demography (Yakuts, SIM), features of industrial development of the North, represented mainly by the mining industry, oil and gas processing enterprises (in the future) and in order to prevent the medical consequences of pollution, the priority tasks are:

1) Medical and ecological monitoring is the only uncontested and mandatory condition for mining in the Republic of Sakha (Yakutia);

2) The organization extracting minerals in the territory of the republic is obliged to finance medical and ecological monitoring, which should be established by a legal act of the Republic of Sakha (Yakutia);

3) A research and development institution engaged in medical and ecological monitoring should be equipped with modern analytical equipment and appropriate human resources.

References

1.Krivoshapkin V.G., Timofeev L.F. Mediko-ekologicheskiy monitoring v zone deyatelnosti predpriyatiy gornodobyvayushchey promyshlennosti v Respublike Sakha (Yakutiya) [Medical and environmental monitoring in the area of mining enterprises in the Republic of Sakha (Yakutia)]. Yakutskiy meditsinskiy zhurnal [Yakut Medical Journal]. Yakitsk, 2018, No. 3, p. 52-53.

2.Dubinin N.P. Obshchaya genetika [General genetics]. Moscow: Nauka [Science], 1986, 560 p.

3.Bochkov N.P. Genetika cheloveka: nasledstvennost i patologiya [Human genetics: heredity and pathology]. Moscow: Medicine, 1978, 384 p.

4.Obzor VOZ Immunodeficiency [WHO Review of Immunodeficiency], 1978.

5.Bertoks P., Radd D. Strategiya zashchity okruzhayushchey sredy ot zagryazniteley [Strategy for the protection of the environment from pollutants]. Moscow: Mir, 1980, 606 p.

6.Pianka E. Evolyutsionnaya ekologiya [Evolutionary Ecology]. Moscow: Mir, 1981, 400 p.

7.Altukhov Yu.P., Kurbatova O.L. Nasledstvennost cheloveka i okruzhayushchaya sreda [Human heredity and the environment] Nasledstvennost cheloveka i okruzhayushchaya sreda[Human heredity and the environment]. Moscow: Nauka [Science], 1984, P. 7-34.

8.Yakovlev D.A. Veshchestvennyy sostav kimberlitov Verkhnemunskogo polya (Yakutiya) [The material composition of kimberlites of Verkhnemunsky field (Yakutia)] Avtoref. diss. … kand. geologo-min. nauk [Author. diss. ... cand. geol. min. sciences]. Irkutsk, 2007, 22 p.

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COMORBIDITY OF CLINICAL SYMPTOMS OF REFLUX DISEASE WITH LIPID-METABOLIC PARAMETERS IN YAKUTS

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ABSTRACT

The aim of the study was to assess the association of clinical manifestations of reflux disease with lipid-metabolic parameters in individuals of the Yakut nationality. The study included 100 patients with gastroesophageal reflux disease of the Yakut nationality who were in the emergency room of the Republican Hospital No. 2 - the Center for Emergency Medical Care and the Gastroenterological Department of the Yakut City Clinical Hospital during 2010-2013. The share of men was 37%, women - 63%. The mean age was 46.9 (SD = 11.35) years. Preliminary verification of the diagnosis of GERD was performed according to the recommendations of the Mayo Clinic and the Montreal Consensus (2006). Statistical processing and analysis of data were performed using the IBM SPSS Statistics 19. Paired comparisons were performed using the Mann-Whitney test. To assess the relationship of the clinical symptoms of reflux disease with the components of the metabolic syndrome, a binary logistic regression method was used with forced inclusion of predictors. Determination of the relationship of clinical symptoms of gastroesophageal reflux disease with lipid-metabolic criteria in the Yakuts revealed contribution components of metabolic syndrome, in particular abdominal obesity, arterial hypertension and triglycerides in the development of dyspeptic symptoms such as bloating, heaviness in the epigastrium, esophageal (belching) and extraesophageal manifestations (night cough) of the reflux disease.

Keywords: blood pressure, lipids, metabolic syndrome, gastroesophageal reflux disease, comorbidity, logistic regression.

The urgency of issues related to the problem of comorbidity of the digestive system and metabolic syndrome (MS), currently does not require a special introduction. Gastroesophageal reflux disease (GERD) is a multifactorial disease that causes local chronic inflammation, which increases the risk of developing Barrett's esophagus (BE) and esophageal adenocarcinoma (EAC). However, not every patient with GERD develops the terrible complications mentioned above, which suggests that other inflammatory mechanisms may exist in the pathogenesis of BE and EAC. It is known that abdominal obesity, as a central component of MS, contributes to gastroesophageal reflux. Abdominal obesity, which causes systemic inflammation, is characterized by an increase in circulating pro-inflammatory cytokines, including C-reactive protein, leptin, interleukin-6, and α-tumor necrosis factor, also contributes to the development of BE and EAC [7, 8, 11]. In this regard, of particular interest is the study of the combined course of GERD and MS. Currently, there are isolated works in Russia [3-5] devoted to the comorbidity of these diseases in certain groups of the population, and the results of the research require generalization and addition.

Research objective: to evaluate the association of clinical manifestations of reflux disease with lipid-metabolic parameters in individuals of the Yakut nationality.

Materials and methods of the research. The work was carried out as part of the research project "Metabolic Syndrome and Chronic Non-Communicable Diseases among the Residents of Yakutia" (registration number of YSU: 11-01M.2009.). The study protocol was approved by the local ethical committee at the Yakut Science Center of Complex Medical Problems

of the Siberian Branch of the Russian Academy of Medical Sciences (protocol No. 24 dated June 29, 2010). All patients were aware of participation in the study and voluntarily signed informed consent. The study was conducted on the basis of the emergency treatment department of the Republican Hospital No. 2 - the Center for Emergency Medical Care and the Gastroenterology Department of the Yakutsk City Clinical Hospital during 2010-2013. Inclusion criteria were the presence of gastroesophageal reflux disease (GERD), persons of Yakut nationality and signed informed consent to the study.

The analysis included 100 patients with GERD of the Yakut nationality. The share of men was 37%, women - 63%. The mean age was 46.9 (SD = 11.35) years.

The following survey methods were conducted for all patients: filling in a specially designed questionnaire, including questions of socio-demographic characteristics, complaints, anamnestic and anthropometric data, heredity, physical activity, the presence of bad habits; biochemical blood test: glucose (mmol / l), total cholesterol (TCh), low density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (HDL), triglycerides (TG), atherogenic index (IA) calculation by the formula : IA = (TCh -HDL) / HDL, mmol / l; esophagogastroduodenoscopy. GERD was diagnosed based on the recommendations of the Mayo Clinic and the Montreal Consensus of 2006.

Statistical data processing was performed using the IBM SPSS Statistics 19. To determine whether the data complied with the law of normal distribution, the Kolmogorov – Smirnov test was used with the Lilliefors amendment and the Shapiro – Wilk criterion. To assess the relationship of the clinical symptoms of GERD with the components of MS, a binary logistic regression method was used with the forced inclusion of predictors. Clinical symptoms were alternately taken as the dependent variable, and the independent variables were lipid-metabolic parameters: waist circumference (WC), systolic and diastolic blood pressure (SBP, DBP), TG levels, HDL cholesterol, LDL cholesterol, on an empty stomach, glucose intolerance (PPG). To compile the regression equation, we initially compared two independent samples with the non-parametric Mann-Whitney test depending on the presence of one or another clinical sign (TM Klimova, senior scientist at NEFU). At identifying of statistically significant differences in lipid-metabolic parameters, these symptoms were included for further logistic regression analysis. The quality of the binary classification was evaluated by the area under the ROC curve.

Results and discussion. According to the results of the comparison, the most statistically significant differences in metabolic parameters in esophageal (belching) and extraesophageal symptoms of the GERD (night cough), dyspeptic symptoms(bloating, heaviness in the epigastrium), as well as in the presence of snoring during sleep (Tables 1, 2) were identified. To build a mathematical model of logistic regression, the clinical symptoms of GERD are alternately taken as the dependent variable, and the independent variables are the lipid-metabolic parameters.

Of the esophageal symptoms, only with belching revealed differences in the mean values of WS, SBP, DBP, TG and LDL (Table 1). But at the same time, when applying a logistic regression analysis, the belching had a positive relationship with OT: B (SE) = 0.056 (0.013), p <0.001, Exp (B) = 1.058; level of blood pressure: SBP (SE) = 0.040 (0.013), p <0.01, Exp (B) = 1.040; DBP B (SE) = 0.091 (0.024), p <0.001, Exp (B) = 1.096 and blood lipids: TG B (SE) = 1.148 (0.331), p <0.001, Exp (B) = 3.152; LDL C B (SE) = 0.557 (0.229), p <0.05, Exp (B) = 1.745.

In a comparative assessment of non-esophageal symptoms of GERD, differences were obtained from a night cough with a level of SBP and DBP (Table 1). In individuals with a night cough, the mean values of SBP and DBP had the highest rates compared with patients without this extra-esophageal symptom. Logistic regression analysis confirmed the dependence of night cough on BP: SBP B (SE) = 0.040 (0.017), p <0.05, Exp (B) = 1.041; DBP: B (SE) = 0.064 (0.030), p <0.05, Exp (B) = 1.066.

In the patients examined by us with a feeling of heaviness in the epigastrium, more negative differences were obtained in terms of WS, BP levels, values of TG and LDL (Table 2). When conducting a logistic regression, we confirmed that the greatest contribution to the development of such a symptom as epigastric severity is played by WS (B (SE) = 0.050 (0.013), p <0.001, Exp (B) = 1,051), blood pressure (SBP: B (SE) = 0.023 (0.012), p <0.05, Exp (B) = 1.023; DBP: B (SE) = 0.054 (0.019), p <0.01, Exp (B) = 1.055) and blood lipids (TG: B (SE) = 0.866 (0.309), p <0.01, Exp (B) = 2.377; LDL: B (SE) = 0.432 (0.217), p <0.05, Exp (B) = 1,541).

In patients with complaints of bloating, the highest numbers of SBP, DBP and

Table 1

Clinical symptoms of GERD and components of MS in people of Yakut nationality

Indicator		Burn (+)	Burn (-)	p	Night cough (+)	Night cough (-)	p
WS, cm.	M (SD)	102(16,40)	84(17,39)	0,000	99(19,21)	90(18,75)	0,068
	Me (Q25-Q75)	103,5(96-113)	78(73-97)		103(83,5-113)	80(75-103)	
SBP, mmHg.	M (SD)	133 (14,67)	121 (19,29)	0,001	137(17,58)	124(18,01)	0,017
	Me (Q25-Q75)	130(120-140)	120(110-130)		135(123-149)	120(110-140)	
DBP, mmHg.	M (SD)	86 (7,44)	76 (12,67)	0,000	85,63(10,31)	78,51(11,89)	0,023
	Me (Q25-Q75)	90(80-90)	80(60-90)		90,00(80-90)	80(70-90)	
TG, Mmol/l	M (SD)	1,76 (0,91)	1,16 (0,5)	0,000	1,52(0,69)	1,37(0,79)	0,263
	Me (Q25-Q75)	1,67(1,02-2,30)	1,02(0,71-1,44)		1,44(1,01-2,05)	1,17(0,77-1,72)	
HDL, Mmol/l	M (SD)	1,34 (0,55)	1,32 (0,28)	0,368	1,25(0,35)	1,34(0,42)	0,810
	Me (Q25-Q75)	1,21(1,03-1,49)	1,29(1,14-1,52)		1,34(0,97-1,50)	1,28(1,11-1,50)	
LDL, Mmol/l	M (SD)	3,59 (0,91)	3,06 (1,02)	0,010	3,31(0,96)	3,26(1,02)	0,705
	Me (Q25-Q75)	3,82(2,89-4,18)	3,13(2,21-3,82)		3,36(2,88-4,10)	3,28(2,49-3,94)	
glucose, Mmol/l	M (SD)	5,60 (1,17)	5,22 (1,05)	0,075	5,25(1,11)	5,39(1,12)	0,851
	Me (Q25-Q75)	5,65(4,83-6,20)	5,10(4,35-5,85)		5,55(4,24-6,10)	5,20(4,67-6,18)	
PPG, Mmol/l	M (SD)	6,48 (1,25)	6,3 (1,49)	0,794	6,06(1,49)	6,54(1,31)	0,634
		6,10(5,46-7,62)	7,00(5,47-7,63)		6,02(5,05-7,32)	6,20(5,60-7,65)	

Note: WS - waist circumference; SBP - systolic blood pressure; DBP - diastolic blood pressure; TG - triglycerides; HDL – high-density lipoprotein cholesterol; LDL – low density lipoprotein cholesterol; PPG - postprandial glucose level; M – is the mean; SD - standard deviation; Me– median; Q25-Q75 - 25 and 75 quartile distributions; p - the achieved level of statistical significance of differences when comparing groups.

Table 2

Clinical symptoms of GERD and components of MS in people of Yakut nationality

Indicator		A feeling of heaviness in the epigastrium (+)	A feeling of heaviness in the epigastrium (-)	p	Bloating (+)	Bloating (-)	p	Snoring during sleep	No snoring during sleep	p
WS, cm.	M (SD)	99,5 (17,84)	84(17,00)	0,000	98 (18,19)	84 (7,58)	0,001	104(15,58)	77(10,50)	0,000
	Me (Q25-Q75)	102 (79,0-112,0)	78 (73-96,5)		100,5 (78-110,5)	79 (72-97)		104,5 (97-115)	77 (70-80)	
SBP, mmHg.	M (SD)	130 (14,63)	122 (20,82)	0,027	132(13,17)	119 (20,87)	0,000	133(13,70)	117(17,89)	0,000
	Me (Q25-Q75)	130 (120-140)	120 (110-140)		130 (120-140)	120 (100-130)		130 (120-140)	110 (105-130)	
DBP, mmHg.	M (SD)	83 (9,79)	76 (12,72)	0,005	84 (8,26)	76 (3,58)	0,001	86,5(7,16)	72(11,59)	0,000
	Me (Q25-Q75)	85 (80-90)	80 (60,0-90,0)		87,5 (80-90)	80 (60-90)		90 (80-90)	70 (60-80)	
TG, Mmol/l	M (SD)	1,64 (0,93)	1,18 (0,55)	0,013	1,57(0,92)	1,23(0,57)	0,097	1,76(0,89)	1,03(0,42)	0,000
	Me (Q25-Q75)	1,51 (0,91-2,30)	1,04 (0,74-1,45)		1,39 (0,87-2,17)	1,07 (0,79-1,49)		1,64 (1,05-2,30)	0,96 (0,69-1,39)	
HDL, Mmol/l	M (SD)	1,35 (0,51)	1,30 (0,29)	0,814	1,37(0,48)	1,28(0,31)	0,368	1,36(0,49)	1,34(0,28)	0,669
	Me (Q25-Q75)	1,23 (1,05-1,50)	1,28 (1,12 -1,51)		1,30 (1,12-1,56)	1,27 (1,06-1,45)		1,26 (1,07-1,55)	1,30 (1,17-1,51)	
LDL, Mmol/l	M (SD)	3,50 (0,95)	3,08 (1,02)	0,036	3,42 (0,95)	3,12 (1,05)	0,134	3,53(1,06)	3,03(0,90)	0,012
	Me (Q25-Q75)	3,75 (2,79-4,23)	3,18 (2,26-3,83)		3,66 (2,81-4,10)	3,19 (2,34-3,85)		3,82 (2,894,40)	3,18 (2,40-3,74)	
glucose, Mmol/l	M (SD)	5,53 (1,22)	5,23 (0,99)	0,147	5,40 (1,26)	5,34 (0,95)	0,825	5,63(1,32)	5,13(0,77)	0,029
	Me (Q25-Q75)	5,60 (4,80-6,20)	5,00 (4,40-6,02)		5,40 (4,46-6,20)	5,20 (4,62-6,10)		5,90 (4,46-6,42)	5,10 (4,71-5,55)	
PPG, Mmol/l	M (SD)	6,15(1,27)	6,91 (1,34)	0,059	6,25(1,39)	6,72(1,25)	0,214	6,27(1,41)	7,02(0,86)	0,194
		5,80 (5,40-6,50)	7,53 (6,25-7,70)		5,90 (5,29-7,25)	7,20 (5,77-7,65)		6,00 (5,34-7,67)	7,25 (6,10-7,70)	

Note: WS - waist circumference; SBP - systolic blood pressure; DBP - diastolic blood pressure; TG - triglycerides; HDL – high-density lipoprotein cholesterol; LDL – low density lipoprotein cholesterol; PPG - postprandial glucose level; M – is the mean; SD - standard deviation; Me– median; Q25-Q75 - 25 and 75 quartile distributions; p - the achieved level of statistical significance of differences when comparing groups

WS were observed than in patients with no bloating (Table 2). At the same time, a positive association of the bulge with OT (B (SE) = 0.041 (0.012), p <0.001, Exp (B) = 1.042) was obtained; SBP(B (SE) = 0.042 (0.013), p <0.001, Exp (B) = 1.043); DBP (B (SE) = 0.064 (0.020), p <0.001, Exp (B) = 1.067) and triglycerides (B (SE) = 0.622 (0.290), p <0.05, Exp (B) = 1.863).

Also, a comparative analysis of lipid-metabolic parameters in the examined patients with snoring during sleep was conducted. At the same time, high lipid-metabolic indicators were obtained in the group of patients with the GERD and the presence of snoring in sleep, except for the HDL cholesterol values and postprandial glucose level (Table 2). The mathematical model of logistic regression showed the association of snoring during sleep with WS (B (SE) = 0.130 (0.024), p <0.001, Exp (B) = 1.138); SBP(B (SE) = 0.066 (0.017), p <0.001, Exp (B) = 1.069); DBP (B (SE) = 0.163 (0.035), p <0.001, Exp (B) = 1.177) and TG (B (SE) = 1.766 (0.456), p <0.001, Exp (B) = 5.848); LDL (B (SE) = 0.518 (0.228), p <0.05, Exp (B) = 1.678) and glucose (B (SE) = 0.431 (0.206), p <0.05, Exp (B) = 1.539).

Thus, assessing the relationship of clinical symptoms of the GERD with MS have Yakut nationality identified contribution abdominal obesity, arterial hypertension and triglycerides in the development of dyspeptic symptoms (bloating, weight epigastric), esophageal (belching) and extraesophageal manifestations (night cough) GERD. In accordance with the above, it can be said that lipid-metabolic disorders and abdominal obesity, and not the value of body mass index, are one of the strong predictors of GERD development. The correlation of GERD symptoms with blood pressure indicators is multifactorial, since, on the one hand, pathological gastroesophageal reflux can trigger a cascade of pathogenetic mechanisms that initiate destabilization of coronary blood flow, myocardial ischemia and cardiac rhythm disturbances [6]. On the other hand, arterial hypertension causes impaired microcirculation and hemodynamics of internal organs, as well as calcium antagonists used to treat arterial hypertension reduce the tone of the lower esophageal sphincter and suppress muscle contraction in the esophagus itself. In a comparative analysis of the treatment of arterial hypertension in our study, calcium antagonists received 14% of patients.

It should be noted that in our previous work, the analysis of the clinical picture of reflux disease showed that heartburn is the leading symptom, regardless of their ethnicity and the presence or absence of MS. In the presence of metabolic syndrome, reflux disease was characterized by polymorphism of clinical manifestations and atypical course. With the association of reflux disease and MS, regardless of the ethnicity of the patients, dyspeptic symptom complex is more often stated. The next characteristic feature of the manifestation of reflux disease in patients with metabolic syndrome was the presence of a sufficiently high frequency of non-esophageal symptoms [1, 2].

Conclusion. Analysis of the relationship of clinical manifestations of reflux disease with lipid-metabolic indicators showed that Yakuts have esophageal (belching) and extraesophageal (night cough) and dyspeptic (swelling, heaviness in epigastric) manifestations of GERD positively associated with RT, BP, TG and LDL, which at high rates increase the risk of mortality from cardiovascular and oncological complications. In this connection, the correction of lipid-metabolic risk factors is important in the treatment of GERD in persons with metabolic syndrome, that demands joint participation of specialists of cardiological and gastroenterological profile.

The work was carried out as part of the research project "Metabolic syndrome and chronic non-communicable diseases among residents of Yakutia" (registration

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References:

1. Asekritova A.S., Kylbanova E.S., Emelianova E.A. Gastroezofagealnaya reflyuksnaya bolezn v sochetanii s metabolicheskim sindromom u zhiteley Yakutii [Gastroesophageal reflux disease in combination with metabolic syndrome in Yakutia residents]. Yakutskiy meditsinskiy zhurnal [Yakut Medical Journal]. 2015, №1, P.6-8. (in Russian)
2. Asekritova A.S., Kylbanova E.S. Lipidno-metabolicheskiye faktory riska khronicheskikh neinfektsionnykh zabolevaniy u lits s gastroezofagealnoy reflyuksnoy boleznyu [Lipid-metabolic risk factors for chronic non-communicable diseases in individuals with gastroesophageal reflux disease]. Ateroskleroz. Novosibirsk, 2015, №3. P.63-71. (in Russian)
3. Bondarenko E.Yu. Kliniko-endoskopicheskiye i morfologicheskiye osobennosti GERB u bolnykh s abdominalnym ozhireniyem: avtoref. diss. … k.m.n. [Clinical endoscopic and morphological features of GERD in patients with abdominal obesity: PhD thesis abstract]. Moscow, 2010, 23 p. (in Russian)
4. Kachina A.A. Gastroezofagealnaya reflyuksnaya bolezn i ozhireniye: khronobiologicheskiye pokazateli serdechno-sosudistoy sistemy i faktory kardiovaskulyarnogo riska: avtoref. diss. ... kand. med. nauk : 14.01.04 [Gastroesophageal reflux disease and obesity: chronobiological indicators of the cardiovascular system and cardiovascular risk factors: PhD thesis abstract] Perm, 2013, 18 p. (in Russian)
5. Kseneva S.I., Borodulina E.V., Udut V.V. Klinicheskiye osobennosti gastroezofagealnoy reflyuksnoy bolezni u patsiyentov s izbytochnoy massoy tela [Clinical features of gastroesophageal reflux disease in overweight patients] // Sbornik tezisov XIII Natsionalnogo kongressa terapevtov [Collection of theses of the XIII National Congress of Physicians]. Moscow, 2018, P. 153-154. (in Russian)
6. Khlynova O.V., Tuyev A.V., Beresneva L.N., Agafonov A.V. Problema komorbidnosti s uchetom sostoyaniya serdechno-sosudistoy sistemy u patsiyentov s arterialnoy gipertenziyey i kislotozavisimymi zabolevaniyami [The problem of comorbidity, taking into account the state of the cardiovascular system in patients with arterial hypertension and acid-related diseases] // Kazanskiy meditsinskiy zhurnal [Kazan Medical Journal]. Perm, 2013, №1, P. 80-85. (in Russian)
7. Abdominal Visceral to Subcutaneous Adipose Tissue Ratio Is Associated with Increased Risk of Erosive Esophagitis / E.Y. Ze, B.J. Kim, H. Kang, J.G. Kim // Dig Dis Sci. – 2017. – V.62 (5). – P.1265-1271. doi: 10.1007/s10620-017-4467-4
8. Metabolic syndrome in relation to Barrett's esophagus and esophageal adenocarcinoma: Results from a large population-based case-control study in the Clinical Practice Research Datalink / J. Drahos, L. Li, S.S. Jick, M.B. Cook // Cancer Epidemiol. – 2016. – V.42 (9). doi: 10.1016/j.canep.2016.02.008.
9. Obesity increases the risk of erosive esophagitis but metabolic unhealthiness alone does not: a large-scale cross-sectional study / M.K. Baeg, S.H. Ko, S.Y. Ko [et al.] // BMC Gastroenterol. – 2018. – V.18 (82). doi:10.1186/s12876-018-0814-y.
10. Prevalence and risk factors of gastroesophageal reflux symptoms in Chinese retiree cohort / T. Chen, M. Lu, X. Wang [et al.] // BMC Gastroenterol. – 2012. – V.12 (161).doi: 10.1186/1471-230X-12-161.
11. Role of body composition and metabolic profile in Barrett's oesophagus and progression to cancer / Di Caro S, Cheung WH, Fini L [et al.] // Eur J Gastroenterol Hepatol. – 2016. – V. 28(3). – P.251–260. doi: 10.1097/MEG.0000000000000536.

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DIET IN THE NORTH

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MICROBIOTA AND SANITATION OF UNDERGROUND GLACIERS DURING FOOD STORAGE

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ABSTRACT

Carrying out the relevant works on sanitation has difficulties due to the lack of effective means and scientifically-based regimes. The aim of this work is to study the microbiota and to find effective methods and regimes for the sanitation of glaciers in permafrost conditions for food storage. The work was carried out in the Laboratory for the Development of Microbial Preparations of the FSBSI the Yakut Scientific Research Institute of Agriculture, as well as in the underground glaciers of Yakutsk and the regions of the Republic of Sakha (Yakutia) in the period 2007 - 2015. The material for studying the quantitative and qualitative composition of the microbiota circulating in glaciers was air samples and scrapings from surfaces, air samples and scrapings from the glacier surfaces were collected in February, April, June, August, and November. At the same time, the external and internal air temperatures were taken into account. Air samples were taken by sedimentation method. The number of microorganisms in the air, on the surfaces was determined according to the generally accepted methods of sanitary-microbiological examination of environmental objects.

The microbiota of the underground glacier for food storage is mainly represented by soil spore-forming aerobic bacteria of the genus Bacillus, as well as toxic and mold fungi of the genera Aspergillus, Mucor and pathogens of yersiniosis, which can be dangerous in the contamination of food.

We were the first sanitation for the of the glaciers, contaminated with intestinal, coccal and spore infections in Yakutia developed effective modes of disinfection (up to -21.0±0.8°C) using electrochemically activated anolyte containing 0.1 mg/ml of active chlorine and peracetic acid in a concentration of 0.5% (ADV) at the rate of 300 ml/m2 and exposure time 5 hours, and 1% aqueous solutions of the PAA, at the rate of 300-400 ml/m2, exposure 18 hours.

Keywords: underground ice-houses, food storage, microbial contamination, sanitization.