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SECTION 9. Chemistry and chemical technology.

INFLUENCE OF FUNCTIONAL GROUPS ON THE ANTIMICROBIAL PROPERTIES IN LUBRICATING OF OIL M-11

Abstract: *In this scientific work have been investigated the basic features of influence of functional groups on the antimicrobial properties in lubricating of oil M-11.*

It should be noted that this class of sulphides, meaningfully diameter of microbial growth inhibition zone, second only benzilalkoksikarbonilmetildisulfids.

These results suggest that the best antimicrobial properties are polar compounds, ester having at the edges and in the middle disulfide functional groups. Aromatic disulfides containing an oxycarbonyl group, the additives are effective antimicrobial lubricating oil M-11.

The structure of the synthesized sulphides confirmed by IR - and NMR - spectroscopy. IR spectra of synthesized compounds were recorded on a spectrophotometer "UR-20" in the range of 400-4000 sm-1.

Key words: *lubricating of oil M-11, functional groups, antimicrobial properties.*

Language: *English*

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Introduction

From the scientific literature identified [1, 41] that various additives are used for improving the antimicrobial properties of lubricating oils. These additives, generally have a different structure, and since they contain different functional groups which further affect their antimicrobial properties [3, 22].

Materials and Methods

To this end, using techniques developed by us previously synthesized disulfides [4, 31-57] structure containing a carbonyl, oxycarbonyl, and disulfide (C = O, -OC (O) - and -S-S-) functional groups.

Physico-chemical characteristics of the synthesized compounds. These results are shown in Table 1.

Table 1

Physical and chemical synthesis of unsymmetrical sulfides.

№	Compound	Exit, %	(C/0,2 mm pr.cr.) T.пл. (°C)	n_D^{20}	d_4^{20}	MR_D		Elemental composition, %					
								found			calculated		
						found	calculated	C	H	S	C	H	S
1	$C_6H_5CH_2SSC_3H_7$	45.6	90-92	1.5662	1.0734	60.32	60.62	60.56	7.12	32.32	60.17	6.65	33.13
2	$C_6H_5CH_2SSC_5H_{11}$	48.2	118-120	1.5496	1.0423	69.53	69.86	63.65	8.02	28.32	62.82	8.06	29.12

3	$C_6H_5CH_2SSC(O)C_3H_7$	50,1	118 - 120	1,5460	1,0935	65,57	65,25	56,16	5,78	29,06	58,36	6,24	28,33
4	$C_6H_5CH_2SSC(O)C_5H_{11}$	48,6	132 - 134	1,5228	1,0362	75,02	74,43	60,95	6,84	26,04	61,37	7,13	25,21
5	$C_6H_5CH_2SSCO(O)C_3H_7$	43,5	63	-	-	-	-	55,67	5,88	25,82	56,21	6,29	25,01
6	$C_6H_5CH_2SSC(O)C_5H_{11}$	48,2	56	-	-	-	-	58,72	6,64	23,12	59,12	7,09	22,55

The structure of the synthesized sulphides confirmed by IR - and NMR - spectroscopy.

IR spectra of synthesized compounds were recorded on a spectrophotometer "UR-20" in the range of 400-4000 sm-1.

The IR - spectra of ethyl benzyl disulfide band appears stretching vibrations, -S-S- characteristic of communication at 460 ± 10 cm-1.

The TMR - amilbenzildisulfida observed spectrum signals from aromatic (in 7 ÷ 7,17 ppm) and methylenes (in the range 4.83 ÷ 4.42 ppm) of protons S5N11 signals from n (-S- S-CH2 δ = 2,68 ppm (CH2) 3 δ = 1 ÷ 2 m ppm, -SN3- δ = 0,95 ppm triplet distorted).

The IR - spectrum benzildekanoildisulfida detected absorption bands at 460 ± 10 cm-1, characteristic for the group -S-S- and stretching vibrations 1710 ± 10 cm-1 corresponding to the C = O group.

The TMR - spectrum contains signals characteristic for aromatic (in 7 ÷ 7,17 ppm) and methylenes (in the range 4.83 ÷ 4.42 ppm) of protons. In addition to these signals from n-C3H7, there are, respectively, -C-CH2- δ = 2,45 ppm triplet, -CH- δ = 1,61 ppm sextet, -SN3- δ = 0,90 ppm triplet.

The IR - spectrum benzilpropoksikarbonilmetildisulfida detected absorption bands at 460 ± 10 cm-1, characteristic for the group -S-S- and stretching vibrations 1270 ± 10 cm-1 corresponding to the -C-O- group, and in 1700 ± 10 cm -1, corresponding to the C = O group.

The TMR - spectrum contains signals from aromatic (in 7 ÷ 7,17 ppm) and methylenes (in the range 4.83 ÷ 4.42 ppm) of protons. In addition to these signals in said disulfide observed from S5N11-n (-C-O-CH- ppm δ = 4,23 t (CH2) 3 δ = 1,1 ÷ 2,1 ppm, m, - CH3 δ = 0,95 ppm doublet garbled).

With increasing concentration of sulphate in the oil of their antimicrobial properties efficacy increases. For example, at a concentration of 1.5% benzilpropoksikarbonilmetildisulfid appreciably increases the resistance of the oil to M-11 microorganisms (24, 22, 16 mm), especially bacterial and fungal cultures.

Tests alkilbenzildisulfids oil M-11 have shown that elongation of the alkyl radical of the antimicrobial efficacy is reduced.

For example, M-11 oil containing 1.5% propilbenzildisulfida diameter of microbial growth inhibition zone is respectively 14, 12, 20 mm, and in case amilbenzildisulfida it is respectively 16, 14 and 20 mm.

Alkilalkoildisulfids test results show that the compounds tested, mainly, are more effective antimicrobial additives than alkilbenzildisulfidy.

It should be noted that this class of disulfides meaningfully diameter of microbial growth inhibition zone, second only benzilalkoksikarbonilmetildisulfids.

Conclusion

1. It should be noted that this class of sulphides, meaningfully diameter of microbial growth inhibition zone, second only benzilalkoksikarbonilmetildisulfidam.

2. These results suggest that the best antimicrobial properties are polar compounds, ester having at the edges and in the middle disulfide functional groups. Aromatic disulfides containing an oxycarbonyl group, the additives are effective antimicrobial lubricating oil M-11.

3. With increasing concentration of sulphate in the oil of their antimicrobial properties efficacy increases. For example, at a concentration of 1.5% benzilpropoksikarbonilmetildisulfid appreciably increases the resistance of the oil to M-11 microorganisms (24, 22, 16 mm), especially bacterial and fungal cultures.

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5. The TMR - amilbenzildisulfida observed spectrum signals from aromatic (in 7 ÷ 7,17 ppm) and methylenes (in the range 4.83 ÷ 4.42 ppm) of protons S5N11 signals from n (-S- S-CH2 δ = 2,68 ppm (CH2) 3 δ = 1 ÷ 2 m ppm, -SN3- δ = 0,95 ppm triplet distorted).

6. The TMR - spectrum contains signals from aromatic (in 7 ÷ 7,17 ppm) and methylenes (in the range 4.83 ÷ 4.42 ppm) of protons. In addition to these signals in said disulfide observed from S5N11-n (-C-O-CH- ppm δ = 4,23 t (CH2) 3 δ = 1,1 ÷ 2,1 ppm, m, - CH3 δ = 0,95 ppm doublet garbled).

7. Comparative tests of the antimicrobial properties of the synthesized disulfide give reason to place them in the following number:

S6N5SN2SSR <C6H5CH2SSC (O) R <C6H5CH2SSCH2CO (O) R.

8. The results of the research allowed to identify among disulfides synthesized antimicrobial additives with optimal structure and on their basis to develop new lubricant compositions.

References:

1. Farzaliev VM, Ismaylova ND, Musaeva ME (2009) Prisadki k smazochnym maslam: istoriya nauki. Baku, Elm, pp. 41.
2. Novruzova HA (1996) Sintez i issledovanie gidroksiarilalkil-sul'fadov v kachestve zashchitnykh prisadok k smazochnym maslam. Materialy nauchnoy konferentsii aspirantov AN Azerbaydzhana. Baku, pp. 34.
3. Farzaliev VM, Soltanova ZG, Babaev NR, Alieva KhSh, Yusifova L M, Tairova RYu (2014) Proizvodnye etilenglikolevykh efirov fenoksiuksusnoy kisloty v kachestve prisadok k smazochnym maslam. Protsessy neftekhimii i neftepererabotki, Baku, tom 15, №1 (57), pp. 22
4. Aliev FY (1980) Disc... kand. khim. nauk. Baku, pp. 31-57.
5. Danilov AM (2000) Primenenie prisadok v toplivakh dlya avtomobiley: Sprav, izd. - Moscow: Khimiya, 232 p.
6. Kuliev AM (1972) Khimiya i tekhnologiya prisadok k maslam i toshshvam. Moscow, 358 p.
7. Vilenkin AV (1982) Masla dlya shesterenchatykh peredach, Moscow, 1982
8. Erikh VN, Rasina MG, Rudin MG (1985) Khimiya i tekhnologiya nefti i gaza. 3 izd., L., pp. 90-94
9. Gureev AA, Fuks IG, Lashkhi VL (1986) Khimmotologiya, Moscow, pp. 208-24
10. (1989) Topliva, smazochnye materialy, tekhnicheskie zhidkosti. Assortiment i primenenie. Sprav, izd., pod red. V. M. Shkol'nikova, Moscow, pp. 363