

ON IODIZED SALT AND IODINE DEFICIENCY DISORDERS

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Abstract: Iodine is a necessary element for the develop of the human's brain. Deficiency of iodine can cause mental retardation or even total dementia. The cause of the iodine deficiency disease is simply the deficiency of iodine. Though there are various iodine supplement methods, experiment repeatedly showed that the iodized salt is the most efficient, long-term, simplest and economical method. Popularization of iodized salt is significant to the improvement of the population quality, healthy pregnancy and scientific nurture, the health of the people, and the construction of the harmonious society. Therefore, the popularization of iodized salt is a key issue related to the people's livelihood and the national prosperity.

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1. IODINE IS A NECESSARY TRACE ELEMENT FOR THE HUMAN BODY

There was an interesting experiment in the field of medicine: the tadpoles that has been cut thyroid off can not become a frog. However, if the Thyroid hormone were added into the water, the tadpoles after thyroidectomy all grow to be frogs. This example indicates that the thyroid plays a decisive role in animal's development. As well as our daily ingestion of protein, fat, sugar, and vitamins, iodine presents in our body as a nutrient. In the synthesis of thyroid hormone, iodine is required. Without iodine, the thyroid hormone can not be synthesized. Hence, let us look at the physiological effects of the thyroid on the human body.

(1) It can maintain the body energy metabolism and the body temperature. Deficiency of thyroid can cause damage to basic life activities and physical decline.

(2) For the children in the growth and development phase, the bone growth, sexual development, muscle development and height

and weight development all are controlled by the thyroid.

(3) In a certain period (a crucial period) of the brain development of a feta or infant, the thyroid is indispensable. Deficiency of thyroid causes different degrees slow brain development of the feta or infant and after birth, this brain development retardation is generally incurable.

Therefore, though the iodine content in the body is minimal, iodine is an essential element for the maintenance of the life activities and the iodine content in the body should not be deficient or excessive.

2. RESULTS OF IODINE DEFICIENCY AND PREVENTION OF IODINE DEFICIENCY DISORDERS

Iodine deficiency disorders is a kind of geochemical disease caused by the iodine deficiency of the natural environment. Let us look at what harm the iodine deficiency will cause.

(1) impact to the intelligence

A normal man has an IQ (intelligence quotient) of around 100. The with serious

iodine deficiency has the IQ lower than 50 and becomes totally demential and can not take care of himself/herself. The man with mild iodine deficiency has IQ of 50-69, which is considered as mentally retarded, but the man can take care of him- or herself. In the area with iodine deficiency, many people with mild iodine deficiency (or their bodies are not sensitive to iodine deficiency) have IQ of 10-15% lower than the normal people.

(2) other diseases

Other damages to human's health include endemic goiter, cretinism, deaf, abortion, premature birth and congenital malformations and so on. The main hazard is that the iodine deficiency causes impact to the fetal brain development, retardation of the children intelligence and physical development, and the damage to the intelligence of the people in the area with iodine deficiency.

The iodine deficiency is widespread in our country. In 1993, there are approximately 700 million people live in the area with iodine deficiency which covers 30 provinces and 1726 counties. Because the iodine deficiency is widespread and causes hazard to a large population and the economical development of the society, it has become a serious public health problem. The prevention method is the iodine supplement to the people in the area with iodine deficiency. It is well-known that the iodine deficiency disease is a kind of geochemical disease caused by the iodine deficiency of the natural environment. Experts predict that it will take more than ten thousand years to change the environment with iodine deficiency. This cruel long time forced people to throw away the attempt of natural iodine supplementation and adopt the artificial iodine supplementation. Currently, the main measures for iodine supplementation include:

Iodized salt: appropriate for the supplementation to the whole population for long time. Advantages: inexpensive, easy access, easy to use, and safe. This method is an efficient method and is easy to be widespread and insisted. Iodized salt is the ultimate method for prevention of iodine efficiency disorders in China and the whole world.

Iodized oil: can be divided into two types. Injection solution (usually intramuscular injection): adult dose is 1 ml for each time (containing 475 mg iodine). Usually one time injection is enough. The valid period is 23 years after which injection can be given again.

Another type is iodized oil pill, that is oral iodized oil pill (or capsule). Its dose is 665 μg that is 1.4 times more than that for injection. The valid period is around 1 year. The iodized oil should not be used as the measure for long-termed iodine supplementation and it can only be used as auxiliary method for the iodized salt method to ensure the normal intelligence and physical development of the fetus and the children. The effect of the iodized oil injection is more dependable than that of the oral iodized oil pill, but the people prefer the oral method. Currently, the iodized oil can only be used after the approval by the health management.

Iodized water: add the iodine into the water. For example, add the iodine into the cement brick or a special plastic tube that can control the release process. The iodine brick or tube is put into the water tank to iodize the water and realize the iodine supplementation.

Iodized tea: in the ethnic minority areas, people have the habit of drinking tea everyday. Therefore, iodine is put into the tea brick to supply iodine.

Iodized food: ingest food containing iodine. The food that contains more iodine includes various sea fish, seashell, kelp, algae and the fortified food containing iodine.

The reasons why the iodized salt is taken as the main measure of iodine supplementation include 1. Salt is common in people's daily life and everyone has to take in salt. The iodized salt method is an easy and simple way to supply iodine. Every people benefits for a lifetime. 2. Usually, there is no side effects, if the amount of iodine added into the salt is in line with the standard amount for human body. 3. It is suitable for massive manufacture and is inexpensive and convenient. Therefore, in 1948, both United Nations and World Health Organization actively promote the use of iodized salt to combat iodine deficiency disorders. Till 1998, 86 countries implement the measure of iodized salt for all the people and 62 countries have achieved remarkable results.

3. EXCESS IODINE AND ITS CORRESPONDING MEASURES

In the earlier years, the iodine supplementation became really popular in some parts of China mainland. Some people believed it was good to intake iodine as much as possible. On the contrary, excess iodine intake causes damage to the health of the

human body as well as the iodine deficiency. For example, excess iodine can cause iodide goiter, iodine-induced hyperthyroidism or hypothyroidism, ashimoto's thyroiditis and etc. Some comrades worried that situation would be worse if the iodized salt was used in the areas with excess iodine intake. This worry was reasonable. According to the expert reports, the area where iodide goiter is popular is distributed in 91 counties in 9 provinces. The distribution is in the shape of a focal and many people suffer from the excess iodine. Therefore, excess iodine is an important problem that should not be neglected. . Article 20 of "Regulations of the iodized salt management for iodine deficiency prevention" provides that "The people who are unsuitable for iodized salt because of disease should get certification from the medical institution designated by the health department of the county government and then purchase non-iodized salt from the company designated by the salt industry administration of the local government. For the province with excess iodine, salt companies at all levels should support actively. Sale counter for non-iodized salt should be provided. The management of the supply and marketing of the non-iodized salt should be strengthened. Take measures actively and prevent the spread of the non-iodized salt to the areas with deficiency of iodine."

4. Normal iodine content in human body and the popularization of iodized salt

Iodine is one of the essential trace elements for the human body. Excess iodine and deficiency of iodine causes all cause disorders. Then, what is the suitable daily dose for the human body? Different standards of iodine intake for one people and for one day have been provided for different groups of people: 100-150 μg for adults; 60-100 μg for teenagers; 50-80 μg for children; and 180-200 μg for pregnant or breast-feeding women. Iodine in human blood is in the form of iodide. 100 μg iodine is enough for a normal adult for one day. When the human body lives in the environment with deficiency of iodine for a longtime and the amount of iodine taken by the body is less than 50 μg everyday, the body may get iodine deficiency disorders. Since the iodized salt is the main measure for the prevention of the iodine deficiency disorders, how much iodine should

be added to the iodized salt? According to the standard of "Table Salt" (People's Republic of China, GB5461-2000), the table salt should contain 20-60 mg/kg. The salt containing iodine less than 5 mg/kg is non-iodized salt. The salt with other iodine content is considered as unqualified iodized salt.

In order to realize the target of eliminating the iodine deficiency disorders in 2000, the "Regulations of the iodized salt management for iodine deficiency prevention" is being implemented seriously throughout the country. The measures urged by the government are being carried out. A campaign of preventing the iodine deficiency disorders and promoting the population quality is arising. This campaign has attracted the attention of every people in the society and involves everyone. Table salt monopoly is the deputy of the government for table salt monopoly policy. The departments of all levels should be responsible for the political and historical mission entrusted by the party and the people. In order to realize the universal access to iodized salt supply and ensure that each family can get the qualified iodized salt, the following work must be emphasized:

1. The support of the related departments of the government

Without the support of the government, it is unimaginable for a project to be carried out thoroughly. The support and participation of the government is necessary for the project of iodized salt to be carried out properly.

2. The support of the people

Every policy has to be implemented by the people. Any work requires the support of the people. Without the support of the people, no work can last for longtime. In order to win the support of the people, the following work must be carried out properly:

- a. Extensive publicity and mobilization.

Since the initial implementation of the measure of iodized salt for the whole population in 1933, the iodine deficiency problem for most of the people in the country has been solved. Some people raised the question of whether it is necessary to continue supplementing iodine. These people should be given patient guidance, and let them understand that the iodine supplementation should be last for longtime. A short time of supplementation is not enough. Once the iodine supplementation stops, the damage of the iodine deficiency will bounce up.

The administration of salt business at all levels should make full use of the newspapers, networks, radio, television and other news media to publicize the policies actively and promote the sense of self-care of the people.

b. Setting examples in the typical area

The popularization of the iodized salt should be carried out firstly in the typical areas with iodine deficiency. The iodized salt can be introduced to the whole nation after the positive result is achieved in the typical areas.

3. THE IMPORTANCE OF THE ADMINISTRATION OF SALT BUSINESS

The administration of salt business is the ultimate implementer of the popularization of the iodized salt. The supply and management of the administration of salt business is the key issue of the popularization of iodized salt. Under the current situations, the following work should be carried out properly by the administration:

a. Maintaining the monopoly of the table salt

Fight with the irregular salt and carry out the policy of table salt monopoly thoroughly. Complete the historical mission with great political responsibility and ensure each family get the qualified salt.

b. Strengthen the execution of the law

Fight with the irregular salt firmly and take strict action to the major cases with serious adverse impact according to the law. Expose the illegal deeds to warn the society and deter the criminals. The administration of salt business, administration of trade and industry, police, department of health, administration of food and medicine and other relevant departments should communicate and cooperate with each other. Build the mechanism of resource sharing and cooperation. The relevant departments should act as an integrity and fight with the irregular salt dealing.

c. Establishment of the long-term mechanism

Table salt monopoly and prevention of iodine deficiency are long-term missions. Therefore, we should analyze the new trends, new characteristics and new problems, and find the regular management method. Establish the mechanisms of long-term publicity, routine inspection, transference of the major cases, cooperative execution self-regulation in the field and other effective

mechanism. The fight with the irregular salt should be firm, accurate and relentless. Solve the problem completely to provide safe and healthy environment for the consumers.

In recent years, great achievement has been made in the prevention of iodine deficiency disorders. Especially, since the "Mobilize conference for eliminating the iodine deficiency disorders in 2000" held by the State Council, effective mechanism has been initially established with the support of the government, the cooperation of the relevant departments, and the participation of the people. The iodine nutritional status has been improved remarkably for most people. Nevertheless, the iodine supplementation for the whole population is a long term mission. If the policies and measures of the iodized salt can be persisted for longtime, the intelligence of our nation will be fully developed and the quality of our nation will increase greatly. Consequently, we must complete the mission of iodized salt popularization for the country, the people's health, and the children's future.

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Xinju Song, female, graduated from the 88 Class of Salt Chemistry in the Xinjiang College of Light Industry. Since 1991, the author has been working in the Hongda Salt Business Co., Ltd.. During the working period of around 20 years in the salt companies, the author has engaged in the salt production, quality testing, quality management and human resource management. Currently, the author is the assistant officer of the human resource department. The author's papers of "Advance the resource reservation and promote the development of the circular economy", "Advance the scientific innovation in the trend of standardization", "Construct the saving society according to the standards" are included in The 3rd China Standardization Forum, The 4th China Standardization Forum, The 5th China Standardization Forum & "Schneider Electronics Cup" National Excellent Essays.

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