AMERICAN ACADEMIC PUBLISHER

INTERNATIONAL JOURNAL OF MEDICAL SCIENCES

ISSN NUMBER: 2692 - 5206 Volume 6. No 04. Aprel ,2026

ANALYTICAL ASSESSMENT OF THE RADIOACTIVE STATE OF ARTESIAN WATERS

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Abstract: The quality of drinking and natural waters directly affects human health and environmental safety. In this context, the radioactive state of water is of particular importance, which includes radionuclides originating not only from natural sources, but also from anthropogenic factors. The main radionuclides found in drinking and natural waters include uranium, thorium, radon and their decay products. The presence of these substances can pose a long-term threat to aquatic ecosystems and human health.

Keywords: water, radioactivity, analysis, ionometry, spectrometric analysis, health, natural geochemical properties, anthropogenic impacts.

Literature review. Last in years drink water quality according to concerns exceed These concerns are natural geochemical features with together industry waste, useful fossils digging take, rivers and land under of the waters natural regimes change such as anthropogenic from the effects come These factors as a result in the water radionuclides amount out of the norm exceed departure danger to the surface comes and this situation scientific based monitoring and requires supervision. This of the subject relevance one how many aspects with First, water human to the body radionuclides entrance main tool is considered. Secondly, long term during radioactive water consumption to do in the body radioactive of substances to gather and chronic diseases, including oncological pathologies to develop reason to be Third, global climate changes, human of activity increase and population growth water to resources download radioactive pollution the risk strengthens.

Radioactivity – elements of the nuclei no how external unaffected by himself/ herself elementary particles or light to emit nuclei (radiation) to the nucleus of another element rotation is a property of the nuclei. other to the core's rotation radioactive decay Such an event is called and radioactivity event Radioactivity natural under the circumstances manifestation just to

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ISSN NUMBER: 2692 - 5206 Volume 6. No 04. Aprel ,2026

be without leaving it artificial road also with to do possible. But naturally and artificial radioactivity between principal difference none. Radioactivity laws radioactive isotope how come to the exit related the word “Radioactivity” is not from the Latin word "radio" come came out to be, to radiate Marie Curie of elements radiation “Nature radioactivity” radioactive of elements oneself and "Radioactive" elements. The element radium especially radiation asset source to be It came out. That's why This element is radium. name Radioactive of the nuclei in the decomposition harvest to be new nuclei chemical properties in terms of initial from the core difference Radioactive isotopes in the nuclei excess neutron and protons Such nuclei own the composition independent accordingly changing, decaying steady to the situation passed away. In 1896 French scientist André Becquerel uranium element radioactivity property determined. With this Becquerel first to be radioactivity Becquerel discovered the phenomenon. black on paper wrapped uranium salt photographic plate on top of He put it. A few day sun Uranium salts placed photographic plate one dark in the box left. A few from the day then photographic plate when opened photographic plate darkening observed. From this and uranium salts himself/ herself somehow rays release Radioactivity was detected. event on other Scientists also work in 1898, Marie and Pierre Curie polonium, thorium Marie Curie discovered the elements in 1911. radium element separate took. Marie Curie radioactivity in the field such works for two Nobel Prize winner to take worthy It was in 1898. Rutherford such of elements issuing radiation magnet on the field discovered the work of the ox. Rutherford magnet on the field radiations of the handle divorce and one to the side, the other opposite towards hard work watched. One towards a leak radiation alpha radiation, opposite towards a leak the radiations were called β (betta) -radiations. Later, the scientist Paul discovered gamma- radiations. and this radiations magnet on the field unyielding short wavy electromagnet radiations that determined. In the biosphere scattered natural radionuclides and various to the reasons see nature in samples appearance was artificial come to go out has was radionuclides no how nature events, temperature, pressure to the changes related not happened without decaying Such decays produce α, β, and γ- radiation. harvest will be and of the biosphere general to radiation own contribution adds. Research as a result until 1912 about 30 radioactive elements have been discovered and their properties studied. That at the time Mendeleev periodic in the system only 12 places empty was, so for new 30 elements found this to the seats placement the issue solution to do need to be remained. English chemist Simple chemical of elements radioactive isotopes existence about hypothesis previously after pushing, this problem solution to do possibility was born. Radioactivity main feature – one of the elements independent accordingly other to the element is the rotation. Independent radioactive in disintegration harvest to be new atomic chemical properties in terms of initial from the atom difference Radioactive isotopes in the nuclei excess neutron and protons They will be. the composition independent accordingly changing steady to the situation Alpha and beta particles occur in nature. releasing isotopes found. Such radioactive to changes decomposition and decay It is also called heavy. of the nuclei (A=240) 2 averages anyway It is also natural to divide into nuclei (A=120) is radioactivity.

Radiation protection principles by the International Commission on Radiological Protection working issued to concepts is based on. According to it, radiation the effect is “justification”, “optimization” and “dosing”. "limitation" principles based on controlled. Drink to the water relatively this approach this means that water in the content radionuclides amount population real health risk fertile to the level insufficient, necessary in cases and cleaning or alternative source with provide measures to be seen Europe in the territory drink water quality by the

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European Union acceptance made drink water directives based on order This is in documents tritium, radon and indicative dose indicators according to clear limits For example, indicative dose 0.1 mSv/ year at the level If in water tritium amount or general indicative dose designated from the value high if yes, in detail radiochemical analysis Such a system is required to transfer screening and deepened control from the stages consists of to be economic and hygienic in terms of effective is considered. Some drinking in countries, including the United States of water radiological indicators by the Environmental Protection Agency order is inserted. Here maximum permission done pollution levels (MCL) current done radium -226 and radium -228, total alpha activity and beta particles issuer radionuclides for clear limits This is fixed. approach health for acceptable danger to the level is based on and far term epidemiological research the results in consideration takes [1-6].

National at the level drink water for radiation hygienic standards sanitation rules and state in standards reflection Usually following indicators control: total alpha activity, total beta activity, radon concentration, radium isotopes, uranium amount and necessary in some cases, such as cesium-137 or strontium-90 artificial radionuclides. Normative in documents every one radionuclide for road wearable maximum concentration or annual effective dose border These indicators are determined drink water per day average 2 liters consumption doer big old human for calculated dose to the model is based on. Drink in the waters radionuclides control to do system usually three in stages done the first stage is screening. inspection then total alpha and beta activity is determined. The second stage — identification and quantification stage, in which gamma - spectrometry, alpha- spectrometry or radiochemical separation methods Third stage — dose assessment and the danger analysis to do This is the stage. In this process determined concentrations based on annual effective dose is considered and it is standard borders with is compared [7].

Experimental part. Radionuclides according to normative requirements working on the way out one how many factors into account obtained from: radionuclide half decay period, radiation type (alpha, beta, gamma), biological gathering feature, water consumption size, population young composition and territorial geochemical conditions. For example, alpha particles issuer radionuclides external in radiation big danger Although it does not give birth, it is internal in radiation high ionization to the ability has happened because of strict control is done. Therefore, overall alpha index drink water quality in evaluation important indicator is considered. Modern in approaches to danger-based control concept This concept is being used. water supply system all in stages — from the source pull to the consumer — radiation risks determination and to manage in mind Water basins geological monitoring, hydrogeochemical mapping, regular laboratory analyses and information digital in the bases to conduct normative of requirements in practice execution provides. Beverage in the waters radionuclides according to normative requirements system radiation security practical in terms of to manage aimed at complex mechanism This is the system main task — water through human to the body falling ionizer radiation dose scientific based safe at the border hold to stand. To moderate process only concentration designation with is not limited; it is a dose calculate, risk modeling, monitoring frequency and management take measures yourself inside takes.

First of all, drink of water radiological evaluation indicative indicators based on done is increased. In practice following main criteria used:

general alpha activity;

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total beta activity;

tritium concentration;

radon content;

annual effective dose (indicative) dose).

Screening degrees water in the composition deepened isotopic analysis the necessity determination for service If the overall alpha or beta activity designated screening from the value if it increases, separately radionuclides is determined and their every one according to dosed contribution International in practice drink water through removable annual effective dose 0.1 mSv/ year from the level not to exceed need acceptance This criterion is included in the World Health Organization recommendations. reinforced It is water. consumption per day the average is considered to be 2 liters. made to the conditions is based on. This value population for additional radiation minimize the risk to keep aimed at conservative (cautious) approach is a product.

The isotope radon-222 permission done standard to the level of was amount useful It also has properties. It's this in terms of in medicine human health in recovery used and it is radiotherapy method It is called. Natural and artificial with radon well - watered with radon bathtubs current at the time the widest widespread treatment from the methods one to be special sanatoriums and central recreation to their homes installed. Of them not only baths, maybe showers and drink way also done with is increased. As a result on the skin microcirculation process improves, heart work normalizes arterial pressure coordinates, immune system activity increases, cold against impact increases, blood serum and morphological composition normalizes, tissues regeneration process stimulates and main exchange effects to normalize help shows.

Underground and land above drink of the water's radioactivity features study for chosen Zarkentsolpi and Salty village from the regions taken depths suitable 85 and 75 meters respectively from of the water's radioactivity Salty waters for his/her such as Ra-226, Th-232, K-40, Cs-137 and Rn-222 in the composition isotopes quantitative in terms of study based on was evaluated.

In Figure 3 below and his/her based on Table 3 above record done radioactive isotopes assets values cited.

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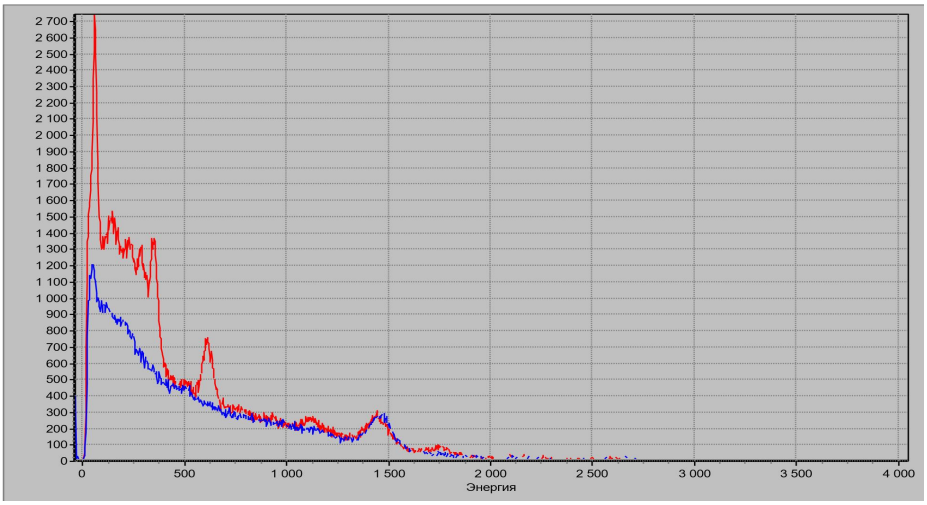

Figure 3. Solpi village land under from water of the obtained SGS spectrum appearance

In Table 3 below, Solpi village land under from water taken analytical of samples radioactivity features activity and comparison assets through assessment values.

Table 3.

Salty land under of water such as Ra-226, Th-232, K-40 and Cs-137 in the composition isotopes radioactivity quantitative assessment results

Nuclide	Activity / Bq/kg	Random error.,%	Comparison a activity. Bq/kg	Absolute error Bq/kg	Relative error.,% (P=0.95)
Ra-226	70,681	0.06	70,681	8.6	12.2
Th-232	< 2.2824	-	< 2.282	-	-
K-40	< 20.545	-	< 20.55	-	-
Cs-137	< 1.5792	-	< 1.579	-	-

The Ra-226 isotope radiation of safety hygienic the standard is 8.1 ·104 Bk/ year, Th-232- 7.8· 102, K -40 (0.01%) isotope half decay period

1.32·109 years organization will be, Cs- 137 permission done rate (Bk/ year) 9.6· 108 into account received without quantitative assessment results record done to the standards relatively not much high that it is not record to grow possible.

Conclusion: Zarkent, Zarkentsolpi, Solpi and Boyto'p well waters of the radon 222 isotope contained amount their SGS spectra based on detected. Verified water samples of radon-

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222 contained they for permission done borderline from the value suitable respectively 1.9; 7.3; 5.56; 1.98 times excess that was determined.

Conclusion as this to say maybe four - name drink waters as in use land under waters in the content radon amounts from 1.9 to 7.3 Bk/dm ^{3} until in quantity excess that separately record so, so the waters consumption and farm use for the purposes of recommendation we don't.

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