

Supplementary Materials for

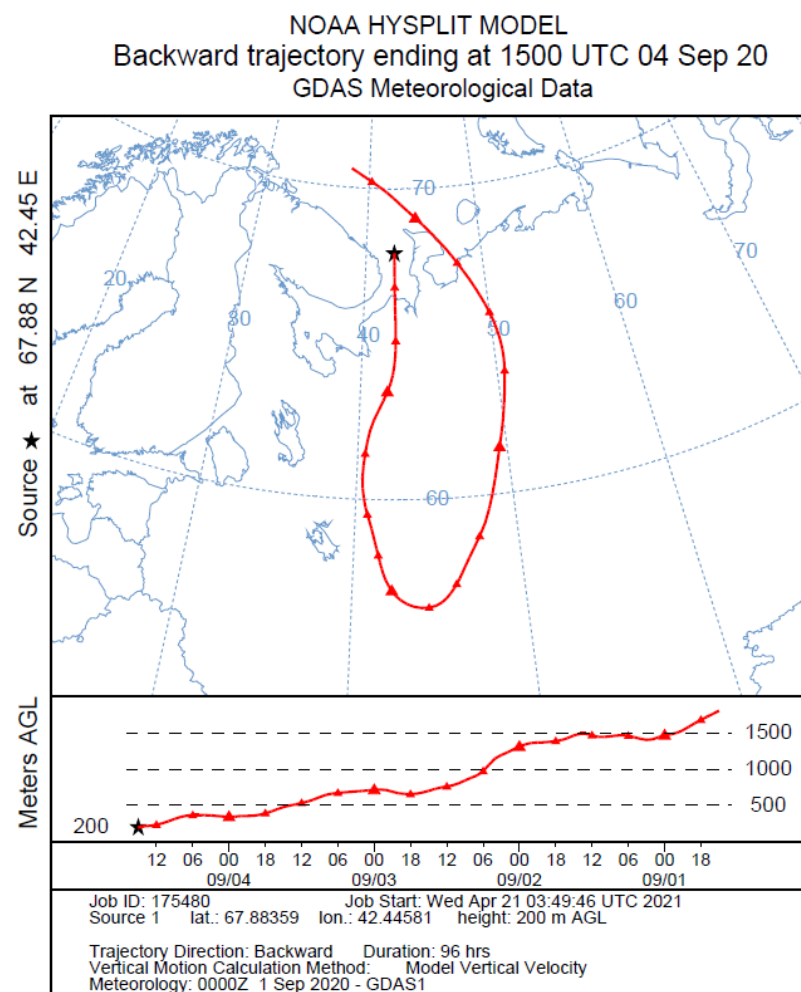
# Culturable Microorganisms of Aerosols Sampled during Aircraft Sounding of the Atmosphere over the Russian Arctic Seas

Irina S. Andreeva <sup>1</sup>, Aleksandr S. Safatov <sup>1,\*</sup>, Larisa I. Puchkova <sup>1</sup>, Nadezhda A. Solovyanova <sup>1</sup>, Olesya V. Okhlopkova <sup>1</sup>, Maksim E. Rebus <sup>1</sup>, Galina A. Buryak <sup>1</sup>, Boris D. Belan <sup>2</sup> and Denis V. Simonenkov <sup>2</sup>

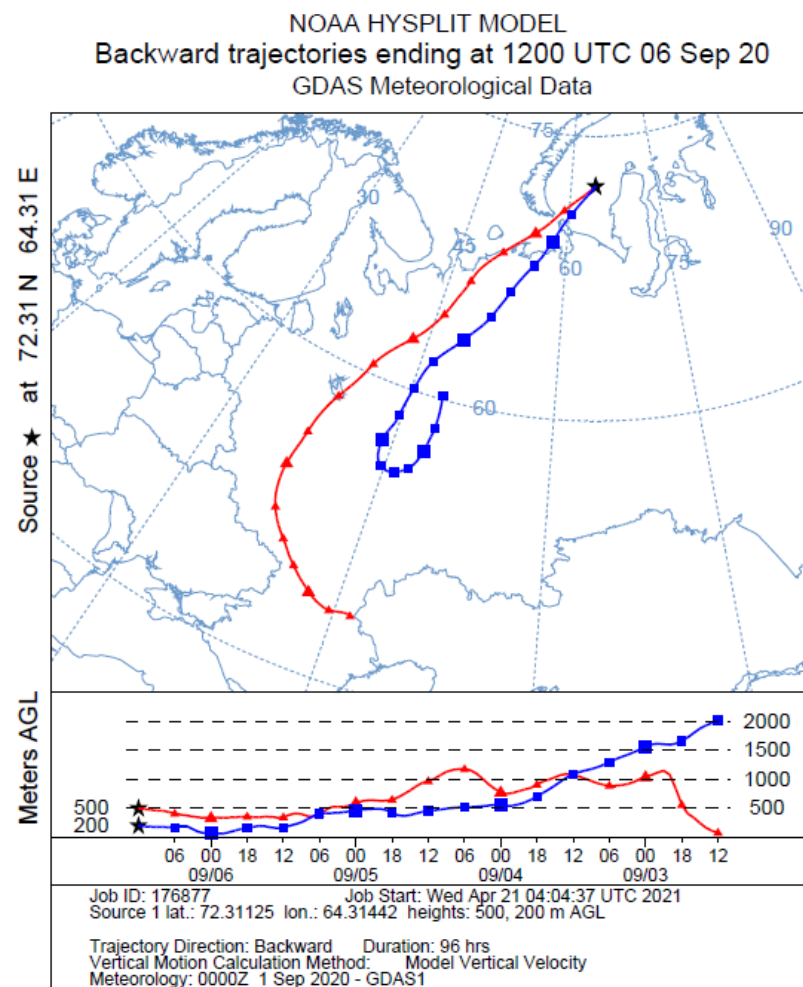
<sup>1</sup> Vector State Research Center for Virology and Biotechnology, Federal Service for Surveillance on Consumer Rights Protection and Human Welfare, 630559 Koltsovo, Novosibirsk Region, Russia; andreeva\_is@vector.nsc.ru (I.S.A.); puchkova\_li@vector.nsc.ru (L.I.P.); solovyanova\_na@vector.nsc.ru (N.A.S.); ohlopkova\_ov@vector.nsc.ru (O.V.O.); rebus\_me@vector.nsc.ru (M.E.R.); buryak@vector.nsc.ru (G.A.B.)

<sup>2</sup> Laboratory of Atmosphere Composition Climatology, V.E. Zuev Institute of Atmospheric Optics, Siberian Branch of Russian Academy of Sciences, 634055 Tomsk, Russia; bbd@iao.ru (B.D.B.); simon@iao.ru (D.V.S.)

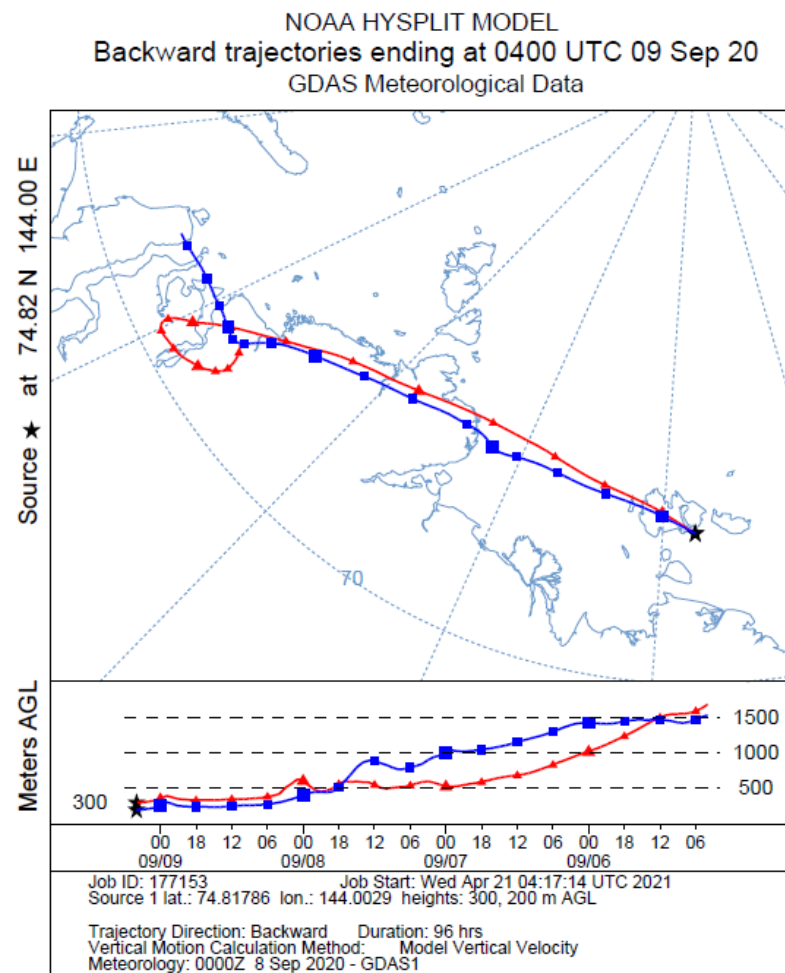
\* Correspondence: safatov@mail.ru or safatov@vector.nsc.ru



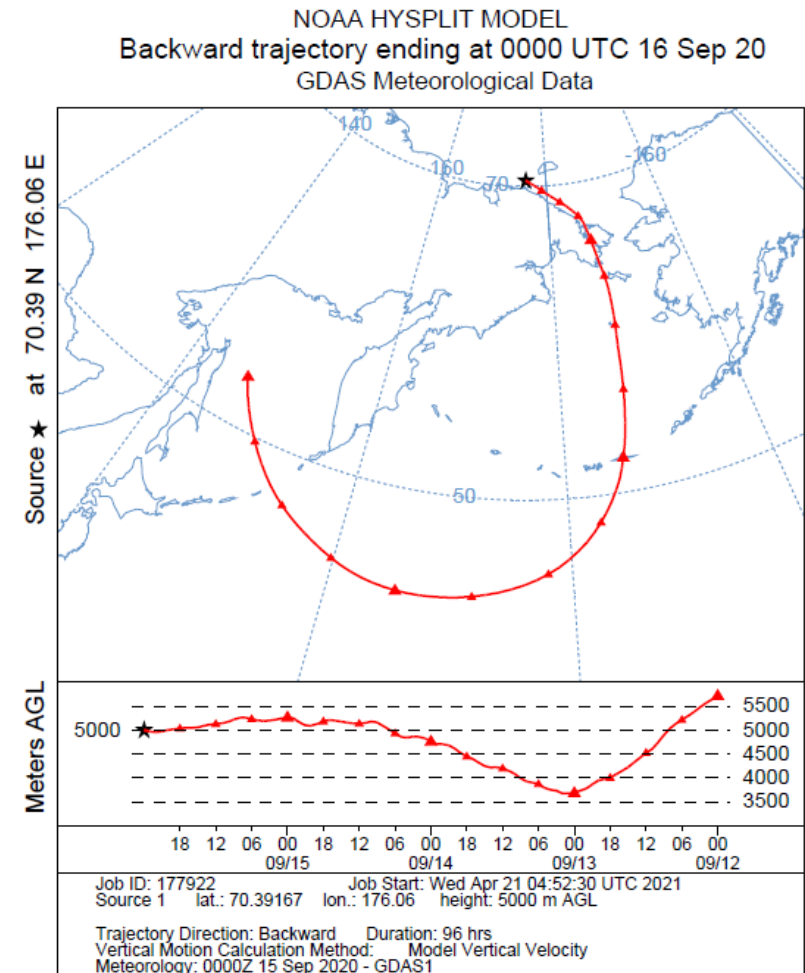
**Figure S1.** Backward trajectory of air masses from which an air sample was taken at an altitude of 200 m above the Barents Sea.



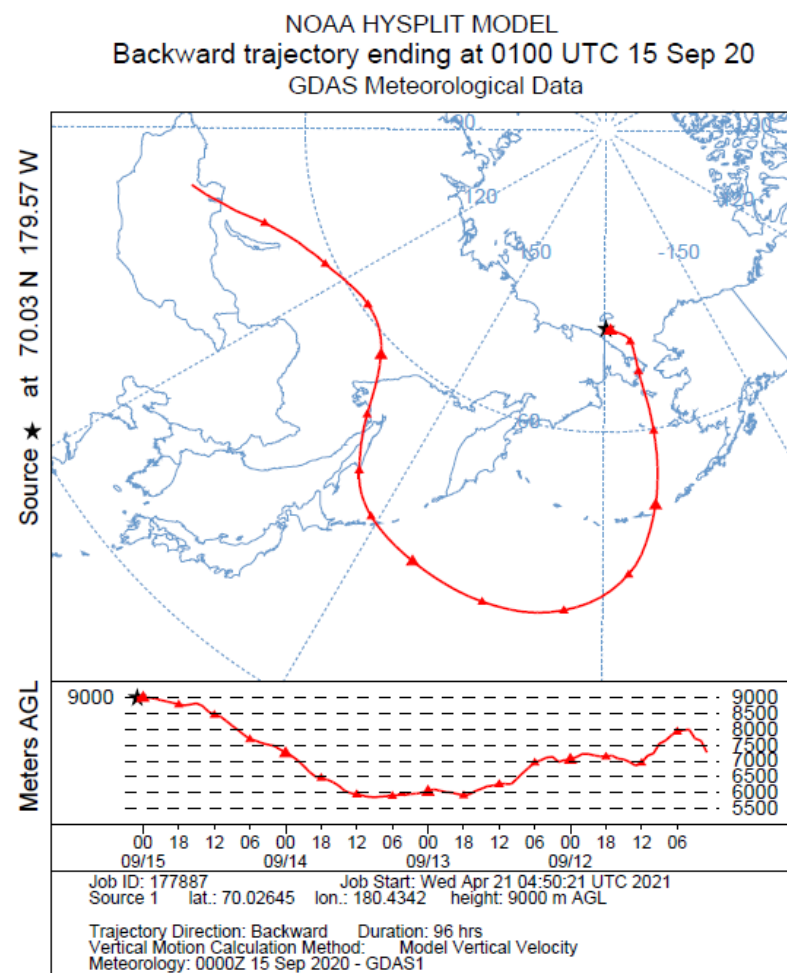
**Figure S2.** Backward trajectories of air masses from which an air sample was taken at altitudes of 200 - 500 m above the Kara Sea.



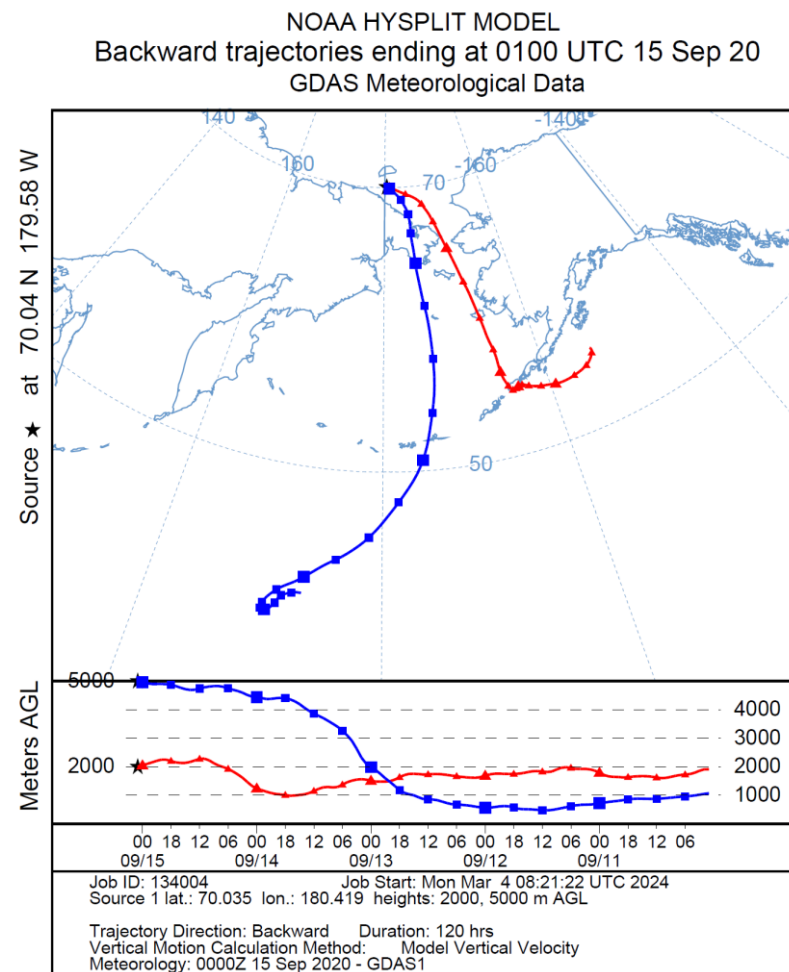
**Figure S3.** Backward trajectories of air masses from which an air sample was taken at altitudes of 200 - 300 m above the Laptev Sea.



**Figure S4.** Backward trajectory of air masses from which an air sample was taken at an altitude of 500 m above the East Siberian Sea.



**Figure S5.** Backward trajectory of air masses from which an air sample was taken at an altitude of 9000 m above the Chukchi Sea.



**Figure S6.** Backward trajectories of air masses from which an air sample was taken at altitudes 2000 – 5000 m above the Chukchi Sea.

**Table S1.** Antifungal effect of bacilli strains on the pathogenic strain of *Candida albicans* determined by the diffusion method on an agarized nutrient medium.

Strains bacilli	C. albicans FA-1		Strains bacilli	C. albicans FA-1	
	zone (mm)			zone (mm)	
	lysis	oppression		lysis	oppression
Sp-12	25	20	Sp-81	-	40
Sp-17	38	7	Sp-82	30	15
Sp-48	35	20	Sp-83	-	40
Sp-50	30	15	Sp-86	20	25
Sp-59	25	20	Sp-86-1	25	20
Sp-56	25	20	Sp-90	30	15
Sp-60	35	10	Sp-91	25	20
Sp-62	-	45	Sp-95	-	40
Sp-64	25	20	Sp-100	25	20
Sp-67	25	20	Sp-104	-	40
Sp-69	35	10	Sp-105	35	10
Sp-70	38	7	Sp-109	-	40
Sp-71	35	10	Sp-110	25	20
Sp-75	35	10	Sp-111	-	40
Sp-79	30	15	Sp-120	35	10
Sp-80	-	40	Sp-140	37	8

**Table S2.** Sensitivity determination to antibiotics of strains belonging to the group of staphylococci using the disk diffusion method.

Strain	Antibiotic, amount on the disk / zone of inhibition or lysis, mm							Strain	Antibiotic, amount on the disk / zone of inhibition or lysis, mm						
	Gentomycin, 10 µg	Ciprofloxacin, 30 µg	Kanamycin, 30 µg	Vancomycin, 30 µg	Levofloxacin, 5 µg	Benzy/penicillin, 10 IU	Oxacillin, 10 µg		Gentomycin, 10 µg	Ciprofloxacin, 30 µg	Kanamycin, 30 µg	Vancomycin, 30 µg	Levofloxacin, 5 µg	Benzy/penicillin, 10 IU	Oxacillin, 10 µg
<b>Sp-3</b>	24	30	22	18	26	30	26	<b>Sp-52</b>	30	28	26	20	28	30	24
<b>Sp-6</b>	25	16	20	15	20	37	25	<b>Sp-53</b>	25	30	28	26	30	30	30
<b>Sp-7</b>	40	38	30	38	32	45	42	<b>Sp-61</b>	25	24	22	20	30	12	25
<b>Sp-9</b>	10	40	0	20	30	45	34	<b>Sp-85</b>	27	25	24	16	26	26	20
<b>Sp-10</b>	22	32	15	20	28	36	30	<b>Sp-87</b>	24	20	12	18	24	20	16
<b>Sp-13</b>	27	25	20	15	30	32	30	<b>Sp-89</b>	30	30	26	20	25	24	28
<b>Sp-28</b>	30	20	22	18	15	15	35	<b>Sp-92</b>	30	30	25	25	30	26	39
<b>Sp-33</b>	28	30	25	30	35	30	29	<b>Sp-93</b>	30	30	24	25	28	30	30
<b>Sp-35</b>	27	26	22	17	28	21	25	<b>Sp-97</b>	22	20	18	14	22	0	0
<b>Sp-36</b>	27	22	21	18	23	16	27	<b>Sp-99</b>	22	24	20	16	22	0	20
<b>Sp-37</b>	14	30	0	16	25	12	25	<b>Sp-108</b>	22	20	22	15	17	20	17
<b>Sp-39</b>	20	12	18	15	23	35	26	<b>Sp-112</b>	30	25	26	20	30	18	32
<b>Sp-40</b>	30	25	20	18	22	32	28	<b>Sp-113</b>	15	27	10	13	23	0	22 <sub>A</sub>
<b>Sp-41</b>	25	24	18	16	22	34	22	<b>Sp-121</b>	32	27	23	20	25	20	26
<b>Sp-42</b>	28	30	0	18	25	28	25	<b>Sp-124</b>	28	22	10	20	22	15	24
<b>Sp-43</b>	25	30	28	18	32	35	30	<b>Sp-125</b>	18	24	22	18	20	35	30
<b>Sp-50</b>	30	40	25	22	32	40	35	<b>Sp-135</b>	22	20	18	18	24	25	23
<b>Sp-51</b>	22	24	28	20	32	32	30	<b>Sp-136</b>	14	22	0	14	22	12	22
<b>S. epide- rmidis MRSE, B-1350</b>	0	0	0	21	0	0	0	<b>S. aureus MRSA, B-1352</b>	0	0	0	5	0	0	0
<b>S. aureus B-1266</b>	24	25	15	20	21	35	22								

*Note:* when considering the results, recommendations were applied to the use of a set of disks to determine the sensitivity of staphylococci to antimicrobial drugs (APD) DI-PLS-50-01 according to TU 9398-001-39484474-2000 produced by Russian Federation LLC Scientific Research Center for Pharmacotherapy. Strains resistant to a given antibiotic are highlighted in color.

**Table S3.** Interpretation of growth retardation zone diameters in determining the sensitivity of cocci to antimicrobial agents by disk-diffusion method.

Antibiotic, amount on the disk	Diameter of culture zones, in mm		
	Resistant	Intermediate	Sensitive
Gentomycin, 10 µg	≤14	15-16	≥17
Ciprofloxacin, 30 µg	≤15	16-20	≥21
Kanamycin, 30 µg	≤14	15-18	≥19
Vancomycin, 30 µg	≤14	-	≥15
Levofloxacin, 5 µg	≤13	14-16	≥17
Oxacillin, 10 µg	≤11	12-13	≥14
Benzympenicillin, 10 IU	≤28	-	≥29

**Table S4.** Sensitivity determination to antibiotics by the disk diffusion method of strains of spore-forming bacteria.

Strain	Antibiotic, amount on the disk / zone of inhibition or lysis, mm							Strain	Antibiotic, amount on the disk / zone of inhibition or lysis, mm						
	Imipenem, 10 µg	Ciprofloxacin, 30 µg	Vancomycin, 30 µg	Linezolid, 30 µg	Γ Gentomycin, 10 µg	Norfloxacin, 10 µg	Levofloxacin 5 µg		Imipenem, 10 µg	Ciprofloxacin, 30 µg	Vancomycin, 30 µg	Linezolid, 30 µg	Γ Gentomycin, 10 µg	Norfloxacin, 10 µg	Levofloxacin 5 µg
<b>Sp-11</b>	26	20	20	30	18	15	15	<b>Sp-74</b>	22	20	18	24	15	12	20
<b>Sp-12</b>	30	30	16	25	20	22	28	<b>Sp-140</b>	20	17	14	20	15	10	14
<b>Sp-32</b>	0	20	14	22	12	0	13	<b>Sp-141</b>	25	24	16	20	18	16	22
<b>Sp-50</b>	25	24	20	26	20	20	25	<b>Sp-75</b>	15	22	15	25	18	15	22
<b>Sp-59</b>	20	25	13	18	16	14	20	<b>Sp-78</b>	24	25	20	28	26	24	20
<b>Sp-60</b>	17	20	15	18	15	16	20	<b>Sp-79</b>	25	23	20	25	16	17	24
<b>Sp-56</b>	20	23	15	18	15	16	22	<b>Sp-80</b>	24	25	16	20	18	16	25
<b>Sp-64</b>	20	24	14	20	18	17	20	<b>Sp-81</b>	21	25	15	23	17	18	24
<b>Sp-62</b>	20	24	14	22	16	18	20	<b>Sp-82</b>	25	25	18	23	20	18	28
<b>Sp-67</b>	28	25	15	24	16	18	26	<b>Sp-86</b>	20	22	18	25	20	18	25
<b>Sp-69</b>	18	0	11	18	15	10	9	<b>Sp-83</b>	22	20	16	22	18	20	22
<b>Sp-70</b>	19	9	14	18	15	16	18	<b>Sp-90</b>	0	8	14	21	15	15	20
<b>Sp-71</b>	15	12	15	16	14	15	20	<b>Sp-91</b>	22	24	20	22	15	20	22
<b>Sp-95</b>	15	25	26	20	18	15	25	<b>Sp-109</b>	19	20	16	24	14	20	20
<b>Sp-96</b>	22	16	18	20	15	16	15	<b>Sp-110</b>	18	26	16	24	18	15	20
<b>Sp-139</b>	20	23	10	0	14	20	18	<b>Sp-111</b>	25	15	22	25	17	16	23
<b>Sp-100</b>	20	24	16	24	16	16	10	<b>Sp-117</b>	25	22	15	23	17	18	24
<b>Sp-101</b>	26	27	18	23	18	20	25	<b>Sp-120</b>	18	20	13	18	18	15	17
<b>Sp-104</b>	25	26	16	22	18	16	13	<b>Sp-127</b>	14	15	8	8	12	16	16
<b>Sp-105</b>	20	22	18	26	18	18	25	<b>Sp-138-2</b>	22	25	16	24	14	15	24
<b>E. coli B-1373</b>	16	20	6	0	17	21	22	<b>B.subtilis B-1376</b>	18	10	14	20	18	16	12
<b>B. cereus B-1367</b>	22	12	7	28	17	16	22								

*Note:* when considering the results, recommendations were applied to the use of a set of disks to determine the sensitivity of staphylococci to antimicrobial drugs (APD) DI-PLS-50-01 according to TU 9398-001-39484474-2000 produced by LLC Scientific Research Center for Pharmacotherapy.

**Table S5.** Interpretation of growth retardation zone diameters in determining the sensitivity of strains of spore-forming bacteria to antimicrobial agents by disk-diffusion method.

Antibiotic, amount on the disk	Diameter of culture zones, mm		
	Resistant	Intermediate	Sensitive
Gentomycin, 10 µg	≤12	13-14	≥15
Ciprofloxacin, 30 µg	≤15	16-20	≥21
Vancomycin, 30 µg	≤14	15-16	≥17
Levofloxacin 5 µg	≤13	14-16	≥17
Norfloxacin, 10 µg	≤12	13-16	≥17
Imipenem, 10 µg	≤13	14-15	≥16
Linezolid, 30 µg	≤20	-	≥21