PHYSICO-CHEMICAL, MICROBIOLOGICAL AND PHARMACOLOGICAL STABILITY OF THERAPEUTIC MINERAL WATERS

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Introduction:

For a natural mineral water to be bottled and then sold as table water, besides some physicochemical characteristics that define it, must come from a natural source (spring, well, borehole) with a high purity biological and microbiology.

Most chemical compounds, expressed major elements, trace elements, gases, some undissociated compounds closely correlated with water temperature and pH they have a role in assessing qualitative characterization and classification of mineral waters.

Variety composition of mineral water generated their many uses in both the therapeutic and the water table.

Physico-chemical composition and microbiological indicators values for drinking must belong to a high degree of stability for certain periods of time.

Degree of physical and chemical stability of mineral waters in general is closely related to chemical equilibrium achieved naturally when water does not undergo any transformation (being bottled just by adding carbon dioxide), or may undergo significant changes technological processes (deferizare, desulfurization, degassing, etc.).

Use bottled mineral water is provided in the form of national and international rules that limit technological operations and treatments that could influence the initial natural features. For this purpose were admitted as necessary to ensure stability operations only bottled mineral water deferizarea and impregnation with carbon dioxide.

Objectives:

LIAMNT lab has pursued stability physicochemical, microbiological and pharmacodynamics over a period of 6 months or 1 year of several types of bottled mineral water (oligomineral water, carbonated water, sulfur water, etc).

Materials and methods:

Changing the physicochemical composition of water, in terms of long-term preservation (6 or 12 months), may also be correlated with the nature of the chemical constituents that define the water, whether they have a natural origin, or were acquired in technological processes. This change mainly refers to sensibilitea phenomena of chemical components from oxidation-reduction, precipitation and coprecipitation.

Under these circumstances the notion of stability of mineral water is expressed by maintaining or variation of physico-chemical and therapeutic action for each new situation created (depending on storage time, deferizare, impregnated with carbon dioxide), compared to when initially.

To track the evolution of physicochemical processes in water analysis done on selection of representative indicators that are sensitive to changes in the chemical composition of water in acid-base balance, the degree of hydrolysis and oxidation-reduction state, such as: pH, HCO3 ion concentration, Ca2 +, Mg2 +, Fe2 + whose determination gave monthly information on water stability conservabilitate analyzed period.

Complete analyzes were performed physicochemical, microbiological and pharmacodynamic fresh packaged product (baseline) and for the same product stored for 6 months or 12 months at ambient temperature.

Complete physicochemical analyzes include: physical examination (temperature,

density, conductivity, resistivity) and physico-chemical dynamics of assessing water stability at ambient temperature (at baseline, 1 month, 2 months, 3 months, 4 months, 5 months, 6 months, 7 months ..... 12 months).

Were analyzed especially indicators of pollution (nitrogen compounds, oxidizable substances, detergents, etc.). Were conducted chemical tests for ionic content, undissociated substances and gases.

In terms of microbiological quality conditions require setting values to limit contamination with undesirable effects on the human body.

Bacterial pollution of bottled mineral waters may be due to multiple causes manifested in source capture or during technological process, causing microbiological composition changes. Prompt detection and remediation of pollution causes them requires constant supervision by bacteriological examination thus preventing a product marketing endangering both domestic and foreign markets.

Bacterial indicators of pollution established as international standards and those of our country are considering highlighting some groups of microorganisms that represent the most significant contamination. Bodies were selected coliform group, Es. Coli and fecal staphylococci as indicators of bacterial pollution, the first organisms were most commonly used.

In general coliforms defined as aerobic organisms, facultative anaerobic, gram-negative bacillary form, producing gas (CO2) from the fermentation of lactose after 48 h at 370C, the test is most significant and widely used to assess the degree of pollution of a mineral.

The experimental study was performed according to the job type mineral waters pharmacodynamic internal treatment. Animals (rats and mice) were divided into working groups and received for 18 days, twice a day, 2 ml of mineral water. A lot of animals kept in the same accommodation and food received for 18 days, twice a day, and tap water was the control group.

Were tracked the following:

1. Action of mineral water on gastric secretion in rats with pyloric ligation method (parameters were followed as pH, amount of gastric juice, free and total acidity, pepsin in the juice). For complete data on mineral water action on digestive function has been determined pepsin in gastric wall and pancreatic amylase;
2. Choleretic action of mineral water on function, common bile duct catheterization method in guinea pigs. Secreted bile was collected for three hours, they measured the amount and concentration of bilirubin was determined.
3. Mineral water action on hepatocytes was assessed by analyzing metabolic function - its enzyme. There have been determianri as: TGO, TGP, phospholipids, glycogen;
4. Action mineral water electrolyte metabolism was done by assessing diuresis in rats with water loading method.
5. Mineral water action on carbohydrate metabolism, lipid and protein was assessed by determination of the The parameters: glucose, total lipids, total proteins.

After the animals received mineral water for 18 days, respectively, tap water, were killed by bleeding and blood were harvested organs and biochemical determinations.

Results and conclusions:

The main variable experiments, conservation or environmental temperature (5-300C), does not affect sensitive condition "stability" of quality and meaning of triggering major redistribution hydrochemical processes of natural mineral water category specific (acid-base and redox) .

Physico-chemical and microbiological analyzes highlight the stability and quality of these waters by keeping the weight of the main components which contribute to providing quality mineral water.

The most obvious correlation in the balance quantity of total dissociated substances is between TDS and total mineralization value, the quantitative ratio between mono and divalent elements, their preponderance in water composition is constant during the entire experiment.

Results of microbiological examination conducted while physicochemical analyzes attest microbiological purity nature conservation throughout the study period. Total content of microorganisms (NTG) analysis evaluated the ballot does not exceed the maximum permissible standards. Relevance of the indicator becomes significant only in relation to natural microbial population to source threshold to prove its vulnerability to aggression eventual pollution factors.

Concentrations of nitrogen compounds, the organic matter, absence of undesirable compounds completes the assessment of stability of this water analyzed.

Pharmacodynamic study reveals that the studied waters not suffer any changes after 6 months or 1 year after bottling, from baseline.

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