

## Chapter 26

# Omega–3 Fatty Acids as an Essential Nutritional Element in the High North

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### **ABSTRACT**

*This chapter considers specific nutritional factors of indigenous peoples in Russia's Arctic zone. The authors have identified the prerequisites for the optimization of the diets of indigenous peoples in the light of existing environmental and medical-biological problems. A low level of self-sufficiency of local population with basic food products (meat, dairy, and egg products) was identified. The chapter provides a detailed analysis of the chemical composition of chia seeds as a promising ingredient of the northern diet, in particular the biological value of a product based on protein, lipid, carbohydrate, mineral, and vitamin components. The authors proposed considering chia seeds as a part of the composition of various food products for functional purposes. Potentially, the inclusion of scientifically based food recipes in the diets let providing the indigenous people with balanced food products.*

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## INTRODUCTION

At present, the development of the Arctic territories is an important strategic task in the implementation of defensive and economic projects of Russia (Aftanas, Voevoda, & Puzirev, 2014; Chereshev, 2011). Arctic zone of the Russian Federation includes Murmanskaya Oblast, Nenetsky, Chukotsky, and Yamalo-Nenetsky autonomous districts, municipal formation of the urban district of Vorkuta (Komi Republic), Norilsk city district, Taimyr and Turukhansk districts of Krasnoyarsky Krai, a number of territories in Arkhangelskaya Oblast, some of the northern ulus of the Republic of Sakha (Yakutia), and the lands and islands in the Arctic Ocean. The boundaries of the maritime possessions of Russia in the Arctic Ocean are determined by international legal regulations. The total area of the Arctic zone of Russia is about 6 million km<sup>2</sup>, including 2.2 million km<sup>2</sup> of land, where more than 2.5 million people live. Life and work in the Arctic are complicated due to the extreme terms of living, which are characterized by severe natural and climatic conditions, unusual photoperiodism, increased electromagnetic activity and radiation, etc. (Agadzhanian, Zhvavii, & Ananiev, 1998; Gudkov, 1996; Tedder, Gudkov, Degteva, & Simonova, 1996; Fateeva & Kolpakov, 2011).

Human factor plays a key role in the development of the Arctic, so the priority task of any state is to optimize the living conditions of the population, both local and temporary resident. According to the World Health Organization (WHO) (Belova, Lavrinov, Vorobyova, Zueva, & Ayvazova, 2013), people's health depends on lifestyle and social conditions by 50-55%, on genetic factors by 20-22%, on the environment by 19-20%, and on the level of the system health care and quality of medical assistance by 7-10%. Thus, the most significant factor of a person's health is the way of life, in particular, nutrition in the prevailing conditions of society.

Life in the Far North determines a unified type of nutrition of native-born peoples, which was established genetically and provides high protective forces for the organism in specific conditions of the region (Arctic Monitoring and Assessment Programme [AMAP], 2004). Traditionally, the diet of native-born inhabitants of the Arctic includes a high number of proteins and fats, which is characterized by an increase in the energy content of lipids and proteins and a decrease in the role of carbohydrates coming from the external environment. This type of food is usually called protein-lipid. Specific nutritional factors of the local population are manifested at various levels: physiological (gastric digestion), cultural (cooking), biochemical (formation of "polar metabolism"). Undoubtedly, the diet of native-born peoples of the North is based on the availability of raw materials in this region.

The traditional occupation of native people of the Arctic is sea-hunting industry, reindeer breeding, fishing, and hunting. This provides the local population with homemade food products. The main feature of the national food is still a raw food diet. The most common way is eating frozen meat and fish in the form of "stroganina" or "dolbanina". Among the local population, there is a limited use of food heating. The most common way of heat treatment of raw food is baking on stones, in the sand, on an open fire, or in a specially equipped smoker. In winter, jerky and sour or fermented walrus meat is widely used. The most popular is a roll of walrus meat with skin, called "kopalchen" (AMAP, 2004; Strogov, Broshe, & Ozias, 2003; Kozlov, 2005). In addition, preference in feeding the local population is given to various types of meat of sea animals, in particular, whale meat and small seal meat.

Studies of particular characteristics of employment of population in Chukotsky Autonomous District (CAD) have shown that sea hunting is the primary specialization of the native people of the Chukotka Peninsula. At the same time, there is a kind of relation between the food ration and the occupation of

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