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Vitamins and minerals in the traditional Greenland diet

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Data sheet

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Abstract: The relative importance of traditional Greenlandic food items has diminished during the last decades. Today these account for 25% of the Greenland diet with a dominance of fish, seabirds, and marine mammals. This report synthesises the available information on concentrations of vitamins and minerals in the various food items that form the traditional Greenlandic diet. However, through this diet people in Greenland are also exposed to a high intake of heavy metals and organochlorines, due to a contamination of many of these food items. In combination with information on the concentration of contaminants, the information about vitamins and minerals will potentially make it possible to adjust the diet in Greenland, taking both nutrients and contaminants into account.

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1 Dansk resumé

Betydningen af traditionelle grønlandske fødeemner er aftaget i løbet af de sidste årtier. I dag udgør disse omkring 25% af den grønlandske kost, med en dominans af fisk, havfugle og marine pattedyr. Denne rapport syntetiserer den tilgængelige information om næringsstofkoncentrationer i mange af de forskellige fødeemner, som udgør den traditionelle grønlandske kost. Pga. et højt indhold af kontaminanter i mange af disse fødeemner er det grønlandske folk udsat for et højt indtag af tungmetaller og organokloriner. Den samlede viden om næringsstofkoncentrationer og kontaminantniveauer vil potentielt gøre det muligt at balancere føden i Grønland.

2 English summary

The relative importance of traditional Greenlandic food items has diminished during the last decades. Today these account for 25% of the Greenland diet with a dominance of fish, seabirds, and marine mammals. This report synthesises the available information on concentrations of vitamins and minerals in the various food items that form the traditional Greenlandic diet. However, through this diet people in Greenland are also exposed to a high intake of heavy metals and organochlorines, due to a contamination of many of these food items. In combination with information on the concentration of contaminants, the information about vitamins and minerals will potentially make it possible to adjust the diet in Greenland, taking both nutrients and contaminants into account.

3 Naalisagaq kalaallisooq

Kalaallit qangaaniilli nerisannarisaasa pingaarutaat ukiuni qulikkuutaartuni kingullerni annikilliartorsimavoq. Ullumikkut tamakkua kalaallit nerisaasa 25%-ii missiliorpaat, pingaartumik tassaallutik aalisakkat, timmissat imarmiut imaluunniit miluumasut imarmiut. Nalunaarusiami uani vitaminit mineralillu kalaallit qangaaniilli nerisannarisaanniittut annertussusiat pillugu paasissutissat pissarsiarineqarsinnaasut ataatsimut eqikkarneqarput. Nerisat tamakkua ilarpassuisa annertuumik mingutitsissutinik akoqarneratigut inuit Kalaallit Nunaanniittut saffiugassanik oqimaatsunik organoklorinenillu nerisat aqqutigalugit timiminnut akuliutitsinissamut navianartorsiortinneqarput. Inuussutissat mingutitsisullu isumaliuteqarfiginerisigut mingutitsissutinik vitamininillu ataatsikkortillugit paasisitsiniaanikkut Kalaallit Nunaanni nerisat aaqqiiviginissaata anguneqarnissaa periarfissinneqarsinnaavoq.

4 Introduction

Due to a high consumption of marine traditional food items such as fish, seabirds, seals and whales, people in Greenland are exposed to a high intake of heavy metals, like mercury and cadmium, and organochlorines, like PCBs. The National Environmental Research Institute, NERI, has examined the most important marine animal food items in Greenland and found that these are contaminated in various degrees (Johansen et al. 2004). Although the relative importance of the traditional food items has diminished during the last century (Pars 1997; 2000), fish, seabirds and marine mammals still constitute a substantial part of the daily Greenlandic diet. In 1901 traditional food made up more than 80% of the daily energy intake, contrary to 25% today (Pars 1997). The amount of traditional food consumed usually varies with season and between the demographic groups in Greenland and other parts of the Arctic. In general, older Inuit consume more traditional food than younger Inuit; men consume more traditional food than women, and people living in villages have a higher intake than people living in larger towns (Kuhnlein 1997; Pars 1997).

Heavy metals typically concentrate in the liver and kidneys of animals, while PCB and DDT are concentrated in the adipose tissue (Johansen et al. 2004). Due to the lipophilic nature of these chemicals, they tend to accumulate in the animals at the top of the food chain (Jensen et al. 1997). It is not straightforward to recommend a reduction in the consumption of the various tissues from fish, seabirds, and marine mammals, because the vitamins and minerals they supply are nutritionally vital. Therefore this report synthesises the available information on concentrations of vitamins and minerals in the various food items that form the traditional Greenlandic diet. In combination with previously published information on the concentration of contaminants in marine animals, this information will potentially make it possible to adjust the diet in Greenland, taking both nutrients and contaminants into account.

Though the supply of some nutrients from the traditional diet is poor, the Greenlanders have through time learnt how to achieve the essential nutrients in sufficient quantities. Formerly Greenlanders consumed the spleen, lymph glands and testicles from musk ox and seals (Rodahl 1949), organs that are rich in vitamin C. The spleen and lymph glands contain app. 40 mg/100 g and the testicles app. 70 mg/100 g, whereas the adrenal gland contain app. 130 mg/100 g (St.Aubin and Geraci 1980) (see Table 2). For many years people from Ammasalik achieved 50% of their vitamin C from algae (Høygaard and Rasmussen 1939). People who did not realise the nutritional value of these food items, and hence avoided them, suffered from scurvy (Rodahl 1949), an illness caused by vitamin C deficiency. Also, the manner in which the food is prepared is crucial for the vitamin C content; for instance when stored or salted, the meat looses its vitamin C content (Rodahl 1949).

Documents from the 18th and the 19th century indicate that scurvy was not observed among Inuit (Berton 1988), actually no vitamin de-

ficiency was known among the East Greenland Inuit living of traditional food (Rodahl 1949).

Inuit in Greenland and the Canadian Arctic have experienced health problems, including vitamin C deficiency, as their diet in the 20th century shifted from an exclusive reliance on traditional diet to a mixed diet on traditional food and market food use (Bjerregaard and Young 1998). Formerly, when an animal was caught, all the internal organs were exploited by the Inuit, even the stomach content of ptarmigan, seal and caribou was eaten (Rodahl 1949). When leaving the strict traditional diet, Inuit need to balance their diet properly and weigh benefits and contaminant risks of traditional food.

5 Arctic traditional food

In Table 1 is given the content of energy, carbohydrate, fat and protein in various traditional Inuit food items. As expected, energy and fat contents are highest in blubber samples (3,742 kJ and 99 g fat/100 g in ringed seal blubber), whereas the highest content of protein is found in muscle samples from caribou (56-68 g/100 g), arctic char (69 g/100 g), and narwhal (77.5 g/100 g). Caribou stomach content contained 11.4 g carbohydrate/100 g and was together with berries from crowberry (app. 10 g/100 g), bog whortleberry (10.6 g/100 g), and cowberry (14.9 g/100 g) the best sources of carbohydrate.

Values for vitamin content in traditional Inuit diet are given in Table 2, and mineral values in table 3. Recommended daily intake (RDI) of vitamins and minerals correspond to the amount needed to support growth during infancy and childhood, to maintain body weight and health, and to facilitate pregnancy and lactation (Nordic Council of Ministers 2004). These values refer to the amounts consumed, hence losses during preparation must therefore be accounted for (see app. 1).

Many important constituents of traditional Inuit diet have not or have only been poorly investigated for their content of energy-giving components, minerals and vitamins. That is e.g. minke whale, spotted wolf-fish, redfish, Greenland and Atlantic cod, Greenland and Atlantic halibut, crabs and shrimps, glaucous gull, thick-billed murre and kittiwake, which are all eaten by Greenland people. The content of vitamin B5, B6, B9, B12, E, D, and K have apparently not been examined in traditional Inuit diet. Vitamin B1, B2, and B3 have only been examined in some food items, whereas vitamin A and C are the vitamins most thoroughly examined. Very few data exist from Greenland. Therefore this report is primarily based on data from Canadian investigations. Unfortunately, deep freezing and conservation will result in a gradually reduction of the vitamin C content of foodstuffs (Fediuk et al. 2002), and in some investigations the vitamin C content may therefore be underestimated.

6 Vitamins and minerals

6.1 Vitamins

Vitamins are a group of complex organic compounds required in small quantities for the maintenance of health. They are not synthesised in the body in sufficient amounts to compensate for the breakdown and excretion, and are therefore essential in the diet. Vitamins can be divided into two main groups: water- and fat-soluble vitamins.

Unless otherwise stated, the text below is based on the following references: St.Aubin & Geraci (1980), Haut (1982), Gaman & Sherrington (1996), Hagerup (1997), Dilling (1999), Leth et al. (2000), and Nedergaard (2002).

6.1.1 Water-soluble vitamins

The water-soluble vitamins are not stored in the body, and are continuously lost through the urine. A regular intake is therefore a necessity.

B1 (thiamine)

Function: Thiamine functions as a co-enzyme for the vital enzyme carbozylase, which plays a decisive role in the breakdown of carbohydrates. It is essential for the functioning of the heart, muscles and nervous system. Furthermore it contributes to the removing of lactic acid in working muscles.

Deficiency: If thiamine is deficient in the diet, glucose is only partially oxidised. A total absence of thiamine can cause beriberi. Beriberi is characterised by loss of appetite with subsequent weight loss, cardiac abnormalities, and neuromuscular disorders (such as itching, burning, etc.), and muscle weakness. Beriberi is still common in places where white rice is preferred. The consumption of coffee, alcohol, tobacco, and medicine will reduce the absorption of most B-vitamins.

RDI: 1.4-1.5 mg for men and 1.1 mg for women (see app. 1).

Sources: Brown rice (thiamine is abundant in whole grains, usually in the scutellum (the thin covering of the starchy interior endosperm), but is scarce in the endosperm), graham flour, wheat bran, cereal flakes, oatmeal, brewers' yeast, sunflower seed, sesame seed, and other types of seed, various types of nuts and beans, garlic, and several vegetables and fruits. Furthermore in cheese, raw cod roe, plaice, tuna, lamb, poultry, and other types of meat.

Losses on cooking and storage: Thiamine is lost to the water when boiled.

B2 (riboflavin)

Function: Riboflavin is necessary for the maintenance of the body's energy level. It assists in the formation of antibodies.

Deficiency: The symptoms of riboflavin deficiency are wounds in the corners of the mouth, discoloration of the mucous membrane in the mouth and lips, facial inflammations and hypersensitivity to light. The consumption of coffee, alcohol, tobacco, and medicine will reduce the absorption of most B-vitamins.

RDI: 1.7 mg for men and 1.3 g for women (see app. 1).

Sources: Liver is a particularly good source. Other good sources are lean meat and fish, cheese, kidney, eggs, and raw cod roe. Riboflavin is also found in brewer's yeast, dairy products, goat's milk, almonds, in various nuts, beans, seeds, in wholemeal and rye, wheat germ, brown rice and maize, as in several vegetables and fruits.

Losses on cooking and storage: Is only slightly soluble in water and is resistant to the influence of acid, air and heat, but will quickly turn inactive in basic solutions and when influenced by sunlight.

B3 (niacin)

Function: Possibly protects against cardiovascular diseases by lowering the cholesterol levels in the blood, and causing vasodilation, which lowers the blood pressure. Niacin is a very important co-enzyme connected to the conversion of carbohydrates, fats and proteins.

Deficiency: Prolonged deficiency of niacin gives rise to pellagra. Pellagra is a disease that affects the nervous system and the digestive system. Symptoms include decreased appetite, weight loss and weakness. The effects of pellagra are commonly referred to as the three D's: dementia, diarrhoea and dermatitis. This disease is lethal if not treated. The consumption of coffee, alcohol, tobacco, and medicine will reduce the absorption of most B-vitamins.

RDI: 19-20 NE/100 g for men and 15 NE for women (see app. 1). The overall effect of niacin is given as niacin equivalents (NE). 1 mg niacin = 60 mg tryptophan.

Sources: Niacin appears both in plants and in animal products, but the best sources are liver, kidneys, muscles, brewers' yeast, tuna, poultry, and peanuts. It is also found in garfish and a lot of other fish species, in chicken, turkey and other lean types of meat, in cheese, eggs, seeds and nuts, brown rice and wholemeal, furthermore in various legumes, and many other vegetables and fruits.

Losses on cooking and storage: Niacin is very stable, but it is lost to the water during cooking, rinsing, and soaking.

B5 (pantothenic acid)

Function: Vitamin B5 is essential for the suprarenal gland and the production of cortisone and other hormones from the suprarenal gland. It is important for normal growth and development of the central nervous system, and is an essential constituent of enzyme systems involved in the release of energy from carbohydrates and fats.

Deficiency: Vitamin B5 deficiency is virtually impossible. The consumption of coffee, alcohol, tobacco, and medicine will reduce the absorption of most B-vitamins.

RDI: No RDI exists for vitamin B5.

Sources: brewers' yeast, egg yolk, raw cod roe, peanuts, wholemeal, beans, seeds and nuts, brown rice, avocado, and in several vegetables, berries and fruits. Furthermore in various meats, entrails and fish, as well as in dairy products and cheese.

Losses on cooking and storage: Soluble in water and therefore sensitive to boiling.

B6 (pyridoxine)

Function: It functions in many enzyme systems, especially those concerned with protein synthesis. Needed for the breakdown of protein and necessary for maintaining and building muscle tissue. Large protein consumption, especially from meat, results in a proportionally large use of vitamin B6.

Deficiency: Vitamin B6 deficiency can cause anemia and inflammation of the skin (dermatitis) with redness and greasy scaling. The tongue may become sore and red, and cracks may form in the corners of the mouth. The person may become confused, irritable, and depressed. The consumption of coffee, alcohol, tobacco, and medicine will reduce the absorption of most B-vitamins. Vitamin B6 deficiency is rare.

RDI: 1.6 mg for men and 1.2-1.3 mg for women (see app. 1).

Sources: Soybeans and many other types of beans, wholemeal, buckwheat, rye, oatmeal and brown rice. Other sources are meat, liver, fish and poultry.

Losses on cooking and storage: Soluble in water and therefore sensitive to boiling.

B8 (biotin)

Function: Necessary for the formation of fatty acids essential for the proper functioning of many bodily functions.

Deficiency: The intestinal flora produces biotin, but the consumption of antibiotics, sugar, coffee and alcohol disturb the conditions needed for this production. Symptoms of deficiency may be fatigue, loss of appetite, muscle pain, dry and scaly skin. Deficiency is rare.

RDI: No RDI exists for vitamin B8.

Sources: Important dietary sources are liver, soybeans, as well as other beans and nuts, brewers' yeast and mushrooms. This vitamin is furthermore found in fish, kale and other vegetables, berries and fruits, as well as in wholemeal, brown rice, and dairy products.

Losses on cooking and storage: Biotin is lost to the water during boiling.

B9 (folacin)

Function: Folacin supports the immune system and the nervous system. It is necessary for the formation of red blood cells and thus aids in preventing anaemia. It is extremely important in preventing malformation of the nervous system in foetuses. Involved in many metabolic reactions necessary for proper growth.

Deficiency: A dietary deficiency causes a characteristic type of anaemia. A low intake during early pregnancy may be associated with neural tube defects in babies. The consumption of coffee, alcohol, tobacco, and medicine reduces the absorption of most B-vitamins.

RDI: 300 µg for adult men and women, and 400 µg for women of the childbearing age (see app. 1).

Sources: Liver, green leafy vegetables (broccoli, spinach, and Brussels sprouts), and oranges. Brewers' yeast, rice and beans.

Losses on cooking and storage: Folacin is lost to the water during boiling.

B12 (cyanocobalamin)

Function: Vitamin B12 is needed, together with folacin, for red blood cell formation. It is necessary for the functioning of cells and needed in forming and maintaining healthy nerve tissue.

Deficiency: Unlike most other vitamins, B12 is stored in substantial amounts, mainly in the liver. Vitamin B12 deficiency is nearly always caused by a failure to absorb the vitamin rather than by a dietary deficiency. Because vitamin B12 is necessary for the production of red blood cells, deficiency of this vitamin can result in anaemia. The consumption of coffee, alcohol, tobacco, and medicine will reduce the absorption of most B-vitamins.

RDI: 2.0 µg for adults (see app. 1).

Sources: Occur only in animal products and in yeast. Liver is the richest source, but vitamin B12 is also found in milk, meat, poultry, fish, shellfish and eggs.

Losses on cooking and storage: Vitamin B12 is lost to the water during boiling.

C (ascorbic acid)

Function: The production of collagen, a protein substance in fibrous tissue, depends on ascorbic acid. Vitamin C maintains capillary integrity through the production of an intercellular cement substance. This function promotes the healing of wounds, fractures, bruises, some haemorrhages, and bleeding gums. Additionally, it reduces susceptibility to infections.

Deficiency: In contrast to most other large mammals humans are not capable of synthesising ascorbic acid (Dilling 1999; St.Aubin and Geraci 1980). Vitamin C deficiency will eventually cause scurvy. A few months on a diet low in vitamin C can cause bleeding under the skin, around the gums, and in the joints. Symptoms may include irritability, depression, weight loss, fatigue, and general weakness. The gums become swollen, purple, and spongy. The teeth eventually loosen. Infections may develop, and wounds do not heal.

RDI: 75 mg for adults (see app. 1).

Sources: Vitamin C is found in most fresh fruits and vegetables. Citrus fruits are known for their high content of vitamin C, containing about 50 mg/100 g, but also acerola-berries, hips, capsicums, and

fresh potatoes are good sources, as well as several types of beans. Adrenal glands from various marine mammals are very rich sources of vitamin C (St.Aubin and Geraci 1980).

Losses on cooking and storage: Vitamin C is very soluble in water and also readily oxidised. Therefore it is readily lost as well as destroyed during the preparation and cooking of fruits and vegetables. Deep freezing and conservation will gradually reduce the vitamin C content of foodstuffs (Fediuk et al. 2002).

6.1.2 Fat-soluble vitamins

The fat-soluble vitamins are more stabile than the water-soluble vitamins, but they are sensitive to air, light and heat.

A (retinol and beta-carotene)

Function: Vitamin A exists in two forms: retinol, which is found only in animal foods, and carotene (pro-vitamin A), a group of orange pigments found in many fruits and vegetables, which can be converted into retinol in the body. Vitamin A is essential for growth and metabolism of all body cells; children and pregnant women therefore have a greater need than others. It is also required for the formation of a pigment in the retina, and is necessary for vision in reduced light. Vitamin A is used in the body for regulating the development of various tissues, such as the skin, and the lining of the lungs and intestines.

Deficiency: If vitamin A is deficient for a longer period, children will show retarded growth. An early symptom of vitamin A deficiency is night blindness, which is caused by a disorder of the retina. Furthermore the health of the skin is affected.

RDI: 900 RE for men and 700 RE for women (see app. 1). The overall effect of vitamin A is given as retinol equivalents (RE). 1 RE = 1 μg retinol = 6 μg β-carotene.

Sources: Liver from various animals has a high retinol content; e.g. caribou (30-32 mg/100 g) (Morrison and Kuhnlein 1993) and ringed seal (15 mg/100 g) (Kuhnlein and Soueida 1992). Vitamin A is also found in egg yolk and fatty dairy products.

Losses on cooking and storage: Both retinol and carotene are unaffected by most cooking methods but small amounts may be lost during frying or prolonged cooking.

E (tocopherol)

Function: Vitamin E aids in the forming of red blood cells, and it is utilised in forming muscle tissue and other body tissues. Furthermore it is an antioxidant: It protects cells against damage by free radicals, which are reactive by-products of normal cell activity.

Deficiency: Vitamin E deficiency is rare. Symptoms may include reduced reflexes, loss of co-ordination, and muscle weakness.

RDI: 10 α -TE for men and 8 α -TE for women (see app. 1).

Sources: Vitamin E protects lipids, especially polyunsaturated fatty acids (PUFA), against free radical damage. Therefore the more PUFA

eaten the more vitamin E is needed. However, food rich in PUFA is usually also good sources of vitamin E.

Vitamin E is found in vegetable oils such as peanut and wheat oils, and in green leafy vegetables, nuts, seeds, and beans. Other sources are whole-wheat, brown rice, seafood, and poultry.

D (cholecalciferol)

Function: Needed for the growth and maintenance of bones and teeth. Vitamin D is necessary for the absorption of calcium.

Deficiency: In children receiving a diet containing insufficient vitamin D, blood levels of calcium and phosphate will decrease, because vitamin D is necessary for the absorption of these two minerals. If not enough calcium and phosphate are available to maintain healthy bones, vitamin D deficiency may eventually result in a bone disorder called rickets, which is a disease where normal ossification is disturbed. The disease is characterised by bending and distortion of the bones during muscular action.

RDI: 7.5 µg for adults younger than 60 years, and 10 µg for pregnant and lactating women and elder people (see app. 1).

Source:

1. Food. Vitamin D is found in relatively few food items. It occurs naturally in foods of animal origin. Meat, apart from liver and some other entrails, contains only a trace of vitamin D. Also found in fish, cod liver oil, fatty dairy products, egg yolk, and avocado.

2. Sunlight (ultraviolet light). On exposure to sunlight a preliminary stage to vitamin D is formed from cholesterol in the skin. The amount formed varies with latitude, the amount of time spend in the sun and the pigmentation of the skin. In darker-skinned people less synthesis occur.

Losses on cooking and storage: Vitamin D is heat stable and is insoluble in water, and hence, unaffected by cooking.

K (phylloquinone)

Vitamin K exists in two forms. Phylloquinone is consumed in the diet, and intestinal bacteria produce menaquinone.

Function: Necessary for the synthesis of the proteins that help control bleeding (clotting factors) and, thus, for the normal clotting of blood. It is also needed for healthy bones.

Deficiency: Infants are born with low levels of vitamin K. They do not have any vitamin K-producing bacteria in their intestines, and breast milk is low in vitamin K, and can supply only about 20% of the infant's requirement. Hence, new-borns are often supplemented with vitamin K immediately after birth. Vitamin K deficiency in adults is rare, because this vitamin is also being synthesised by bacteria present in the intestine as well as being present in a normal diet. Antibiotics destroy the intestinal flora, and may cause vitamin K deficiency. Vitamin K deficiency can result in bleeding gums, and in skin that is easily bruised.

RDI: No RDI exists for vitamin K (see app. 1).

Source: Vitamin K is found in green vegetables (spinach, lettuce, broccoli, brussels sprouts, and cabbage) and a variety of other foods.

Losses on cooking and storage: Stable in cooking but sensitive to light.

6.2 Minerals

Minerals are inorganic nutrients. Their continued supply in the diet is needed for growth, maintenance of body weight in adulthood, and for reproduction. Unless otherwise stated, the text below is based on the following references: St.Aubin & Geraci (1980), Haut (1982), Gaman & Sherrington (1996), Hagerup (1997), Dilling (1999), Leth et al. (2000), and Nedergaard (2002). Cooking losses of minerals (sodium, potassium, phosphorus, calcium, magnesium, iron, zinc, manganese, copper) are particularly high in vegetables, on average about 30-40% are lost (Kimura and Itokawa 1990).

6.2.1 Major minerals (macrominerals)

Calcium

Function: Approximately 99% of the calcium in the human body is found in bones and teeth. Calcium is necessary for proper nerve function to the heart, and is required for the clotting of blood. Important for the balance between sodium, potassium and magnesium, and for the utilisation of vitamin D, A, C, and B12. Activates the enzymes that are necessary to convert food into energy.

Deficiency: Deficiency affects various bones. Deformed thoracic cages and crooked-legged children are the best known. Furthermore it causes problems with teeth, nails, and hair. Reduced growth, depression, muscle cramps, nervousness, sleeplessness, reduced production of gastric juice, acid/base-imbalance.

RDI: 800 mg for adults. Increased requirements: during pregnancy and breast-feeding. Older people and women after menopausal often have calcium deficiency (see app. 1).

Sources: Dairy products, cheese and green leafy vegetables have a high content of calcium. Calcium is also very prominent in many fish species, e.g. sculpins (429 mg/100 g) (Kuhnlein and Soueida 1992), and skin from Arctic char (268 mg/100 g) (Kinloch et al. 1992; Kuhnlein and Soueida 1992).

Phosphorus

Function: Phosphorus is an essential constituent of bones and teeth. It regulates the metabolism of carbohydrates and fat and, hence, the content of fat in the blood.

Deficiency: Soft bones, dental damages, poor brain- and nerve functions, loss of weight and general weakening. Deficiency is rarely seen, and not in healthy people, except in connection with vitamin D deficiency.

RDI: 600 mg for adults (see app. 1).

Sources: Meat is a particularly good source for phosphorus, e.g. muscles/skin from Arctic char (857 mg/100 g) (Kuhnlein and Soueida 1992), and muscles from narwhal (700 mg/100 g) (Kuhnlein and Soueida 1992), caribou (539-621 mg/100 g) (Kuhnlein and Soueida 1992; Kuhnlein et al. 2002), and beluga (582 mg/100 g) (Kuhnlein and Soueida 1992). Furthermore seeds, nuts, soybeans and other beans, egg yolk, cheese, and dairy products have a high content of calcium. Also found in wheat, brown rice, and several vegetables and fruits.

Magnesium

Function: Helps to regulate proper heart function. Releases the enzymes that promote body energy. Magnesium is necessary for the formation and functioning of healthy bones, teeth, muscles, and nerves.

Deficiency: Magnesium deficiency is rarely seen, but when it occurs, it tends to occur in chronic alcoholics, and in people suffering from severe and prolonged diarrhoea. There is a tendency, that magnesium deficiency occurs with the same conditions that provoke deficiencies in sodium and potassium.

RDI: 350 mg for men and 280 mg for women (see app. 1).

Sources: It is found in the chloroplasts of green plants and therefore green vegetables are good sources. Salmon (143 mg/100 g) (Kuhnlein et al. 2002), oysters, scallops, and most nuts are good sources. Oatmeal is also a good source.

Iron

Function: The majority of iron in the human body occurs in haemoglobin, the red pigment in red blood cells. Haemoglobin carries oxygen from the lungs to the cells of all body tissues.

Deficiency: Iron deficiency leads to anaemia, which means that too few and small red blood cells are produced. Dizziness, tiredness, headaches, and paleness will occur. Iron deficiency is the most common deficiency in the world (including the North). Absorption of iron from the diet depends on the composition of the meal. Vitamin C promotes the absorption of iron, furthermore copper, molybdenum and folacin is needed for the absorption of iron. Coffee, tea, oxalic acid, phytin, and lack of oxygen inhibit the absorption of iron.

RDI: 9 mg for adults and 15 mg for menstruating women (see app. 1).

Sources: Red meat, liver and kidney, shellfish and all fish. Egg yolks, dried apricots, legumes and oatmeal.

Losses on cooking and storage: Iron is not destroyed by heat but small amounts may be lost to cooking water or discarded meat juices.

Potassium

Function: Works in conjunction with sodium in regulating body fluid balances. Very important for the functioning and contractions of muscles and is therefore very important for the function of the heart and regulation of the heartbeat. Also needed for proper nerve conduction.

Deficiency: The increased intake of sodium leads to a deficiency of potassium. Many people therefore lack potassium despite the fact that they actually receive enough through their diet.

RDI: 3,500 mg for men and 3,100 mg for women (see app. 1).

Sources: Dried fruits are excellent potassium sources as well as potatoes, avocados, bananas, whole-wheat, and caribou muscle (1,000-1,167 mg/100 g) (Kuhnlein et al. 1994; 2002) and polar bear muscle (552 mg/100 g) (Kuhnlein et al. 2002).

Sodium

Function: Necessary for maintaining body fluids. It is important for the bones, the functioning of muscles, production of hydrochloric acid in the stomach and other gland secretions.

Deficiency: Deficiency of sodium is rarely seen. On the contrary most people in the western part of the world have too high an intake of sodium in the form of salt (NaCl), for instance through an increased addition to food during preparation.

RDI: none.

Sources: Sodium is found in many foods. The most important sources are cereals, meat products and salt used in the household. Furthermore shrimps and clams (475-858 mg/100 g) (Kuhnlein and Soueida 1992) have a high content of sodium, as well as Blue mussel (325 mg/100 g) (Kuhnlein and Soueida 1992).

6.2.2 Trace elements

Copper

Function: Copper is important for the pigmentation of the skin, the formation of blood, and it promotes the absorption of B12 and iron, which is not absorbed without the presence of copper. It is part of many enzyme processes and the protein metabolism. Contributes to the development of bones. It is important for the brain, nerves, connective tissue and the immune response.

Deficiency: Ascorbic acid and the metals zinc, cadmium and iron inhibit the absorption of copper. Copper deficiency may lead to accumulation of iron in the liver, ultimately leading to anaemia. Other deficiency diseases can be a reduced resistance to toxins, growth retardation and bone weakness in children, and disturbance in nerve functions. Copper deficiency is, however, uncommon.

RDI: 0.9 mg for adults (see app. 1).

Sources: Particularly entrails and shellfish are rich in copper. Copper is found in most foods where iron is found; e.g. cashew nuts and other nuts, seeds and almonds, beans, and peas. Also found in meat, buckwheat, wheat, rye, raisins, and apricots, olives and several vegetables, herbs, fruits, and berries.

Iodine

Function: Iodine is required by the thyroid gland for the formation of hormones, which are involved in the regulation of the speed of oxidation of nutrients in body cells.

Deficiency: Iodine deficiency is rather common, and causes goitre. People with goitre may experience a soft swelling in the front of the neck, which is caused by an enlargement of the thyroid gland. Women are more prone to this disease than men.

RDI: 150 µg for adults (see app. 1).

Sources: Iodine occurs in very low concentrations in the sea-water, but organisms living in the sea have an ability to concentrate iodine. Therefore seaweed and sea fish are very rich in iodine, Atlantic cod muscle contain 7.44 mg iodine/100 g (Andersen et al. 2002).

Zinc

Function: Zinc forms part of more than 100 enzymes and proteins. These enzymes and proteins are necessary components for digestion.

Deficiency: Zinc deficiency is rare. Growth retardation, delayed sexual puberty, and changes in skin are some of the results of zinc deficiency. The absorption of zinc from the intestine varies and depends on the composition of the meal. The phytin content of wholemeal products reduce the absorption of zinc, whereas animal proteins counteract this effect. Long-term fermentation of wholemeal bread, in which the phytin is split, can counteract the negative effect of phytin.

RDI: 9 mg for men and 7 mg for women (see app. 1).

Sources: Oysters are particularly rich in zinc. Ringed seal eyes contain 30 mg zinc/100 g (Kuhnlein and Soueida 1992). Wheat germ, wheat bran and whole-grains, red meat and poultry are also excellent sources.

Chromium

Function: Acts in conjunction with insulin to maintain normal glucose levels. May help lower high blood sugar in some individuals.

Deficiency: Chromium is necessary for a normal development of the foetus, and deficiency may therefore cause growth disturbance of the foetus, as well as arteriosclerosis and possibly heart diseases. Chromium deficiency is rare.

RDI: No RDI exists for chromium.

Sources: Brewers' yeast, treacle, cane sugar, soybeans, sesame seeds and other seeds, and nuts and almonds. Found in potatoes, whole-grain cereals and seafood. Furthermore in fish, meat and sea salt, in whole-wheat grain and other grains, black pepper, tea and in many vegetables and fruits.

Selenium

Function: Acts in conjunction with vitamin E and is important in preventing the breakdown of cells. Might protect against mercury.

Deficiency: Selenium deficiency may occur in regions of the world where the soils are poor in selenium, because foods low in selenium are produced.

RDI: 50 µg for men and 40 µg for women (see app. 1).

Sources: Eggs, cereals and grains, mushrooms, garlic, poultry, fish, and entrails. Furthermore mattak from beluga (200-650 µg/100 g)

(Kuhnlein et al. 2002), narwhal (400 µg/100 g) (Kuhnlein et al. 2002), and walrus (100 µg/100 g) (Kuhnlein et al. 2002) are good selenium sources.

Molybdenum

Function: Molybdenum is crucial for the functioning of three enzymes, which are involved in the metabolism of fats and uric acid. It is important for the teeth, liver, kidneys and spleen. It detoxifies sulphur and copper, and participates in the metabolism of carbohydrate.

Deficiency: Loss of appetite, the formation of uric acid, gout, impotence and caries. Molybdenum deficiency is rare.

RDI: No RDI exists for molybdenum.

Sources: Split peas, lentils, and brown rice. In wheat, nuts, fish, egg yolks and dairy products, and in several vegetables and fruits.

Manganese

Function: Manganese is important for the oxidation of the cells and the conversion of carbohydrates, fats and proteins. The balance of blood sugar is regulated by manganese together with chrome.

Deficiency: Deficiency causes liver diseases, anaemia, asthma, indigestion, psychological sufferings, and a failing sense of equilibrium. Deficiency is rarely seen.

RDI: No RDI exists for manganese.

Sources: Manganese is primarily found in vegetable food, particularly in dried leguminous fruits, whole-wheat grain, rye and other types of grain and in brown rice, in nuts, seeds, and tea. Furthermore caribou stomachs contain 10 mg manganese/100 g (Kuhnlein and Soueida 1992).

7 Energy-giving components, vitamins and minerals in Arctic traditional food items

Table 1. Energy, carbohydrate, fat and protein values per 100 g. Letters in brackets refer to the references from which the values were obtained, for explanation see below this table.

Common name *Scientific name*	**Calculated energy (kJ)**	**Carbohydrate (g)**	**Fat (g)**	**Protein (g)**
	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic
Marine mammals				
Beluga *Delphinapterus leucas*				
Blubber, boiled	3430 [(n)]		90 [(n)]	1.2 [(n)]
Blubber, raw	2679-3432 [(n)]	0 [(h)]	66-72 [(n)]	9-10 [(n)]
Mattak, boiled	849 [(n)]		10 [(n)]	24 [(n)]
Mattak, raw	645-647 [(n)]	0.8 [(h)]	4.2-7 [(n)]	22-27 [(n)]
Muscle, dried	1491 [(h)]	0 [(h)]	5.2 [(h)]	72 [(h)]
Oil, raw	3723 [(n)]		98 [(n)]	0.3 [(n)]
Narwhal *Monodon monocerus*				
Blubber, aged	3351 [(h)]	0 [(h)]	87 [(h)]	4.5 [(h)]
Blubber, boiled	3341 [(h)]	0 [(h)]	87 [(h)]	
Blubber, raw	2343-3153 [(n)]	0 [(h)]	42-81 [(n)]	5.3-13 [(g, n)]
Flippers (mattak), aged	571 [(h)]	0 [(h)]	2.3 [(h)]	27 [(h)]
Mattak, aged	582 [(h)]	5.8 [(h)]	2.5 [(h)]	22 [(n)]
Mattak, boiled	521 [(h)]	0 [(h)]	3.2 [(h)]	23 [(n)]
Mattak, raw	544-557 [(n)]	1.1 [(h)]	3-5 [(n)]	22-22.9 [(n, g)]
Muscle, aged				77 [(h)]
Muscle, dried	1778 [(h)]	0 [(h)]	11 [(h)]	77.5 [(g)]
Bearded seal *Erignathus barbatus*				
Intestine, boiled	521-530 [(n)]	0 [(h)]	1.9-3 [(n)]	21-25 [(n)]
Intestine, raw	418 [(h)]	0 [(h)]	2 [(h)]	19 [(h)]
Muscle, boiled	698-720 [(n)]	0 [(h)]	2.5-3 [(n)]	34-35 [(n)]
Muscle, raw	505 [(h)]	0 [(h)]	1.4 [(h)]	25 [(h)]
Walrus *Odobenus rosmarus*				
Blubber, aged	2344-2695 [(n)]	0 [(h)]	58-68 [(n)]	2.8-8 [(n)]
Blubber, boiled	2884 [(h)]	0 [(h)]	73 [(h)]	7.6 [(h)]
Blubber, raw	3120 [(h)]	0 [(h)]	80 [(h)]	5.9 [(h, g)]
Mattak, aged	678 [(h)]	0.5 [(h)]	3.4 [(h)]	30 [(h)]
Mattak, raw	716 [(h)]	0 [(h)]	3 [(h)]	33-33.3 [(h, g)]
Muscle, aged	643-854 [(n)]	0 [(h)]	5-11 [(n)]	24-26 [(n)]
Muscle, boiled	797 [(h)]	0 [(h)]	2.9 [(h)]	38 [(h)]
Muscle, raw	466-499 [(n)]	0 [(h)]	1.6-1.9 [(n)]	23-23.9 [(n, g)]
Ringed seal *Phoca hispida* (pup)				
Muscle, boiled	886 [(h)]	0.9 [(h)]	9.8 [(h)]	28 [(h)]
Muscle, raw	482 [(h)]	0 [(h)]	2.8 [(h)]	21 [(h)]
Ringed seal *Phoca hispida*				
Blubber, aged (liquid)	3742 [(h)]	0 [(h)]	99 [(h)]	0.7 [(h)]
Blubber, aged (solid)	3507 [(h)]	0 [(h)]	92 [(h)]	2.5 [(h)]
Blubber, boiled	3420 [(h)]	0 [(h)]	89 [(h)]	3.2 [(h)]
Blubber, raw	3402-3443 [(n)]	0 [(h)]	86-90 [(n)]	1.7-2.8 [(n, g)]
Brain, raw	628 [(h)]	0 [(h)]	9.9 [(h)]	14 [(h)]
Eyes, raw	291 [(h)]	0.5 [(h)]	2.3 [(h)]	11 [(h)]
Heart, raw	472 [(h)]	0 [(h)]	1.9 [(h)]	23 [(h)]
Liver, raw	506-576 [(n)]	0.5 [(h)]	3-3.9 [(n)]	22-24 [(n)]
Muscle, aged	699 [(h)]	0 [(h)]	6.4 [(h)]	26 [(h)]
Muscle, boiled	625-752 [(n)]	0 [(h)]	2.5-3.7 [(n)]	31-34 [(n)]
Muscle, raw	515-541 [(n)]	0 [(h)]	1.7-2 [(n)]	21-25.2 [(n, g)]
Polar bear *Ursus maritimus*				
Fat, boiled	3312 [(h)]	0 [(h)]	86 [(h)]	3.4 [(h)]
Fat, raw	3164 [(h)]	0 [(h)]	82 [(h)]	3 [(h)]
Muscle, boiled	799-909 [(n, h)]	0 [(h)]	2.9-6 [(n, h)]	38-41 [(h, n)]
Muscle, raw	485 [(h)]	0 [(h)]	2.5 [(h)]	22 [(h)]

Common name *Scientific name*	**Calculated energy (kJ)** Canadian Arctic	**Carbohydrate (g)** Canadian Arctic	**Fat (g)** Canadian Arctic	**Protein (g)** Canadian Arctic
Fish				
Sculpin *Myoxocephalus sp.*				
Whole/no skin, raw	386 [h]	0 [h]	1.5 [h]	18 [h]
Trout (*Salmo* and *Salvenius* sp.)				
Muscle, cooked #	540-655 [n]		4.2-7 [n]	21-23 [n]
Muscle, raw	474-528 [n]		3-3.9 [n]	19-21 [n]
Muscle, smoked	393 [n]		1.7 [n]	19 [n]
Arctic char *Salvenius alpinus*				
Muscle, boiled	663 [h]	0 [h]	5 [h]	26 [h]
Muscle, dried	1264 [h]	0 [h]	20 [h]	28 [h]
Muscle, raw	422-494 [n, h]	0 [h]	2-3.3 [n]	18-42.2 [n, g]
Muscle/skin, dried	1823 [h]	0 [h]	15 [h]	69 [h]
Muscle/skin, raw	545 [h]	0 [h]	3.9 [h]	22 [h]
Skin, raw	1461 [h]	0 [h]	19 [h]	42 [h]
Terrestrial mammals				
Muskox *Ovibos moschatus*				
Fat, raw	2438 [n]		54 [n]	1.4 [n]
Muscle, raw	440 [n]		2 [n]	19 [n]
Caribou *Rangifer tarandus*				
Bone marrow, cooked #	1709 [n]		41 [n]	8.9 [n]
Brain, boiled	736 [h]	0 [h]	13 [h]	13 [h]
Brain, raw	575 [h]	0 [h]	9.8 [h]	12 [h]
Fat, raw	3446-3507 [n]	0 [h]	90-92 [n]	2.7-3.1 [g, 424, n]
Heart, boiled	608 [n]		3.5 [n]	28 [n]
Heart, raw	422-490 [n]	0.1 [h]	2.1-3.9 [n]	19-20 [n, h]
Liver, raw	519-522 [n]		2.4-3 [n]	20 [n]
Lungs, raw	456 [h]	0 [h]	2.4 [h]	21 [h]
Muscle, boiled	891 [h]	0 [h]	5.1 [h]	39 [h]
Muscle, cooked #	677-686 [n]		3 [n]	32 [n]
Muscle, dried	1169-1394 [n, h]	0 [h]	4.7-8 [n, h]	56-68 [n, h]
Muscle, raw	495-586 [n, h]	0 [h]	2.2-4 [n, h]	22-24 [n, f, h]
Muscle, raw, aged	526 [n]		3.1 [n]	23 [n]
Stomach, raw	400 [h]	3.6 [h]	2.1 [h]	15 [h]
Stomach contents, raw	382 [h]	11.4 [h]	1.7 [h]	7.4 [h]
Tongue, cooked #	1364 [n]		27 [n]	20 [n]
Tongue, raw	958-1354 [n]	1.8 [h]	17-30 [n]	12-15 [n, h]
Birds				
Ptarmigan *Lagopus mutus*				
Muscle, cooked #	555-728 [n]		1.5-4.2 [n]	28-32 [n]
Muscle, raw	503-564 [n, h]	0 [h]	2.7-3.3 [n]	23-25 [n]
Plants				
Crowberry *Empetrum nigrum*				
Berries, raw	205-242 [n]	9.5-10.9 [f, h]	0.7-1.2 [f, h]	0.2-0.5 [f, h]
Mountain sorrel *Oxyria digyna*				
Leaves, raw	213 [h]	7.6 [h]	0.9 [h]	3.8 [h]
Arctic blueberry & bog whortleberry *Vaccinium myrtillus* & *V. uliginosum* Berries, raw	173-290 [n]		0.7-4 [n]	0.7-0.8 [n]
Cranberry & cowberry *Vaccinium oxycoccuc* & *V. vitis-idaea* Berries, raw	285-307 [n]		0.7-1.4 [n]	0.7 [n]
Bog whortleberry *Vaccinium uliginosum*				
Berries, raw		10.6 [f]	0.6 [f]	0.7 [f]
Cowberry *Vaccinium vitis-idaea*				
Berries, raw		14.9 [f]	0.7 [f]	0.7 [f]

Cooked # = baked, boiled, poached (for some fish) or roasted.

Data presented in Table 1, 2, and 3 are obtained from Høygaard and Rasmussen (1939) [a]; Rodahl (1949) [b]; Geraci and Smith (1979) [c]; St.Aubin and Geraci (1980) [d]; Kuhnlein and Kinloch (1988) [e]; Kuhnlein and Turner (1991) [f]; Kinloch et al. (1992) [g]; Kuhnlein and Soueida (1992) [h]; Morrison and Kuhnlein (1993) [i]; Kuhnlein et al. (1994) [j]; Aastrup et al. (2000) [k]; Andersen et al. (2002) [l]; Fediuk et al. (2002) [m]; Kuhnlein et al. (2002) [n]; and Johansen et. al (2004) [o].

Table 2. Vitamin values per 100 g. Letters in brackets refer to the references from which the values were obtained, for explanation see table 1.

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Marine mammals								
Beluga *Delphinapterus leucas*								
Adrenal, raw						97.3 (d)		
Blubber, raw						5-5.3 (c, d)		
Brain, raw						18 (d)		
Dermis, raw						3 (c)		
Heart, raw						6.4 (d)		
Kidney, raw						8.1 (d)		
Liver, raw						16.2 (d)		
Lungs, raw						15.6 (d)		
Mattak, raw						38 (d, c)		
Muscle, dried						1.14 (m)		
Muscle, raw						4.2 (d)		
Pancreas, raw						22 (d)		
Skin, boiled						23.63 (m)		
Skin, raw						36.02 (m)		
Stomach, raw						15 (d)		
Thyroid, raw						20.5 (d)		
Narwhal *Monodon monocerus*								
Blubber, aged	1.000 (h)							
Blubber, boiled	2.200 (h)							
Blubber, raw	1.406-2.432 (g, h, e)							
Flippers (mattak), aged	0.185 (h)							
Mattak, aged	0.244 (h)							
Mattak, boiled	0.140 (h)							
Mattak, raw	0.18-0.220 (g, h)						31.8 (b)	
Muscle, dried	0.004 (g, h)							
Skin, aged						20.68 (m)		
Skin, raw						31.51 (m)		
Harbour porpoise *Phocoena phocoena*								
Adrenal, raw								126.2 (d)
Blubber, raw								2.3 (d)
Dermis, raw								6.5 (d)

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Harbour porpoise *Phocoena phocoena* (cont.)								
Heart, raw								3 [(d)]
Kidney, raw								6.5 [(d)]
Liver, raw								32 [(d)]
Mattak, raw								36.8 [(d)]
Muscle, raw								4 [(d)]
Hooded seal *Cystophora cristata*								
Brain, raw							9.0 [(b)]	
Diaphragm, raw							1.0 [(b)]	
Heart, raw							1.1 [(b)]	
Kidney, raw							9.9 [(b)]	
Muscle, raw							0.5 [(b)]	
Pancreas, raw							28.4 [(b)]	
Spleen, raw							12.9 [(b)]	
Bearded seal *Erignathus barbatus*								
Adrenal, raw						108 [(d)]		
Blubber, raw	0.553 [(h)]						0.0 [(b)]	
Brain substance, raw							10.6 [(b)]	
Heart, raw						3.8 [(d)]	0.9 [(b)]	
Intestine, boiled	0.019 [(h)]					6.12 [(d)]		
Intestine, raw	0.006 [(h)]							
Kidney, raw							3.8 [(b)]	
Liver, boiled						0.9 [(c)]		
Liver, raw						1-30 [(c, d)]	14.3 [(b)]	
Lungs, raw						6 [(d)]	0.5 [(b)]	
Lymph glands, raw						24 [(d)]		
Muscle, boiled	0.002 [(h)]					0.9-0.95 [(c, m)]		
Muscle, raw	0.014 [(h)]					1-3 [(c, d)]	0.5 [(b)]	
Skin, raw						4.6 [(d)]		
Thyroid, raw						19 [(d)]		
Walrus *Odobenus rosmarus*								
Blubber, aged	0.600 [(h)]							
Blubber, boiled	0.199 [(h)]							
Blubber, raw	0.983-1.000 [(g, h)]							
Mattak, aged	0.064 [(h)]							
Mattak, raw	0.057-0.100 [(g, h)]							

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Walrus *Odobenus rosmarus* (cont.)								
Muscle, aged	0.022 [h]					0.85 [m]		
Muscle, boiled	0.006 [h]							
Muscle, raw	0.015 [h, g]					1 [m]		
Skin, raw						0.7 [m]		
Harp seal *Phoca groenlandica* (pup)								
Liver, raw		3.975 [b]						
Harp seal *Phoca groenlandica*								
Adrenal, raw								121.3 [d]
Blubber, raw								2.7 [d]
Brain, raw								24 [d]
Diaphragm, raw							0.4 [b]	5.5 [d]
Epididymis, raw							7.2 [b]	
Heart, raw							0.7 [b]	5.8 [d]
Intestine, raw								35 [d]
Kidney, raw							3.9 [b]	14.2 [d]
Liver, raw		11.76 [b]						32 [d]
Lungs, raw							1.1 [b]	22.1 [d]
Lymph glands, raw								45.5 [d]
Muscle, raw							0.3 [b]	5.8 [d]
Ovary, raw								37 [d]
Pancreas, raw							7.4 [b]	32.5 [d]
Skin, raw								4.8 [d]
Spleen, raw							4.6 [b]	44.5 [d]
Stomach, raw								22.5 [d]
Testis, raw							24.4 [b]	78.8 [d]
Thyroid, raw								30.7 [d]
Tongue, raw								8.3 [d]
Ringed seal *Phoca hispida*								
Adrenal, raw							127 [a]	
Blood, raw						0.04 [m]	3 [a]	
Blubber, aged (liquid)	0 [h]							
Blubber, aged (solid)	0.15 [h]							
Blubber, boiled	0.40 [h]							
Blubber, raw	0.67-0.70 [g, h]						0 [b, a]	
Brain, raw	0.005 [h]					14.86 [m]		

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Ringed seal *Phoca hispida* (cont.)								
CNS, raw							18 [a]	
Epididymis, raw							1.9-17 [b, a]	
Eyes, raw	0.30 [h]					3.17 [m]	10 [a]	
Heart, raw	0.006 [h]						2 [a]	
Kidney, raw							2-13 [b, a]	
Large intestine, raw							1.0 [b]	
Liver, boiled						13.6 [c]		
Liver, raw	15 [h]					23.8-35 [m, c]	11.9-18 [b, a]	
Lymph gland, raw							7 [a]	
Muscle, aged	0.062 [h]							
Muscle, boiled	0.005 [h]					1.19-2.5 [m,c]		
Muscle, raw	0.029 [g, h]					1.55-3 [m, c]	0.7-2 [b,a]	
Ovary, raw							7 [a]	
Pancreas, raw							7 [a]	
Skin, raw							3 [a]	
Small intestine, raw							3-3.3 [a, b]	
Small intestine (content), raw							2.1 [b]	
Testis, raw							9.4 [b]	
Thumus, raw							26 [a]	
Harbour seal *Phoca vitulina*								
Adrenal, raw								54.7 [d]
Blubber, raw								2.8 [d]
Heart, raw								2.8 [d]
Kidney, raw								9.8 [d]
Liver, raw								27 [d]
Lungs, raw								7.3 [d]
Muscle, raw								2.9 [d]
Pancreas, raw								11.8 [d]
Skin, raw								4 [d]
Spleen, raw								17.6 [d]
Polar bear *Ursus maritimus*								
Fat, boiled	0.129 [h]							
Fat, raw	0.200 [h]							
Muscle, boiled	0 [h]					0.8 [c]		
Muscle, raw	0.002 [h]					1 [c]		

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Fish								
Sculpin *Myoxocephalus* sp.								
Muscle, raw						1.05 [m]		
Whole/no skin, raw	0 [h]							
Arctic char *Salvenius alpinus*								
Muscle, boiled	0.090 [h]							
Muscle, dried	0.000 [h]							
Muscle, dried, raw						1.8 [c]		
Muscle, raw	0.000 [g, h]					1.23 [m]		
Muscle/skin, dried	0.000 [h]							
Muscle/skin, raw	0.000 [h]							
Skin, raw	0.000 [g]							
Whole, boiled						0.8 [c]		
Whole, raw						5.8 [c]		
Invertebrates								
Clams								
Muscle, raw						3.69 [m]		
Blue mussel *Mytilus edulis*								
Whole, raw							6 [a]	
Crayfish sp.								
Muscle, raw							3 [a]	
Terrestrial mammals								
Arctic hare *Lepus arcticus*								
Muscle, boiled						0.8 [c]		
Muscle, raw						1.3 [c]		
Snow hare *Lepus variabilis glacialis*								
Kidney, raw							2.9 [b]	
Liver, raw							4.8 [b]	
Muscle, raw							1.3 [b]	
Stomach content, raw							10.6 [b]	
Muskox *Ovibos moschatus*								
Adrenal, raw							39.2 [b]	
Bile, raw							1.0 [b]	
Brain, raw							1.5 [b]	
Diaphragm muscle, raw							0.4 [b]	
Epididymis, raw							4.2 [b]	

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Muskox *Ovibos moschatus* (cont.)								
Eye, whole organ, raw							0.7 [b]	
Heart, raw							12.8 [b]	
Kidney, raw							5.9 [b]	
Liver, frozen (12 days)							8.2 [b]	
Liver, raw							10.4 [b]	
Lungs, raw							8.1 [b]	
Lymph gland, raw							20.7 [b]	
Muscle, boiled							1.4 [b]	
Muscle, dried, boiled						0.5 [c]		
Muscle, frozen (3 months)							0.3 [b]	
Muscle, raw						1-1.5 [c]	0.8 [b]	
Pancreas, raw							3.9 [b]	
Small intestine, raw							7.4 [b]	
Small intestine (content), raw							2,4 [b]	
Spleen, raw							6.0 [b]	
Testis, raw							18.2 [b]	
Thyroid, raw							3.8 [b]	
Tongue, raw							1.0 [b]	
Caribou *Rangifer tarandus*								
Bone marrow, raw	0.055 [h]							
Brain, boiled	0.004 [h]							
Brain, raw	0.000 [h]							
Fat, boiled						0.3 [c]		
Fat, raw	0-0.022 [g, h]					1.8 [c]		
Heart, raw	0.009 [h]					2.6 [m]		
Kidney, boiled						7.24 [m]		
Kidney, raw						8.88 [m]		
Liver, baked	32 [i]							
Liver, raw	30 [i]					23.76 [m]		
Lungs, raw	0.004 [h]							
Muscle, baked	tr-0 [i]							
Muscle, boiled	0.002 [h]					0.9 [c]		
Muscle, dried	0.000 [i, h]							
Muscle, raw	tr-0.007 [i,g,h]					0.86-1.4 [m, c]		
Stomach, raw	0-0.003 [h]							

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Caribou *Rangifer tarandus* (cont.)								
Stomach contents, raw						1.01 [(m)]		
Stomach walls, raw						0.45 [(m)]		
Tongue, raw	0.027 [(h)]							
Birds								
Long-tailed duck *Clangula hyemalis*								
Brain, raw							8.2 [(b)]	
Crop, raw							1.9 [(b)]	
Eye (whole organ), raw							3.1 [(b)]	
Heart, raw							1.7 [(b)]	
Liver, raw							12.3 [(b)]	
Muscle (breast), raw							1.2 [(b)]	
Small intestine, raw							17.4 [(b)]	
Common loon *Gavia immer*								
Brain, raw							29.3 [(b)]	
Eye (whole organ), raw							2.1 [(b)]	
Heart, raw							1.1 [(b)]	
Liver, raw							19.2 [(b)]	
Small intestine, raw							8.0 [(b)]	
Glaucous-gull *Larus hyperboreus*								
Brain, raw							19.4 [(b)]	
Eye (whole organ), raw							2.7 [(b)]	
Heart, raw							0.9 [(b)]	
Liver, raw							16.5 [(b)]	
Muscle (breast), raw							0.5 [(b)]	
Small intestine, raw							8.1 [(b)]	
Ptarmigan *Lagopus mutus*								
Muscle, baked	tr [(i)]							
Muscle, boiled						0.5 [(c)]		
Muscle, raw	0.012 [(h)]					1.2-1.7 [(c, m)]		
Whole, boiled						2.89 [(m)]		
Common eider *Somateria mollissima*								
Brain, raw							9 [(a)]	
Eyes, raw							14 [(a)]	
Fat, raw							0.0 [(b)]	
Heart, cooked							2.4 [(b)]	

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Common eider *Somateria mollissima* (cont.)								
Heart, raw							2.3 [(b)]	
Intestine, raw							4 [(a)]	
Liver, raw							17-30 [(a-b)]	
Liver, cooked							8.7 [(b)]	
Muscle (breast), raw							1.3 [(b)]	
Small intestine, raw							24.8 [(b)]	
Eggs, new-laid							7.0 [(b)]	
Eggs, boiled, white							1.6 [(b)]	
Eggs, boiled, yolk							0.9 [(b)]	
King eider *Somateria spectabilis*								
Muscle, boiled						0.3 [(c)]		
Muscle, raw						1.6 [(c)]		
Arctic Skua *Stercorarius parasiticus*								
Brain, raw							19.1 [(b)]	
Eye (whole organ), raw							2.1 [(b)]	
Heart, raw							1.4 [(b)]	
Liver, raw							12.8 [(b)]	
Muscle (breast), raw							1.0 [(b)]	
Small intestine, raw							11.5 [(b)]	
Guillemot *Uria grylle*								
Brain, raw							16 [(a)]	
Eyes, raw							9 [(a)]	
Intestine, raw							5 [(a)]	
Liver, raw							22 [(a)]	
Plants								
Knotted wrack *Ascophyllum nodosum*								
Leaves, raw							11 [(a)]	
Angelica *Achangelica officinalis*								
Plant, raw							14 [(a)]	
Alaria sp.								
Leaves, raw							45 [(a)]	
Crakeberry *Empetrum hermafrodit*								
Berries, raw							9 [(a)]	
Crowberry *Empetrum nigrum*								
Berries, raw				<0.01 [(f)]	0.1 [(f)]	2.41-51 [(m, f)]		

Common name *Scientific name*	**Vitamin A (mg)**		**Vitamin B1 (mg)**	**Vitamin B2 (mg)**	**Vitamin B3 (mg)**	**Vitamin C (mg)**		
	Canadian Arctic	**Greenland**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Canadian Arctic**	**Greenland**	**SE Canada**
Kelp *Fucus spp.*								
Plant, raw						4.37 [(m)]	13 [(a)]	
Kelp *Laminaria spp.*								
Plant, raw						28.36 [(m)]		
Mountain sorrel *Oxyria digyna*								
Leaves, raw	0.890 [(h)]					40 [(h)]		
Leaves and stem, boiled						5.3 [(c)]		
Leaves and stem, raw						36-41.57 [(c, m)]		
Dulse *Rhodymenia palmata*								
Leaves, raw							17 [(a)]	
Arctic willow *Salix arctica*								
Buds and leaves, raw								
Rosewort *Sedum roseum*								
Leaves and stem, raw							27 [(a)]	
Dandelion *Taraxacum officinale*								
Leaves, raw							15 [(a)]	
Low blueberry *Vaccinium myrtilloides*								
Berries, raw	0.001 [(f)]		0.03 [(f)]	0.05 [(f)]	0.5 [(f)]	14 [(f)]		
Bog whortleberry *Vaccinium uliginosum*								
Berries, raw						26.2 [(m)]		
Cowberry *Vaccinium vitis-idaea*								
Berries, raw			0.02 [(f)]	0.08 [(f)]	0.4 [(f)]	3.88-21.2 [(m, f)]		

tr = peak evident, but not quantifiable.

Table 3. Mineral values per 100 g. Letters in brackets refer to the references from which the values were obtained, for explanation see table 1.

Common name *Scientific name*	Ca (mg)	Cu (mg)		Fe (mg)	K (mg)	Mg (mg)	Mn (mg)	Na (mg)	P (mg)	Se (µg)		Zn (mg)		I (mg)
	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Greenland	Greenland
Marine mammals														
Minke whale *Balaenoptera acutorostrata*														
Blubber,raw											<0.2 (o)			
Kidney, raw											1.21 (o)			
Liver, raw											1.34 (o)			
Mattak, raw											6.28 (o)			
Muscle, raw											<0.2 (o)			
Beluga *Delphinapterus leucas*														
Blubber, boiled	2.4 (n)	0.01 (n)		1 (n)	47 (n)	4.6 (n)	0.01 (n)	24 (n)	20 (n)	20 (n)		0.4 (n)		
Blubber, raw	1.1-2.3 (n, h)	<0.05 (n)		0.1-0.5 (n, h)	4 (n)	1-1.6 (n, h)	0.001-0.01 (n, h)	16-26 (n, h)	6-14 (n, h)	1 (n)	<0.2 (o)	0.1-0.2 (n, h)		
Mattak, boiled	14.5 (n)	0.06 (n)		1.2 (n)	371 (n)	23 (n)	0.01 (n)	90 (n)	145 (n)	650 (n)		8 (n)		
Mattak, raw	5-7.4 (n, h)	0.1 (n, h)		0.4-0.5 (n, h)	325 (n)	16-23 (n, h)	0.003-0.01 (n, h)	100-119 (n, h)	129-202 (n, h)	200 (n)	5.68 (o)	7-7.4 (n, h)		
Muscle, dried	7.3 (h)	0.2 (h)		57 (h)		68 (h)	0.05 (h)	91 (h)	582 (h)			8.9 (h)		
Muscle, raw											0.245 (o)			
Oil, raw	1.3 (n)	0.02 (n)		0.2 (n)	3.8 (n)	1 (n)	0.01 (n)	17 (n)	7.1 (n)	0 (n)		0.2 (n)		
Narwhal *Monodon monocerus*														
Blubber, aged	3.7 (h)	<0.05 (h)		1.4 (h)		3.7 (h)	0.02 (h)	29 (h)	35 (h)			0.7 (h)		
Blubber, boiled	2.3 (h)	<0.05 (h)		0.5 (h)		1.4 (h)	0.01 (h)	20 (h)	15 (h)			0.2 (h)		
Blubber, raw	1.8-3 (g, n, h)	<0.05 (h, n)		0.4-0.8 (n, g, h)	24 (n)	2-3 (h, n)	<0.05 (n, h)	36-50 (n, h)	20-22 (h, n)	10 (n)	<0.2 (o)	0.1-0.4 (g, h, n)		
Flippers (mattak), aged	9.8 (h)	0.1 (h)		0.3 (h)		20 (h)	0.01 (h)	217 (h)	221 (h)			15 (h)		
Kidney, raw											2.54 (o)			
Liver, raw											3.96 (o)			
Mattak, aged	6.9 (h)	0.1 (h)		0.7 (h)		16 (h)	0.01 (h)	130 (h)	182 (h)			6.4 (h)		
Mattak, boiled	4.5 (h)	<0.05 (h)		0.3 (h)		13 (h)	0.01 (h)	76 (h)	164 (h)			7 (h)		
Mattak, raw	4.5-6 (g, h, n)	0.04-0.2 (n, h)		0.3-0.3 (n, g, h)	369 (n)	14-16 (n, h)	0.002-0.01 (h, n)	100-102 (h, n)	155-170 (n, h)	400 (n)	5.26 (o)	7.5-8 (h, g, n)		
Muscle, dried	11-11.3 (g, h)	0.2 (h)		70-71.7 (h, g)		72 (h)	0.27 (h)	160 (h)	700 (h)			7-7.1 (h, g)		
Muscle, raw											0.343 (o)			
Hooded seal *Cystophora cristata*														
Kidney, raw											2.27 (o)			
Liver, raw											21.2 (o)			
Muscle, raw											0.355 (o)			
Bearded seal *Erignathus barbatus*														
Blubber, raw	4 (h)	0.1 (h)		3.6 (h)		4.1 (h)	0.02 (h)	69 (h)	34 (h)			0.5 (h)		
Intestine, boiled	23-58 (h, n)	0.2 (n, h)		1.6-4 (h, n)	278 (n)	25-28 (h, n)	0.05-0.06 (h, n)	107-139 (n, h)	171-254 (n, h)	50 (n)		3.1-3.8 (n, h)		
Intestine, raw	18 (h)	0.2 (h)		1.3 (h)		23 (h)	0.03 (h)	178 (h)	245 (h)			2.7 (h)		
Muscle, boiled	4-5 (n, h)	0.1 (h, n)		22-25 (n, h)	282 (n)	24-30 (h, n)	0.01 (h, n)	37-50 (n, h)	171-200 (n, h)	20 (n)		3-4 (n, h)		
Muscle, raw	8 (h)	0.1 (h)		20 (h)		24 (h)	0.01 (h)	70 (h)	200 (h)			3 (h)		
Walrus *Odobenus rosmarus*														
Blubber, aged	5 (h)	0.6 (h)		3 (h)		4 (h)	0.02 (h)	90 (h)	50 (h)			0.6 (h)		
Blubber, boiled	3.2 (h)	<0.05 (h)		0.7 (h)		2.4 (h)	<0.05 (h)	50 (h)	26 (h)			0.4 (h)		
Blubber, raw	2.6-2.8 (g, h)	<0.05 (h)		0.8 (g, h)		1.8 (h)	0.01 (h)	60 (h)	16 (h)			0.3 (g, h)		
Flippers (blubber), aged	18 (h)	0.03 (h)		1.3 (h)		7.5 (h)	0.01 (h)	225 (h)	35 (h)			0.3 (h)		
Flippers (mattak), aged	21 (h)	0.7 (h)		4.4 (h)		7.4 (h)	0.03 (h)	281 (h)	46 (h)			0.7 (h)		
Mattak, aged	9 (h)	0.3 (h)		1.3 (h)		5 (h)	0.02 (h)	170 (h)	56 (h)			0.5 (h)		
Mattak, raw	8.1-8.3 (h, g)	0.2 (h)		1.3-1.5 (h, g)		4 (h)	0.02 (h)	200 (h)	28 (h)			0.4-0.5 (h, g)		
Muscle, aged	5.3-6.3 (n, h)	0.1 (n, h)		19-20 (n, h)	232 (n)	23-26 (h, n)	0.01-0.03 (h, n)	67-116 (n, h)	150-240 (n, h)	100 (n)		5.1-6 (n, h)		
Muscle, boiled	4 (h)	0.1 (h)		26 (h)		20 (h)	0.02 (h)	51 (h)	190 (h)			7.6 (h)		
Muscle, raw	4-6 (h, n)	0.1 (n, h)		17-19 (n, g, h)	205 (n)	20 (n)	0.01-0.02 (n, h)	63-80 (n, h)	146-185 (n, h)	90 (n)		4.2-4.7 (h, n)		

Common name *Scientific name*	Ca (mg)	Cu (mg)		Fe (mg)	K (mg)	Mg (mg)	Mn (mg)	Na (mg)	P (mg)	Se (µg)		Zn (mg)		I (mg)
	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Greenland	Greenland
Harp seal *Phoca groenlandica*														
Blubber, raw											<0.2 [o]			
Kidney, raw											1.33 [o]			
Liver, raw											3.13 [o]			
Muscle, raw											0.339 [o]			
Ringed seal *Phoca hispida* (pup)														
Muscle, boiled	18 [h]	0.2 [h]		18 [h]		15 [h]	0.03 [h]	92 [h]	154 [h]			6.2 [h]		
Muscle, raw	15 [h]	0.2 [h]		11 [h]		14 [h]	0.02 [h]	139 [h]	128 [h]			3.4 [h]		
Ringed seal *Phoca hispida*														
Blubber, aged (liquid)	<0.8 [h]	<0.05 [h]		0.4 [h]		<0.8 [h]	<0.008 [h]	<0.8 [h]	<0.8 [h]			<0.02 [h]		
Blubber, aged (solid)	0.9 [h]	<0.05 [h]		0.6 [h]		1 [h]	<0.8 [h]	8.7 [h]	12 [h]			0.2 [h]		
Blubber, boiled	0.9 [h]	<0.05 [h]		0.6 [h]		1.9 [h]	<0.008 [h]	15 [h]	20 [h]			0.2 [h]		
Blubber, raw	1.3-1.4 [h, g]	<0.05 [h]		0.9-2 [g, h]		1 [h]	0.01 [h]	20 [h]	16 [h]		<0.2 [o]	0.2-0.3 [g, h]		
Brain, raw	8 [h]	0.7 [h]		10 [h]		15 [h]	0.03 [h]	190 [h]	350 [h]			1.4 [h]		
Eyes, raw	20 [h]	1 [h]		6 [h]		4 [h]	0.01 [h]	230 [h]	33 [h]			30 [h]		
Flippers (blubber), aged	20 [h]	0.2 [h]		13 [h]		6.3 [h]	0.16 [h]	167 [h]	53 [h]			1.7 [h]		
Flippers (mattak), aged	23 [h]	0.2 [h]		3.2 [h]		7.7 [h]	0.1 [h]	161 [h]	56 [h]			0.9 [h]		
Heart, raw	8 [h]	0.4 [h]		12 [h]		19 [h]	0.04 [h]	149 [h]	195 [h]			2.7 [h]		
Kidney, raw											2.68 [o]			
Liver, raw	4.1-10 [n, h]	1.1-1.4 [n, h]		48-50 [n, h]	281 [n]	23-24 [n, h]	0.31-0.41 [h, n]	85-110 [n, h]	270-320 [n, h]	100 [n]	2.12 [o]	3.7-4 [n, h]		
Muscle, aged	11 [h]	0.2 [h]		18 [h]		25 [h]	0.04 [h]	93 [h]	235 [h]			2.6 [h]		
Muscle, boiled	2.5-14 [n, h]	0.1-0.2 [n, h]		27-28 [h, n]	303 [n]	31-32 [h, n]	0.01-0.02 [n, h]	35-140 [n, h]	187-293 [n, h]	30 [n]		3.1-4 [n, h]		
Muscle, raw	10-23 [h, g, n]	0.2 [n, h]		19-20.8 [n, h]	288 [n]	23-24 [n, h]	0.01-0.02 [n, h]	32-110 [n, h]	161-225 [n, h]	20 [n]	0.253 [o]	2-3 [n, g, h]		
Polar bear *Ursus maritimus*														
Fat, boiled	4 [h]	0.2 [h]		1.2 [h]		3 [h]	0.01 [h]	40 [h]	30 [h]			0.5 [h]		
Fat, raw	4.8 [h]	0.09 [h]		1.2 [h]		3 [h]	0.01 [h]	40 [h]	30 [h]			0.3 [h]		
Muscle, boiled	5.2-7.1 [h, n]	0.3 [n, h]		6.6-7 [h, n]	552 [n]	33-35 [h, n]	0.02-0.03 [n, h]	40-59 [h, n]	246-250 [n, h]	70 [n]		13 [n, h]		
Muscle, raw	3.4 [h]	0.2 [h]		4 [h]		30 [h]	0.03 [h]	60 [h]	250 [h]			3.8 [h]		
Fish														
Atlantic wolf-fish *Anarhichas lupus*														
Liver, raw											3.33 [o]			
Muscle, raw											0.303 [o]			
Spotted wolf-fish *Anarhichas minor*														
Liver, raw											2.38 [o]			
Muscle, raw											0.336 [o]			
Atlantic cod *Gadus morhua*														
Liver, raw											0.799 [o]			3.2 [l]
Muscle, raw											0.293 [o]			7.44 [l]
Greenland cod *Gadus ogac*														
Liver, raw											1.47 [o]			
Muscle, raw											<0.2 [o]			
Cod (var. spp.: *Boreogadus, Eleginus, Gadus, Microgadus*)														
Muscle, raw	43 [n]	0.05 [n]		0.25 [n]	404 [n]	26 [n]	0.01 [n]	89 [n]	166 [n]	1 [n]		0.37 [n]		
Capelin *Mallotus villosus*														
Muscle, dried														0.92 [l]
Muscle, raw											<0.2 [o]			0.78 [l]
Whole, raw											<0.2 [o]			
Sculpin *Myoxocephalus* sp.														
Whole/no skin, raw	429 [h]	<0.05 [h]		0.5 [h]		26 [h]	0.05 [h]	83 [h]	415 [h]			0.9 [h]		

Common name *Scientific name*	Ca (mg)	Cu (mg)		Fe (mg)	K (mg)	Mg (mg)	Mn (mg)	Na (mg)	P (mg)	Se (µg)		Zn (mg)		I (mg)
	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Greenland	Greenland
Greenland halibut *Reinhartius hippoglossoides*														
Liver, raw											1.49 [o]			
Muscle, raw											0.287 [o]			
Salmon species (*Salmo and Salvenius* sp.)														
Muscle, cooked #	12-29 [n]	0.04-0.05 [n]		0.6-0.7 [n]	410 [n]	21-26 [n]	0.01-0.06 [n]	50 [n]	220 [n]	60 [n]		0.6 [n]		
Muscle, raw	7-38 [n]	0.03-0.05 [n]		0.4-0.5 [n]	273-440 [n]	26-27 [n]	0.01 [n]	45-50 [n]	231-240 [n]	30 [n]		0.4 [n]		
Muscle, smoked	15 [n]	0.04 [n]		0.47 [n]			0.02 [n]			60 [n]		0.51 [n]		
Atlantic salmon *Salmo salar*														
Liver, raw											7.93 [o]			
Muscle, raw											0.265 [o]			
Salmon species (*Mallotus, Onchorhyncus and Salmo* sp.)														
Eggs, raw	40 [n]	0.5 [n]		1.6 [n]		53 [n]	0.03 [n]			80 [n]		2 [n]		
Muscle, cooked #	32 [n]	0.07 [n]		0.7 [n]		23 [n]	0.05 [n]			30 [n]		0.6 [n]		
Muscle, raw	6 [n]	0.1 [n]		0.9 [n]		74 [n]	0.02 [n]			30 [n]		0.5 [n]		
Muscle, smoked	25 [n]	0.2 [n]		2 [n]		143 [n]	0.07 [n]			50 [n]		1 [n]		
Arctic char *Salvenius alpinus*														
Liver, raw											1.48 [o]			
Muscle, boiled	30 [h]	0.1 [h]		0.5 [h]		30 [h]	0.01 [h]	50 [h]	250 [h]			0.6 [h]		
Muscle, dried	9.8 [h]	0.1 [h]		0.8 [h]		29 [h]	0.01 [h]	100 [h]	280 [h]			0.6 [h]		
Muscle, raw	7-11 [h, n]	0.07-0.1 [n, h]		0.3-0.7 [n, h]	309 [n]	29-30 [h, n]	0.01 [n, h]	56-66 [n, h]	220-313 [n, h]	10 [n]		0.4-0.6 [n, h]		
Muscle/skin, dried	14 [h]	0.1 [h]		0.6 [h]		23 [h]	0.01 [h]	50 [h]	250 [h]			0.6 [h]		
Muscle/skin, raw	44 [h]	0.2 [h]		2.6 [h]		88 [h]	0.04 [h]	128 [h]	857 [h]			2.1 [h]		
Skin, raw	268.2 [h, g]	1.1 [h]		4.8 [g, h]		26 [h]	0.16 [h]	97 [h]	403 [h]			2.5 [h, g]		
Redfish *Sebastes sp.*														
Liver, raw											2.45 [o]			
Muscle, raw											0.242 [o]			
Invertebrates														
Queen crab *Chionoecetes opilio*														
ìLiverî, raw											3.27 [o]			
Muscle, raw											0.599 [o]			
Iceland scallop *Chlamys islandica*														
Muscle, raw											<0.2 [o]			
Clams *Mya* spp.														
Muscle, boiled	198 [h]	0.7 [h]		3.4 [h]		122 [h]	0.3 [h]	475 [h]	339 [h]			5.9 [h]		
Muscle, raw	172 [h]	0.4 [h]		2.5 [h]		107 [h]	0.25 [h]	858 [h]	202 [h]			3.9 [h]		
Blue mussel *Mytilus edulis*														
Muscle, boiled	68 [h]	0.2 [h]		35 [h]		48 [h]	0.35 [h]	81 [h]	142 [h]			2.1 [h]		
Muscle, raw	85 [h]	0.1 [h]		15 [h]		58 [h]	0.16 [h]	325 [h]	84 [h]		0.464 [o]	1 [h]		
Deep sea shrimp *Pandalus borealis*														
Muscle, raw											<0.2 [o]			
Terrestrial mammals														
Arctic hare *Lepus arcticus*														
Kidney, raw											0.841 [o]			
Liver, raw											<0.2 [o]			
Muscle, raw											<0.2 [o]			

Common name *Scientific name*	Ca (mg)	Cu (mg)		Fe (mg)	K (mg)	Mg (mg)	Mn (mg)	Na (mg)	P (mg)	Se (µg)		Zn (mg)		I (mg)
	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Greenland	Greenland
Muskox *Ovibos moschatus*														
Fat, raw											<0.2 [o]			
Kidney, raw											0.757 [o]			
Liver, raw											<0.2 [o]			
Muscle, raw	3.2 [n]	0.13 [n]		4.5 [n]	420 [n]	25 [n]	0.01 [n]	51 [n]	159 [n]	1 [n]	<0.2 [o]	2.4 [n]		0.1 [l]
Caribou *Rangifer tarandus*														
Bone marrow, cooked #	6.1 [n]	0.5 [n]		6.9 [n]	36 [n]	4.1 [n]	0.006 [n]	26 [n]	34 [n]			0.98 [n]		
Bone marrow, raw	3.6 [h]	<0.05 [h]		2.7 [h]		1.8 [h]	<0.008 [h]	31 [h]	17 [h]			0.1 [h]		
Brain, boiled	13 [h]	0.2 [h]		3.8 [h]		16 [h]	0.06 [h]	141 [h]	406 [h]			1.4 [h]		
Brain, raw	71 [h]	0.2 [h]		4.7 [h]		14 [h]	0.04 [h]	151 [h]	376 [h]			1 [h]		
Fat, raw	2.8-4 [g, h]	<0.05 [h]		1.4-3 [g, h]		7 [h]	0.02 [h]	40 [h]	50 [h]		<0.2 [o]	0.2-0.4 [g, h]		
Heart, boiled	5.3 [n]	0.61 [n]		8.8 [n]	506 [n]	34 [n]	0.06 [n]	68 [n]	251 [n]	20 [n]		2.3 [n]		
Heart, raw	3.4-8 [n, h]	0.2-0.5 [n, h]		9-23 [n, h]	393 [n]	12-29 [h, n]	0.006-0.04 [h, n]	64-149 [n, h]	171-195 [h, n]	1 [n]		1.5-2.7 [n, h]		
Kidney, raw											0.714 [o]			
Liver, baked	4.5 [j]	3 [j]		20 [j]	350 [j]	20 [j]	0.35 [j]	84 [j]	370 [j]			6 [j]		
Liver, raw	3.8-4 [j, n]	3-4 [j, n]	2.18-7.1 [k]	20-46 [j, n]	300-312 [j, n]	18-20 [j, n]	0.3 [n, j]	76-80 [j, n]	288-320 [n, j]	10 [n]	<0.2-98 [o, k]	2.4-5 [n, j]	2.32-3.17 [k]	
Lungs, raw	12 [h]	0.4 [h]		8 [h]		16 [h]	0.06 [h]	184 [h]	228 [h]			1.2 [h]		
Muscle, baked	5-7 [j]	0.3 [j]		4-5 [j]	390-442 [j]	30-31 [j]	0.03 [j]	53-66 [j]	230-250 [j]			4-6 [j]		
Muscle, boiled	7 [h]	0.7 [h]		7 [h]		32 [h]	0.07 [h]	50 [h]	310 [h]			5 [h]		
Muscle, cooked #	6.3-7 [n]	0.3-0.43 [n]		6 [n]	299-416 [n]	29 [n]	0.03-0.13 [n]	38-56 [n]	185-263 [n]	10 [n]		5-6 [n]		
Muscle, dried	9-22 [j, h, n]	0.7-1 [n, j, h]		11-13 [n, j, h]	1000-1167[n, j]	70-79 [j, h, n]	0.07-0.16 [n, j, h]	84-125 [n, j, h]	539-621 [n, j. h]	1 [n]		7-12 [j, n, h]		
Muscle, raw	3.9-9 [j, n, g, h]	0.2-0.3 [j, n, h]	0.21-0.36 [k]	4-5.3 [j, n, h, g]	294-370 [n, j]	25-32 [j, n, h]	0.03-0.06 [n, j, h]	4.5-90 [n, j, h]	200-260 [j, n, h]	10 [n]	<0.2-25 [o, k]	3.6-5.2 [j, n, g]	1.75-3.96 [k]	0.04 [l]
Muscle, raw, aged		0.21 [n]		3.1 [n]	385 [n]	30 [n]	0.02 [n]	41 [n]	168 [n]	0 [n]		3.6 [n]		
Stomach, raw	240 [h]	0.2 [h]		24 [h]		39 [h]	10 [h]	129 [h]	325 [h]			3.5 [h]		
Stomach contents, raw	98 [h]	0.1 [h]		31 [h]		21 [h]	2.8 [h]	268 [h]	200 [h]			2.4 [h]		
Tongue, cooked #	10 [n]	0.6 [n]		3.3 [n]	25 [n]	17 [n]	0.03 [n]	56 [n]	111 [n]	20 [n]		3.1 [n]		
Tongue, raw	5-8.8 [n, h]	0.2 [n, h]		2-2.7 [n, h]	213 [n]	14-17 [n, h]	0.02-0.06 [n, h]	67-123 [n, h]	99-171 [n, h]	1 [n]		1.4-1.9 [n, h]		
Birds														
Ptarmigan *Lagopus mutus*														
Liver, raw											<0.2 [o]			
Muscle, baked	9 [j]	0.41 [j]		10 [j]	410 [j]	33 [j]	0.12 [j]	60 [j]	285 [j]			1.1 [j]		
Muscle, cooked #	45 [n]	0.48 [n]		7.3 [n]	249 [n]	38 [n]	0.03 [n]	38 [n]	222 [n]	20 [n]		1.84 [n]		
Muscle, raw	3.2-30 [h, n]	0.4-0.7 [n, h]		8-10 [h, n]	432 [n]	37-38 [n, h]	0.06-0.07 [n, h]	41-42 [h, n]	237-351 [n, h]	1 [n]	<0.2 [o]	0.9-1.2 [h, n]		
Kittiwake *Rissa tridactyla*														
Liver, raw											8.29 [o]			
Muscle, raw											2.40 [o]			
Common eider *Somateria mollissima*														
Liver, raw											7.70 [o]			
Muscle, raw											1.06 [o]			
King eider *Somateria spectabilis*														
Liver, raw											7.71 [o]			
Muscle, raw											0.839 [o]			
Thick-billed murre *Uria lomvia*														
Liver, raw											1.07 [o]			
Muscle, raw											0.538 [o]			
Plants														
Crowberry *Empetrum nigrum*														
Berries, raw	5-9 [h, n, f]	0.04-1.0 [j, n, h, f]		0.2-0.4 [n, h, j, f]	70-99 [n, f]	3-7.9 [j, n, h, f]	0.08-1.4 [j, n, f]	0.1-3 [j, n, f, h]	5-11 [j, n, h, f]	1 [n]	<0.2 [o]	0.1 [n, f, h]		

Common name *Scientific name*	Ca (mg)	Cu (mg)		Fe (mg)	K (mg)	Mg (mg)	Mn (mg)	Na (mg)	P (mg)	Se (µg)		Zn (mg)		I (mg)
	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Canadian Arctic	Greenland	Canadian Arctic	Greenland	Greenland
Mountain sorrel *Oxyria digyna*														
Leaves, raw	116 [h]	0.1 [h]		3.2 [h]		75 [h]	<0.1-1.74 [h]	18 [h]	87 [h]			0.6 [h]		
Arctic willow *Salix arctica*														
Buds and leaves, raw	188 [h]	12 [h]		2.9 [h]		89 [h]	2.9 [h]	2.6 [h]	72 [h]			4.1 [h]		
Low blueberry														
Vaccinium myrtilloides														
Berries, raw	13 [j]	0.08 [j]		0.2 [j]	90 [j]	9.5 [j]	0.32 [j]	0.3 [j]	14 [j]			0.3 [j]		
Arctic blueberry														
Vaccinium myrtillus														
Berries, raw		0.1 [f]		0.5 [f]			<0.1-3.9 [f]				<0.2 [o]	0.3 [f]		
Arctic blueberry & bog whortleberry														
Vaccinium myrtillus & *V. uliginosum*														
Berries, raw	15 [n]	0.06 [n]		0.3 [n]	104 [n]	8 [n]	1.4 [n]	2 [n]	13 [n]	1 [n]		0.2 [n]		
Cranberry & cowberry														
Vaccinium oxycoccuc & *V. vitis-idaea*														
Berries, raw	18 [n]	0.06 [n]		0.3 [n]	93 [n]	8-9 [n]	3 [n]	4 [n]	8 [n]	<4 [n]		0.2 [n]		
Bog whortleberry														
Vaccinium uliginosum														
Berries, raw	19 [f]	0.2 [f]		0.2 [f]		8 [f]	2.7 [f]		13 [f]			0.3 [f]		
Cowberry *Vaccinium vitis-idaea*														
Berries, raw	13-14 [f, j]	0.05-0.1 [j, f]		0.2-0.3 [f, j]	98-100 [f, j]	6.6-8 [f, j]	<0.1-2.9 [f, j]	<0.1 [j, f]	10-11 [j, f]			0.2-6.1 [j, f]		
Leaves, raw	50 [f]				58 [f]	12.5 [f]			16 [f]					

Cooked # = baked, boiled, poached (for some fish) or roasted.

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Appendix 1

Recommended daily intake of certain vitamins. The values refer to the amount consumed, hence changes during preparation, cooking etc. must be accounted for (Nordic Council of Ministers 2004).

Age (Years)	Vitamin A (RE)[b]	Vitamin D (µg)	Vitamin E (α -TE)[c]	Vitamin B1 (thiamine) (mg)	Vitamin B2 (riboflavin) (mg)	Vitamin B3 (niacin) (NE)[d]	Vitamin B6 (mg)	Vitamin B9 (folacin) (µg)	Vitamin B12 (cyanocobalamin) (µg)	Vitamin C (ascorbic acid) (mg)
Children										
<6 mo[a]	-	-		-	-	-	-	-	-	-
6-11 mo	300	10	3	0.4	0.5	5	0.4	50	0.5	20
12-23 mo	300	10	4	0.5	0.6	7	0.5	60	0.6	25
2-5 years	350	7.5	5	0.6	0.7	9	0.7	80	0.8	30
6-9 years	400	7.5	6	0.9	1.1	12	1.0	130	1.3	40
Males										
10-13 years	600	7.5	8	1.2	1.4	16	1.3	200	2.0	50
14-17 years	900	7.5	10	1.5	1.7	20	1.6	300	2.0	75
18-30 years	900	7.5	10	1.5	1.7	20	1.6	300	2.0	75
31-60 years	900	7.5	10	1.4	1.7	19	1.6	300	2.0	75
61-74 years	900	10	10	1.3	1.5	17	1.6	300	2.0	75
≥75 years	900	10	10	1.2	1.3	15	1.6	300	2.0	75
Females										
10-13 years	600	7.5	7	1.0	1.2	14	1.1	200	2.0	50
14-17 years	700	7.5	8	1.2	1.3	15	1.3	300	2.0	75
18-30 years	700	7.5	8	1.1	1.3	15	1.3	400[e]	2.0	75
31-60 years	700	7.5	8	1.1	1.3	15	1.2	300	2.0	75
61-74 years	700	10	8	1.0	1.2	14	1.2	300	2.0	75
≥75 years	700	10	8	1.0	1.2	13	1.2	300	2.0	75
Pregnant	800	10	10	1.5	1.6	17	1.5	500	2.0	85
Lactating	1100	10	11	1.6	1.7	20	1.6	500	2.6	100

[a] Exclusive breast feeding is the preferable source of nutrition for infants during the first six months of life. Therefore, recommendations for single nutrients are not given for infants <6 months.
[b] Retinol equivalents; 1 retinol equivalent (RE) = 1 µg retinol = 6 µg β-carotene.
[c] α –tocopherol equivalents; 1 α (NE) = 1 mg niacin = 60 mg tryptophan.
[e] Women of reproductive age are recommended an intake of 400 µg /d.

Recommended daily intake of certain minerals. The values refer to the amount consumed, hence changes during preparation, cooking etc. must be accounted for (Nordic Council of Ministers 2004).

Age (Years)	Calcium (mg)	Phosphorous (mg)	Potassium (g)	Magnesium (mg)	Iron (mg)	Zinc (mg)	Copper (mg)	Iodine (µg)	Selenium (µg)
Children									
<6 mo[a]	-	-	-	-	-	-	-	-	-
6-11 mo	540	420	1.1	80	8	5	0.3	50	15
12-23 mo	600	470	1.4	85	8	5	0.3	70	20
2-5 years	600	470	1.8	120	8	6	0.4	90	25
6-9 years	700	540	2.0	200	9	7	0.5	120	30
Males									
10-13 years	900	700	3.3	280	11	11	0.7	150	40
14-17 years	900	700	3.5	350	11	12	0.9	150	50
18-30 years	800[d]	600[e]	3.5	350	9	9	0.9	150	50
31-60 years	800	600	3.5	350	9	9	0.9	150	50
61-74 years	800	600	3.5	350	9	9	0.9	150	50
≥75 years	800	600	3.5	350	9	9	0.9	150	50
Females									
10-13 years	900	700	2.9	280	11	8	0.7	150	35
14-17 years	900	700	3.1	280	15[f]	9	0.9	150	40
18-30 years	800[d]	600[e]	3.1	280	15[f]	7	0.9	150	40
31-60 years	800	600	3.1	280	15 (9)[g]	7	0.9	150	40
61-74 years	800	600	3.1	280	9	7	0.9	150	40
≥75 years	800	600	3.1	280	9	7	0.9	150	40
Pregnant	900	700	3.1	280	--[h]	9	1.0	175	55
Lactating	900	900	3.1	280	15	11	1.3	200	55

[a] Exclusive breast feeding is the preferable source of nutrition for infants during the first six months of life. Therefore, recommendations for single nutrients are not given for infants <6 months.
[d] 18-20 years old are recommended 900 mg calcium per day.
[e] 18-20 years old are recommended 700 mg phosphorous per day.
[f] Menstrual flow and its associated iron losses may vary considerably among women, and some women therefore require a larger iron supply than others.
[g] Recommended intake for post-menopausal women is 9 mg per day.
[h] Iron balance during pregnancy requires iron stores of approximately 500 mg at the start of pregnancy. The physiological need of some women for iron cannot be satisfied during the last two thirds of pregnancy with food only, and supplemental iron is therefore needed.

Appendix 2

List of species mentioned in the text in English, Latin, Danish and Greenlandic.

English	Latin	Danish	Greenlandic
Mammals	**Mammalia**	**Pattedyr**	**Uumasut miluumasut**
Minke whale	*Balaenoptera acutorostrata*	Vågehval	Tikaagullik
Beluga	*Delphinapterus leucas*	Hvidhval	Qilalugaq qaqortaq
Narwhal	*Monodon monocerus*	Narhval	Qilalugaq qernertaq
Harbour porpoise	*Phocoena phocoena*	Marsvin	Niisa
Hooded seal	*Cystophora cristata*	Klapmyds	Natsersuaq
Bearded seal	*Erignathus barbatus*	Remmesæl	Ussuk
Walrus	*Odobenus rosmarus*	Hvalros	Aaveq
Harp seal	*Phoca groenlandica*	Grønlandssæl	Aataaq
Ringed seal	*Phoca hispida*	Ringsæl	Natseq
Harbour seal	*Phoca vitulina*	Spættet sæl	Qasigiaq
Polar bear	*Ursus maritimus*	Isbjørn	Nanoq
Arctic hare	*Lepus arcticus*	Arktisk snehare	Ukaleq
Muskox	*Ovibos moschatus*	Moskusokse	Umimmak
Caribou	*Rangifer tarandus*	Ren	Tuttu
Fish	**Pisces**	**Fisk**	**Aalisakkat**
Atlantic wolf-fish	*Anarhichas lupus*	Stribet havkat	Qeeraaraq
Spotted wolf-fish	*Anarhichas minor*	Plettet havkat	Qeeraq milattooq
Atlantic cod	*Gadus morhua*	Torsk	Saarullik
Greenland cod	*Gadus ogac*	Uvak	Uugaq
Capelin	*Mallotus villosus*	Lodde	Ammassak
Sculpin	*Myoxocephalus sp.*	Ulk	Kanajok
Greenland halibut	*Reinhartius hippoglossoides*	Hellefisk	Qaleralik
Trout	(*Salmo* and *Salvenius* sp.)	Laksefisk	Kapisilik and Eqaluk
Arctic char	*Salvenius alpinus*	Fjeldørred	Eqaluk
Redfish	*Sebastes sp.*	Rødfisk	Suluppaagaq
Invertebrates	**Invertebrata**	**Invertebrater**	
Queen crab	*Chionoecetes opilio*	Stor grønlandsk krabbe	Assagiarsuk
Iceland scallop	*Chlamys islandica*	Kammusling	Uiluik
Clams	-	Muslinger	Uiloq
Blue mussel	*Mytilus edulis*	Blåmusling	Uiloq
Deep sea shrimp	*Pandalus borealis*	Dybvandsreje	Kinguppak
Crayfish sp.	-	Krebs	Peqquk
Birds	**Aves**	**Fugle**	**Timmisat**
Long-tailed duck	*Clangula hyemalis*	Havlit	Alleq
Common loon	*Gavia immer*	Islom	Tuullik
Ptarmigan	*Lagopus mutus*	Fjeldrype	Aqisseq
Glaucous gull	*Larus hyperboreus*	Gråmåge	Naajarujussuaq
Kittiwake	*Rissa tridactyla*	Ride	Taateraq
Common eider	*Somateria mollissima*	Ederfugl	Miteq siorartooq
King eider	*Somateria spectabilis*	Kongeederfugl	Miteq siorakitsoq
Arctic skua	*Stercorarius parasiticus*	Almindelig kjove	Isunngaq
Guillemot	*Uria grylle*	Tejst	Serfaq
Thick-billed murre	*Uria lomvia*	Polarlomvie	Appa

English	Latin	Danish	Greenlandic
Plants	**Flora**	**Planter**	**Naasut**
-	*Alaria sp.*	Brunalge (vingetang)	Sulluitsoq
Knotted wrack	*Ascophyllum nodosum*	Buletang	Sapangassat
Dulse	*Rhodymenia palmata*	Søl (rød-alge)	Aupilatukut
Kelp	*Laminaria spp.*	Bl.a. Sukkertang	Qerquaq
Kelp	*Fucus spp.*	Blæretang eller klørtang	Equtit
Angelica	*Achangelica officinalis*	Kvan	Kuanneq
Crakeberry	*Empetrum hermafrodit*		Paarnaqutit
Crowberry	*Empetrum nigrum*	Revling	Paarnaq
Mountain sorrel	*Oxyria digyna*	Fjeldsyre	Seernaq
Arctic blueberry	*Vaccinium myrtillus*	Blåbær	Blåbær
Low blueberry	*Vaccinium myrtilloides*		-
Cranberry	*Vaccinium oxycoccuc*	Tranebær	Tranebæri
Bog whortleberry	*Vaccinium uliginosum*	Mosebølle	Kigutaarnat
Cowberry	*Vaccinium vitis-idaea*	Tyttebær	Kimmernat
Rosewort	*Sedum roseum*	Rosenrod	Sorlak
Dandelion	*Taraxacum officinale*	Mælkebøtte	Inneruulaq
Arctic willow	*Salix artica*	Arktisk pil	-

National Environmental Research Institute

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In Danish, NERI is called Danmarks Miljøundersøgelser (DMU).
NERI's tasks are primarily to conduct research, collect data, and give advice on problems related to the environment and nature.

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Publications:
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Nr. 520: Atmosfærisk deposition. Driftsrapport for luftforurening i 2003. Af Ellermann, T. et al. (elektronisk)

The relative importance of traditional Greenlandic food items has diminished during the last decades. Today these account for 25 % of the Greenland diet with a dominance of fish, seabirds, and marine mammals. This report synthesises the available information on concentrations of vitamins and minerals in the various food items that form the traditional Greenlandic diet. However, through this diet people in Greenland are also exposed to a high intake of heavy metals and organochlorines, due to a contamination of many of these food items. In combination with information on the concentration of contaminants, the information about vitamins and minerals will potentially make it possible to adjust the diet in Greenland, taking both nutrients and contaminants into account.

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