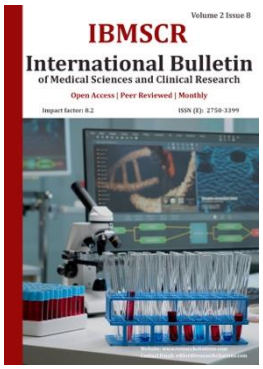

PRODUCTS THAT ARE IMPORTANT IN PROVIDING THE ORGANISM WITH IODINE

Usmonova Saida Gulomovna
Teacher of the Department of Medical and Biological Chemistry,
Andijan Branch of Kokand University PhD
Jamolova Khafiza Muhammadjonovna
Senior Lecturer
Khudoiberdiyeva Maftuna Nematjonovna
Student of the Faculty of Pharmacy, Medical Direction
https://doi.org/10.5281/zenodo.14836862

Abstract: This article provides information about the place of iodine in Mendeleev's periodic system, who determined its atomic mass, its importance in the human body, and its occurrence in various products.

Keywords: iodine, element, hormone, microgram, metabolism,

Introduction. ***IODINE,*** iodine (Latin Iodum, Greek iodis - purple), I - a chemical element belonging to group VII of the Mendeleev periodic system, belongs to the halogens. Atomic number -53, atomic mass 126.9045. Discovered in 1811 by the French chemist B. Courtois. Natural iodine consists of one stable isotope with atomic mass 127. Oxidation states - - 1, +1, +3, +5 and +7; electron affinity -3.08 eV. Pauling electronegativity 2.5; atomic mass 126.9045. radius 0.136 nm, ionic radius (coordination number given in parentheses) I-—0.206 nm (6), 15+—0.058 nm (3), 0.109 nm (6), G+—0.056 nm (4), 0.067 nm (6).[1]

Iodine is an essential element for life. Cases of mental retardation and goiter around the world are associated with iodine deficiency. According to the Iodine Global Network, in 2017, the population of 19 countries around the world was classified as iodine deficient. Problems with the thyroid gland are also common in Uzbekistan.[2]

The World Health Organization recommends that adults get 150 micrograms of iodine a day. Pregnant or breastfeeding women need even more—220 micrograms.

Iodine is an essential trace element involved in the synthesis of thyroid hormones. It is responsible for regulating metabolism, brain development, and the functioning of the cardiovascular and immune systems. [3] Iodine deficiency in the body is eliminated by eating foods rich in this trace element or by taking iodine supplements prescribed by a doctor.

Iodine is a trace element, found in the minerals iodogarite Agl, lautarite

(Ca IO 3)2, and in magma and sedimentary rocks. Iodine is washed out of rocks by water and accumulates in organisms. In algae (in their ash), the iodine content is up to 0.5%. The main source of iodine is ocean water (an average of 5-10~5 g per liter of water). Iodine is easily accumulated in organic matter. On an industrial scale, iodine is extracted from oil and gas wells, from hot underground brines (0.01-0.1 kg/m3), and from nitrate deposits (up to 1%). The freezing point is 113.5°, the boiling point is 184.35°; the density of solid iodine is 4.94 g/cm3, and that of liquid iodine is 3.96 g/cm3.[4]

Discussion. In iodine extraction, the raw materials are the effluents from oil and gas fields (wells), underground hot brines, seaweeds, and a solution rich in sodium iodate separated during the production of sodium nitrate. Iodine is mainly obtained by 3 methods:

1) enrichment of sorbents and ionites;

2) burning of iodized algae;

3) methods of separation and absorption with the help of air (for example, in NaOH solution and sorbents).

In Uzbekistan, methods of separation and absorption with the help of air are used from oil wells and underground brines with an iodine content of 15-40% / l. Iodine is mainly found in these waters in the form of iodide, iodate and organic compounds. Iodine-containing waters are purified in acidic (H_2SO_4 or HC1) conditions (pH=2.5+3.5) with the presence of oxidants (Cl_2, $NaNO_2$ or calcium hypochlorite, sodium hypochlorite) solutions, etc., by passing air under pressure (at 60-75°) into water droplets of iodine compounds, and iodine is released into the air in a free state. Under such conditions, some hydrogen iodide acid is also released into the air. Since the iodine in wastewater released with oil and iodine extracted from underground hot brines partly contains organic compounds, it is purified by sublimation or with concentrated H_2SO_4 under industrial conditions (at 125-140°).

Since seaweed contains very little iodine, they are first burned, the enriched ash is transferred to an aqueous solution, and the solution is exposed to oxidants. Iodine and its compounds are mainly used in medicine. Iodine solution has the property of fighting bacteria and microbes, and it is used to treat damaged skin, potassium and sodium salts of iodine are used in diseases resulting from iodine deficiency, alcoholism, gout, nervous diseases, obesity, mental retardation, and various infectious diseases. To prevent these diseases, it is necessary to consume iodized table salt. Currently, in our republic, the technology for extracting iodine from underground hot waters has been introduced in the Surkhandarya region and the Fergana Valley. Potassium iodide is obtained from crystalline iodine. Table salt is iodized on an industrial scale at the Khojaikon Salt Plant (Surkhandarya).[4] This is a serious problem that affects the thyroid gland and can lead to a number of diseases.

The main causes of iodine deficiency

Iodine deficiency in the diet - low consumption of seafood, iodized foods.

Environmental factors - living in areas with low iodine in soil and water.

Thyroid problems - impaired absorption of iodine in the body.

Hormonal changes - increased demand during pregnancy and adolescence.

Symptoms of iodine deficiency

Fatigue, weakness, memory loss, inability to concentrate, dry skin, hair loss. Enlarged thyroid gland, (goiter) weakened immunity, low blood pressure, slow heartbeat.

Consequences of iodine deficiency

In children - mental retardation, lethargy

In adults - hypothyroidism, metabolic slowdown

In pregnant women - birth defects, low birth weight.

Prevention and treatment of iodine deficiency Consumption of iodine-rich foods: Seafood (fish, shrimp, seaweed)

Iodized salt Milk and dairy products Eggs, potatoes, meat Dried fruits and nuts Taking iodine supplements Iodine supplements in pharmacies (on the recommendation of a doctor)[6]

Biologically active supplements Thyroid gland examination Blood test (T3, T4, TSH) Ultrasound examination

If you have any of the listed symptoms, it is recommended to consult an endocrinologist.

An increase in the amount of iodine in the body can lead to serious consequences, such as its deficiency. An excess of this trace element is manifested by tachycardia, tremors of the

limbs, excessive sweating, diarrhea, muscle weakness, weight loss, nervousness, inflammation of the mucous membrane of the respiratory tract, and other symptoms. Cases of an excess of iodine in the body are rare.

Seafood

Many types of fish and shellfish are rich in iodine. For example, 100 grams of cod contains about 158 mcg of iodine. The amount of iodine varies depending on the water body in which the fish lives.

Milk and dairy products

For those who do not like seafood, milk is the main source of iodine. True, the amount of iodine in this drink depends on what the livestock is fed. On average, 100 grams of milk contains from 44 to 84 micrograms of iodine, which is 30-56 percent of the recommended daily allowance.

Iodized salt

100 grams of salt contains about 40 mcg of iodine. This salt is a product that is artificially enriched with iodine and is widely used to prevent iodine deficiency.

Eggs

One medium-sized boiled egg contains about 31 mcg of iodine, which is 21 percent of the daily value.

Fruits

Strawberries and berries, such as dates, grapes, strawberries, blueberries, and cranberries, also contain iodine. Five dried prunes provide 13

mcg of iodine, or about 9 percent of the daily value.

The amount of iodine in vegetables, fruits, and berries depends on the soil in which they are grown.

Potatoes. This vegetable is another source of iodine. One cooked potato contains 60 micrograms of iodine. 3-4 potatoes are enough to meet the daily iodine requirement.[7]

Meat. Foods rich in iodine include beef and liver. They are a source of many vitamins, including folic acid and iron.

References:

1.Потаенко К. Д., Эшонхўжаев С., Ўзбекистон Республикаси фан ва техника комитети бюллетени, 1999 й., №1. ;

2. Ксензенко В. И., Стасиневич Д. С, Химия и технология брома, йода и их соединений, М., 1979.

3. Н. А. Орлов, «Эндокринология» – қалқонсимон без касалликлари ва йод танқислиги ҳақида.

4. Б. С. Коровкин, «Основы эндокринологии» – эндокрин тизим асалликлари, йоднинг аҳамияти.

5. Г. А. Мельниченко, «Заболевания щитовидной железы» – йод етишмаслиги ва унинг оқибатлари.

7.Д.Ф. Михайлов, «Йододефицитные заболевания» – йод танқислиги билан боғлиқ касалликлар ва уларни олдини олиш.

8. World Health Organization (WHO) – www.who.int (йод етишмаслиги ва унинг глобал таъсири).

9. Endocrine Society – www.endocrine.org (қалқонсимон без касалликлари).
10. PubMed (www.pubmed.ncbi.nlm.nih.gov) – йод етишмаслиги бўйича илмий мақолалар.