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**2nd Grabchenko's International Conference
on Advanced Manufacturing Processes
September 8-11, 2020 | Odessa, Ukraine**

Book of Abstracts

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Grabchenko's International Conference
on Advanced Manufacturing Processes **2020**

**2nd Grabchenko's International Conference
on Advanced Manufacturing Processes
(InterPartner-2020)**

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Editors:

Volodymyr Tonkonogyi, Vitalii Ivanov, Ivan Pavlenko, Oleksandr Liaposhchenko

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Recommended by Coordination Board of International Association for Technological Development and Innovations (Protocol No. 11, August 14, 2020)

This book covers topics at the interface between manufacturing, materials and mechanical engineering, as well as quality assurance, with a focus on advanced manufacturing processes. It focuses on the recent developments in production planning, design engineering, advanced materials, manufacturing technology, machining processes, process engineering, quality assurance. It covers a wide range of manufacturing processes, such as cutting, grinding, assembly, coatings, including ultrasonic treatment, molding, radial-isostatic compression, ionic-plasma deposition, volumetric vibration treatment, wear resistance, highlighting the advantages of augmented reality, RFID technology, reverse engineering, optimization, heat and mass transfer, energy management, quality inspection, and environmental impact. Based on the 2nd Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2020), held on September 8-11, 2020, in Odessa, Ukraine, this book offers a timely overview and extensive snapshot on trends and technologies in the significant areas of engineering. It is also intended to build a bridge between academic and industrial researchers.

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Part VII

Quality Assurance

Using the Specific Molarity Indicator of the Chemical Parameters of Mineral Waters in Assessing their Biological Effects

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The article presents materials on the scientific justification for the use of the specific molarity index of mineral water components in assessing their biological effects. The authors studied 18 types of mineral waters of Ukraine with a salinity of 0.14 g/l to 6.86 g/l and the content of metasilicic acid from 1.0 mg / l to 226.0 mg/l. The effectiveness of their biological action was studied by the example of an excretory function in animals (daily diuresis and glomerular filtration rate). The experiments proved that the features of the biological action of mineral waters (urination) depend on the content and ratio of all components. Microcomponents, in particular, organic substances, most affect the diuretic effect of mineral waters. An inverse relationship was established between the processes of urination and the specific molarity of chlorides and metasilicic acid. The possible biological activity of mineral waters is mostly reflected in the particular molarity of the components. Mineralization does not have a significant effect on urination; therefore, it cannot be a criterion for the differentiation of mineral waters by their biological outcome. The results make it possible to carry out the next stage of work to create methodological foundations for the biomedical classification of mineral waters, depending on the effectiveness of their biological effects.

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The primary goal of the **2nd Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2020)** is to promote research and development activities, to intensify scientific information interchange between researchers, developers, engineers, students, and practitioners working in and around the world. The conference is an ideal platform for people to share views, experience, and knowledge in Engineering related areas. The working language of the conference (including conference proceedings, presentations, and discussions) is **English**.

Interpartner-2020 is under the patronage of the honorary chair of Conference **Prof. Anatoliy Grabchenko**, Rector of Odessa National Polytechnic University **Prof. Gennadii Oborskyi**, Rector of National Technical University «Kharkiv Polytechnic Institute» **Prof. Yevhen Sokol** and Rector of Sumy State University **Prof. Anatoliy Vasylyev**

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Conference Topics

PRODUCTION PLANNING

MANUFACTURING TECHNOLOGY

DESIGN ENGINEERING

MACHINING PROCESSES

ADVANCED MATERIALS

PROCESS ENGINEERING

QUALITY ASSURANCE

<http://interpartner.odessa.ua/topics.html>



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USING THE SPECIFIC MOLARITY INDICATOR OF THE CHEMICAL PARAMETERS OF MINERAL WATERS IN ASSESSING THEIR BIOLOGICAL EFFECTS

The existing classification of mineral waters (MW) in Ukraine and Europe does not fully reflect the direction of their natural activity. It takes into account only the types of MW and some biologically active components. There are differences in the approach to the differentiation of MW in Ukraine and Europe, both in terms of the degree of biological action and in terms of the content of components. The effectiveness of the biological action of MW depends not only on the level of mineralization of MW, but also on the concentration/ratio of ingredients.

We evaluated 32 MW of Ukraine of different chemical composition. Relative values of the content of MW components were also expressed as specific molarity. To assess the biological effect of MW on the functional state of the urinary system – daily diuresis (DD) and glomerular filtration rate (GFR), we experimented on 40 white rats. GFR was determined by the clearance of endogenous creatinine:

$$GFR = \frac{V \cdot U_{cr}}{S \cdot P_{cr}}$$

where GFR is the glomerular filtration rate, ml/(dm²·min); V is urine output in 1 min; U_{cr} is urinary creatinine concentration; S is the surface of the body; P_{cr} is the plasma creatinine concentration.

Since the weight of the rats is not the same, GFR was assigned to the unit surface of the body (S):

$$S = 9\sqrt[3]{w^2},$$

where w is the body weight, g.

The change in the values of DD and GFR was calculated to assess the biological activity of MW in percent relative to the control group.

To identify patterns of distribution of MW components depending on their chemical composition and biological action, we performed a correlation analysis. Correlation coefficient (r), calculated for specific values of the molarity of the components of MW, differ from their absolute values. So, the r of the relation between the specific molarity of Ca and the change in DD is much lower than the absolute value ($r = 0.0579$) (Fig. 1, 2).

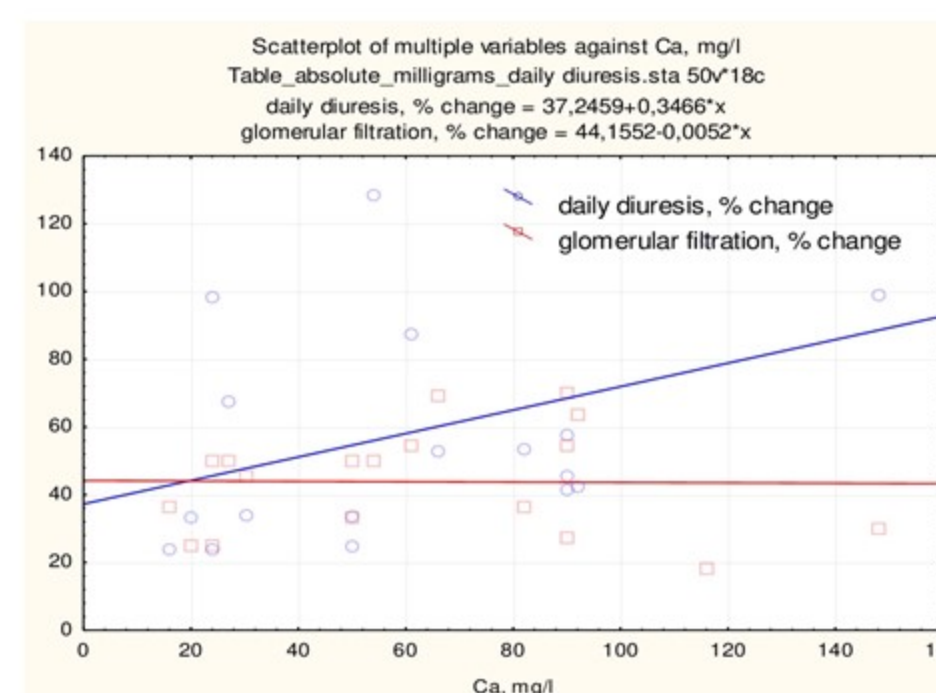


Fig. 1. The scattering diagram of the relationship of Ca with DD and GFR (absolute values)

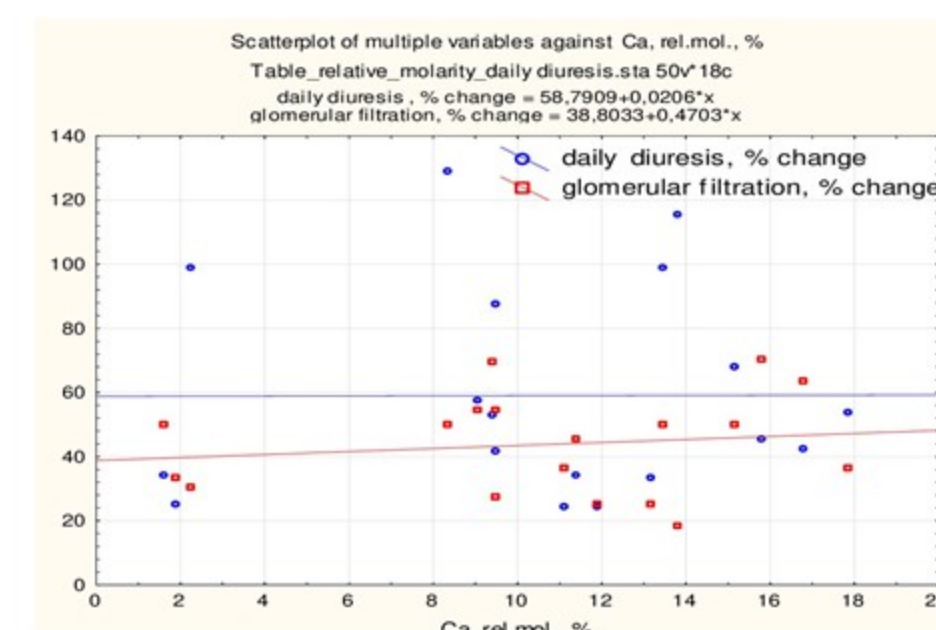


Fig. 2. The scattering diagram of the relationship of Ca with DD and GFR (specific molarity)

It was determined that glomerular filtration plays a considerable part in the diuretic effect of MW if the dominant role of organic substances and bicarbonates in the composition of MW is. DD most increases with the action of MW with the presence of organic substances. An inverse relationship was established between urination and the specific molarity of chlorides and H₂SiO₃.

- The systemic biological activity of MW is caused not only by the content of a specific agent (trace element, organic substance) but also by the presence of a macrocomponent component.
- The results obtained suggest that the possible biological activity of MW is reflected in a greater extent by the total molarity of MW and the specific molarity of their components.
- Having data on the content of components, using the criterion of specific molarity of the components, and the obtained dependencies from the regression equations, it is possible to calculate the approximate range of efficiency and the direction of the biological action of a particular MW.

1. Gushcha, S.G.: To the mechanisms of correcting influence of mineral waters of different osmolarity and microelement composition on the structural-functional state of kidneys of rats with experimental nephritis. *Bulletin of problems biology and medicine*. Issue 2 (144), 301–306 (2018).
2. Gushcha, S.G., Nasibullin, B.A. et al: *Pathogenetic and Sanogenetic Mechanisms of the Influence of Mineral Waters (Siliconed and with Increased Organic Substances) of Different Osmolarity on the Exposure of Toxic Nephritis*. *Journal of Biotechnology and Bioengineering* 2(2), 7–12 (2018).

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