The Norwegian Scientific Committee for Food
and Environment

Our ref: 2018/11626

Date: 26.04.2018

Background

Iodine's only known role in the body is to participate in the synthesis of thyroid hormones produced by the thyroid gland. These hormones help regulating key metabolic processes in every cell of the body and are particularly important for brain cell development. Both iodine deficiency and iodine overdose increase the risk of thyroid disturbances (too slow or too fast metabolism) and the optimal iodine intake appears to be relatively low.

In June of 2016, the National Nutrition Council in Norway published the report “Iodine deficiency risk in Norway. Identifying emergency measures”. The report shows insufficient iodine intake among fertile, pregnant and breastfeeding women. Iodine deficiency in pregnancy or during breastfeeding can impair the neurological development of the child. The World Health Organization (WHO) estimates that severe iodine deficiency is the leading cause of preventable brain damage in infants worldwide. Even mild to moderate iodine deficiency during pregnancy appears to increase the risk of impaired cognitive function.

The main sources of iodine in the Norwegian diet are dairy products, eggs, fish and other seafood. Low iodine intake among Norwegian women is primarily caused by a decrease in the consumption of dairy products and fish. Other risk groups that may have too low iodine intake are vegans, individuals who are allergic to milk and fish and some ethnic minorities. According to the report from the National Nutrition Council, adult men and children aged 2 generally have adequate iodine intake. The recommended iodine intake for adults and children aged 10 and above is 150 µg of iodine daily.

An excessive iodine intake is associated with disruptions of the thyroid gland. It may cause goitre, hypo- and hyperthyroidism as well as inflammation of the thyroid gland (autoimmune thyroiditis). For adults including pregnant and breastfeeding women, the tolerable upper intake level (UL) for iodine, that is the maximum usual daily intake levels at which no risk of adverse health effects is expected for most of the individuals in the general population, is set at 600 µg per day (NNR, 2012).

Iodized salt and other food items

Iodized table salt is available in Norway. Iodine enrichment in salt is not compulsory and only allowed up to 5 µg of iodine per gram of salt. Some foods on the Norwegian market also contain iodized salt. These are primarily imported foods such as bread, baked goods, soups and sauces. Iodine enrichment in foods other than table salt requires special authorization in Norway.

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The report from the National Nutrition Council offers various suggestions to increase iodine intake in the population, especially among women who are of child bearing age, pregnant or breastfeeding. The suggested measures include recalculating how much iodine should be added to salt, raising the upper limit for iodine enrichment in table salt and possibly enforcing compulsory use of iodized salt in parts or all of the food industry. Upper limits for iodine enrichment levels in salt vary across Europe, from 5 µg/g up to 75 µg/g. Sweden and Finland have for example increased iodine intake in their population by using respectively 50 and 25 µg iodine enrichment per gram of salt. Denmark has a lower limit set at 16 µg/g but plans on increasing it. The iodine compounds used for iodine enrichment in foods are potassium iodide (KI), sodium iodide (NaI) and potassium iodate (KIO3).

Salt intake

The average salt intake in Norway is estimated at about 10 grams per day for men and a little less for women. “The National action plan to reduce salt intake 2014-18” is based on the National Nutrition Council's Strategy for reducing salt intake in the population (www. regjeringen.no). The national action plan aims at reducing salt intake in the Norwegian population by 15 percent in 2018 and 30 percent by 2025.

The report also suggests regulating iodine content in Norwegian milk. Milk contains iodine which is added to cow feed in order to avoid iodine deficiency in cattle. Iodine enrichment in animal feed is intended to cover the animal's needs rather than increasing iodine concentration in milk meant for human consumption. Iodine concentration in milk has been stable in Norway (16 µg/100 g milk) and feed regulations remain difficult to alter. The possibility of reducing and / or standardizing iodine concentration in milk has therefore not been taken into consideration in this assessment to VKM.

New data

The publication of the National Nutrition Council's report has been followed by the announcement of new data on iodine contents in foods (The Norwegian Food Composition Table 2017) as well as a new dietary survey carried out among children and adolescents (Ungkost 3). These new data offer an opportunity to adjust current estimations of iodine intake in the Norwegian population. New data on iodine intake among Norwegian women during pregnancy and breastfeeding has also newly been published.

By May 2018, the new version of the Food Composition Table will include several iodine values. Imported foods that are enriched with iodine and sold on the Norwegian market should also be taken into account.

Assignment description

The Norwegian Food Safety Authority (NFSA) hereby requests that the Norwegian Scientific Committee on Food and Environment (VKM) conduct a benefit-risk assessment of iodine enrichment in table salt and in industrial salt used in bread. The assessment should include subpopulations which are vulnerable to overly low or high intake of iodine, including women of childbearing age, women who are pregnant and breastfeeding, men and children. Other risk groups such as vegans, individuals suffering from allergy to fish and dairy products, relevant ethnic minorities and individuals consuming iodine supplements should also be part of the assessment. Iodine enrichment in plant-based alternatives to cow milk products should also be part of the assignment. The aforementioned benefit-risk assessment should be executed in parallel with a separate assignment sent to VKM: establishing a new upper limit for enrichment levels in iodine supplements.

The benefit-risk assessment should cover the following:

1. What is the iodine intake in the general population and among identified risk groups? Risk groups meaning subpopulations at risk for overly low or high iodine intake.

2. What would the iodine intake in the general population and among identified risk groups (see above) be if table salt and industrial salt used in bread were to be enriched in iodine and if plant-based milks were to be enriched with iodine levels comparable to those in cow milk? Table 1 shows the enrichment levels in salt for which the potential effect on iodine intake is to be estimated. The iodine intake resulting of the various scenarios should be estimated both with and without the added effect of iodine enrichment of plant-based alternatives to dairy products (milk 16 µg / 100 g). The estimates should also be seen in conjunction with the *Salt Strategy 2015*.

Table 1. Enrichment scenarios

Iodine enrichment level	**Food items**	
50 mg iodine/kg	Table salt	
		Industrial salt used in bread
	Table salt +	Industrial salt used in bread
25 mg iodine/kg	Table salt	
		Industrial salt used in bread
	Table salt +	Industrial salt used in bread
20 mg iodine/kg	Table salt	
		Industrial salt used in bread
	Table salt +	Industrial salt used in bread

3. What potential health effects will the various iodine enrichment levels have for the general population and the identified risk groups (see above)?

NFSA requires that VKM estimates iodine intake based on data from the national dietary surveys (Norkost 3 and Ungkost 3-, 4-, 9- and 13-year-olds), the small children survey (1- and 2-year-olds), the Norwegian mother and child survey (MoBa) as well as other relevant dietary surveys and studies on iodine concentration in urine for other groups.