

Dedicated to the 80th anniversary of the
Academy of Sciences of Uzbekistan

NUCLEAR MEDICINE

INTERNATIONAL CONFERENCE

Bukhara, Uzbekistan

October 3-5, 2023

BOOK OF ABSTRACTS

CONFERENCE ORGANIZERS:

Academy of Sciences of the Republic of Uzbekistan
Ministry of Health of the Republic of Uzbekistan
Institute of Nuclear Physics of Uzbekistan Academy of Sciences
Bukhara State University
Bukhara State Medical Institute



Tashkent - 2023

**ACADEMY OF SCIENCES OF UZBEKISTAN
INSTITUTE OF NUCLEAR PHYSICS**

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**Academy of Sciences of the Republic of Uzbekistan
Ministry of Health of the Republic of Uzbekistan
Institute of Nuclear Physics of Uzbekistan Academy of Sciences
Bukhara State University
Bukhara State Medical Institute**

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A pair of hands, one at the top and one at the bottom, are shown holding a glowing, stylized atomic model. The model features a central blue nucleus and three white elliptical orbits with small white spheres representing electrons. The background is a light blue, textured surface.

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STUDY OF RADON-222 CONCENTRATION IN BUKHARA WATERS FOR USE IN RADON THERAPY

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In natural waters there is always an inert, colorless heavy radioactive gas - radon-222. The transfer of radon to water occurs through the soil, either by diffusion, or by surrounding air gases, such as CO₂, CH₄ and ⁴He, or by water moving in soil horizons. An increase in the concentration of Rn -222 in natural waters poses a danger to human health on the one hand, and on the other hand it is useful in the treatment of a number of diseases using radon therapy. Therefore, there is a limit on the maximum allowable concentration (MAC) of radon in the waters, adopted by the radiation control authority of each country.

Natural waters with radon-222 concentration ≥ 185 Bq/l successfully used for the treatment of diseases of the musculoskeletal system, peripheral nervous system, as well as gynecological and urological.

The aim of the proposed work is to study the concentration of radon-222 in various sources of Bukhara for the further use of radon-enriched waters in radon therapy.

To measure the concentration of Rn -222 in water, radon-metric instruments and nuclear solid-state track detectors of the CR -39 type were used. The concentration of Rn-222 in the studied waters was determined by the ratio of the concentration of Rn -222 in the reference water, where the root mean square error was $\pm 25\%$.

Water samples were taken from taps, wells and natural springs. Water samples from seven shrines of Bukhara were measured: 1. Abdukholik Gijduvony (Gijduvon); 2. Mohammed Arif Ar-Revgariy (Revgari); 3. Khoja Mahmud Anzhir Fagnaviy (Vobkent); 4. Khoja Azizona (Shofirkon); 5. Bobo As-Samosy (Kogon); 6. Said Amir al Sukhoriy (Sukhor); 7. Bahauddin Nakshbandi (Hinduvan), as well as from the sanatorium Sitorai Mohi-Khosa, Zhuizar and Issiksuv.

The concentration of Rn -222 from the tap of Bukhari was 3.84 Bq/l. In the sacred springs and sanatoriums of Bukhara, the concentration of Rn -222 is in the range of 3.1-12 Bq/l, which does not exceed the maximum allowable concentration of Rn -222 in water of 60 Bq/l kg, established in the norm NRB RUz.

However, high concentrations of radon-222 up to 500 Bq/l and more were found in the well waters of Kyzylkum (Navoi), adjacent to Bukhara.