

**Re para 5/p** Fluorides – The standard for I class cleanliness is 0,5mg F/l. The water according to the invention, contains trace amounts below allowable values.

**Re para 6/p** Sodium - The standard for I class cleanliness is 60mg Na/l. The water according to the invention, contains trace amounts below allowable values.

**Re para 7/p** Potassium - The standard for I class cleanliness is 10mg K/l. The water according to the invention, contains trace amounts below allowable values.

**Re para 8/p** Calcium - The standard for I class cleanliness is 50mg Ca/l. The water according to the invention, contains trace amounts below allowable values.

**Re para 9/p** Magnesium - The standard for I class cleanliness is 25mg Mg/l. The water according to the invention, contains trace amounts below allowable values.

**Re para 10-15/p** Water according to the invention, does not contain any pathogenic microorganisms, therefore it does not cause any infections.

So far no action has been taken to put into use water whose compositions is suitable for prophylaxis of oral cavity. Prophylactic action of the water according to this invention will also be effective in case of using it for fixed prostheses. The water will also help to maintain oral cavity health at high level. Using cheap water whose composition is strictly defined (as above) by a large number of customers and patients will contribute towards the objectivization of scientific research within the scope of prophylaxis of oral cavity and conducting this research among big populations. Therefore use of the water will improve public health and reduce health care expenses. Application of the water, according to the invention, not only brings the benefits enumerated above, but also increases motivation to take better care of oral cavity hygiene. It should also be stressed that this water complies with I class cleanliness requirements and is fit for consumption.

Common and regular use of the water defined according to the invention allows to maintain high standards of oral cavity hygiene due to the following four factors:

- increasing the Ph of oral cavity environment results in reducing the number of pathogenic microorganisms whose multiplication is stopped,
- supporting action of detergents contained in toothpastes through effective emulsification of carbohydrates and fats contained in dental plaque,

- reduction of the amount of tartar deposited on teeth due to presence of trace amounts of metals which are components of the tartar,
- elimination of all additional sources of infection due to lack of pathogenic microorganisms.

### Patent claims

Application of the natural mineral water with special qualities in prophylaxis, hygiene and treatment of teeth and paradontium is characterized by the fact that water has the following physiochemical and biological properties : Ph 7,6 – 8,1; electrolytic conductivity 180 – 210  $\mu\text{S}/\text{cm}$  at 20°C, hardness 110 – 150 mg Ca CO<sub>3</sub>/l; chlorides 0,5 – 2,5 mg Cl/l; fluorides 0,01 – 0,03 mg F/l; sodium 0,6 – 1,6 mg Na/l; potassium 1,2 – 2,2 mg K/l; calcium 30 – 40 mg Ca/l; magnesium 5 – 14 mg Mg/l; faecal coli bacteria (thermotolerant) 0 in 100 ml; coli bacteria 0 in 100 ml; enterococcus 0 in 100 ml; clostridium perfringens 0 in 100 ml; total number of bacteria at 37°C after 24 hours from 1 to 2 in 1 ml and total number of bacteria at 22°C after 72 hours from 3 to 5 in 1 ml.

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International application No  
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**A. CLASSIFICATION OF SUBJECT MATTER**  
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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)

A61K A61P

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 practical, search terms used)

EPO-Internal, BIOSIS, EMBASE, 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	RU 2 272 637 C2 ((NIZH-R) NIZHNIINOVGORODMEDACAD) 27 March 2006 (2006-03-27) abstract	1
X	ANONYMOUS: "Aktuelle Empfehlungen zur Kariesvorbeugung mit Fluoriden" INTERNET CITATION 17 June 2007 (2007-06-17), pages 1-4, XP002485078 Retrieved from the Internet: URL: <a href="http://web.archive.org/web/20070617220834/http://babyernaehrung.de/fluorid-gabe.htm">http://web.archive.org/web/20070617220834/http://babyernaehrung.de/fluorid-gabe.htm</a> [retrieved on 2010-04-22] page 3	1

☒ 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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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	US 5 846 522 A (KOSTI CARL [US]) 8 December 1998 (1998-12-08) claims	1
E	EP 2 080 438 A1 (CIESLIK TADEUSZ [PL]; NOCON JACEK [DE]; RAUCH JAN [PL]) 22 July 2009 (2009-07-22) the whole document	1



**INTERNATIONAL SEARCH REPORT**

Information on patent family members

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EP 2080438	A1	22-07-2009	US 2009185986 A1 23-07-2009