The obtained results confirmed the reduction of the intensity of hydrolytic processes in proteins and lipids.

Thus, the result of our study made it possible to conclude that the polymeric materials with barrier properties can be used to provide the quality and safety of the chilled salmon production in the gas medium with the maximum volume fraction of nitrogen and minimal volume fraction of CO_2 at the storage temperature equal to 4^0C.

WHITE SEA MUSSELS *MYTILUS EDULIS* L. AS A SOURCE OF N-3 POLYENIC FATTY ACIDS

Natalia N. Fokina, Zinaida A. Nefedova, Nina N. Nemova

Institute of Biology Karelian Research Centre Russian Academy of Science, Russia, Petrozavodsk
e-mail: fokinann@gmail.com

The blue mussels, *Mytilus edulis* L. (1758), cultivated on artificial substrates in experimental aquaculture in the Kandalaksha Bay, White Sea, are, like most marine organisms, rich in polyunsaturated fatty acids (PUFA) of the linolenic (n-3) family, originating from phytoplankton. Uptake of various n-3 PUFA with food is known to reduce the risk of cardiac ischemia in humans. Furthermore, the groups of people whose diet is rich in these acids have lower blood coagulability, which is attributed to lower platelet aggregation, blood pressure reduction, weakening of triglyceride and cholesterol circulation (Sergeeva and Varfolomeeva, 2006). PUFA of the n-3 family were found to benefit patients with arthritis, kidney disorders, as well as other inflammatory and immune diseases (Lands, 1992; Mevkh et al., 1996; Bernardi, 1996). At present, one distinguishes the effects of three main fatty acids of the n-3 family: linolenic (18:3), eicosapentaenoic (20:5) and docosahexaenoic (22:6) acids. Eicosapentaenoic acid is the source of products which counteract substances of the arachidonic cascade. Docosahexaenoic acid is essential for the central nervous system (Lauritzen et al., 2000; Jump, 2002).

Comparative analysis of the total lipid fatty acids composition in some species of bivalves from the White Sea, such as *Mytilus edulis* (aged 5–6 years, shell size 65.8 mm), *Hiatella arctica* (shell size 26.6×14.5×12.2 mm) and *Modiolus modiolus* (shell dimensions 63.7×32.7 mm), showed *Mytilus edulis* to contain higher concentrations of both n-3 PUFA and total PUFA (Tab. 1). The proportion of arachidonic 20:4 (n-6) acid was the same in all three species.

Table 1. Fatty acid composition of some bivalves from the White Sea (% of total fatty acids)

Fatty acids (% of total FA)	*Mytilus edulis*	*Modiolus modiolus*	*Hiatella arctica*
Total saturated FA	17.9	22.8	22.8
Total monounsaturated FA	22.1	27.0	24.4
16:4(n-3)	4.6	1.4	1.0
18:3(n-3)	2.1	1.7	1.2
20:5(n-3)	15.4	17.3	10.9
22:6(n-3)	19.4	9.9	16.8
Total n-3 PUFA	44.4	35.8	35.9
20:4(n-6)	2.7	2.7	2.7
Total n-6 PUFA	11.6	10.0	9.6
Total PUFA	60.1	48.3	51.5

Detailed study of the fatty acid composition in cultured *Mytilus edulis* L. mussels from the White Sea showed the content of n-3 PUFA to increase with age (owing to 18:3 (n-3), 20:5 (n-3), 22:6 (n-3) acids), and peak at an age of 4–6 years (Tab. 2).

Interestingly, the content of n-6 PUFA, including the main representative of the series – arachidonic 20:4 (n-6) acid, was about the same, irrespective of the mussels' age (Tab. 2).

Table 2. Fatty acid composition of cultured White Sea mussels *Mytilus edulis* L. of different age (% of total fatty acids)

Fatty acids (% of total FA)	*0+*	*1+*	*2+*	*3+*	*4+*	*5+–6+*
Total saturated FA	18.1	19.0	18.5	19.6	19.1	17.9
Total monounsaturated FA	21.5	24.0	21.4	21.8	20.6	22.1
16:4(n-3)	6.3	4.2	5.4	4.2	5.3	4.6
18:3(n-3)	1.3	1.7	2.0	2.2	1.9	2.1
20:5(n-3)	13.1	13.1	14.8	14.7	16.5	15.4
22:6(n-3)	16.4	17.3	18.8	18.8	19.4	19.4
Total n-3 PUFA	41.0	39.3	43.7	42.6	45.9	44.4
20:4(n-6)	3.6	2.7	2.5	2.3	2.4	2.7
Total n-6 PUFA	14.9	13.1	12.4	11.5	10.9	11.6
Total PUFA	60.4	57.0	60.1	58.6	60.3	60.1

Thus, the fatty acid composition of *Mytilus edulis* L. mussels is noted for high content of n-3 PUFA, represented predominantly by 20:5 (n-3), 22:6 (n-3) acids. Their positive effect at some human diseases has been proven in quite a number of studies. Our results suggest *Mytilus edulis* L is a commendable source of polyunsaturated acids of the n-3 family to be used in manufacturing of medicines.

The study was supported by the Russian Foundation for Basic Research grant 08-04-01140-a, RF Presidential Programme "Leading Scientific Schools of RF" NSch-3731.2010.4, programme "Young Scientists Support", programme of the RAS Biological Sciences Division "Biological resources of Russia" and "Biodiversity".

References

Sergeeva M.G., Varfolomeeva A.T. Arachidonic acid cascade. M.: Public education. 2006. 256 p.

Lands W.E. Biochemistry and physiology of n-3 fatty acids // FASEB J. 1992. v.6. № 8. pp. 2530–2536.

Mevkh A.T., Yuskovich A.K., Duzhenko V.S. et al. Ratios of substrates and inhibitors of prostaglandin synthesis in blood plasma of patients with heart ischemia // Appl. Biochem. Biotechnol. 1996. v. 61. № 1–2. pp. 199–204.

Bernardi G. ed. New comprehensive biochemistry. Biochemistry of lipids, lipoproteins and membranes. / Ed. G. Bernardi. Amsterdam: Elsevier. 1996. v. 31. pp. 141–152.

Lauritzen I., Blondeau N., Heurteaux C et al. Polyunsaturated fatty acids are potent neuroprotectors // EMBO J. 2000. v. 19. № 8. pp. 1784–1793.

Jump D.B. The biochemistry of n-3 polyunsaturated fatty acids // J. Biol. Chem. 2002. v. 277. № 11. pp. 8755–8758.

IDENTIFICATION AND CHARACTERIZATION OF SMALL REGULATORY RNAS IN THE GRAM-NEGATIVE FISH PATHOGEN *ALIIVIBRIO SALMONICIDA*

Peik Haugen

Department of Chemistry, Faculty of Science and Technology, University of Tromsø, Norway, Tromsø
e-mail: peik.haugen@uit.no

Small RNAs from Bacteria, commonly known as sRNAs, make up a new and interesting group of regulatory RNAs involved in stress responses, central metabolism, quorum sensing, motility and more. Even though data on sRNA function is accumulating, there are still large gaps in our understanding of their biological roles in Bacteria. We use bioinformatic tools, biochemical methods and – omics approaches to identify and characterize sRNAs in the cold-loving fish pathogen *Aliivibrio salmonicida*. Our main goal is to understand the critical roles of sRNAs in virulence, for example by triggering expression of proteins involved in iron uptake, oxidative stress and cell-cell communication. Recent data from these experiments will be presented.