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SYNTHESIS AND ANTIBACTERIAL ACTIVITY OF NEW HYDROCHLORIDES OF 2-DIALKYLAMINOALKYL 2-SUBSTITUTED QUINOLINE-4-CARBOXYLATES

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This work presents studies of antibacterial activity of new hydrochlorides of 2-dialkyl-aminoalkyl-4-[2-(4-substituted phenyl)quinolyl]benzoates. It has been shown that some compounds in this series have the indicated activity against gram-positive and gram-negative bacteria. The structure and biological activity regulations have been found.

Table 1, references 14.

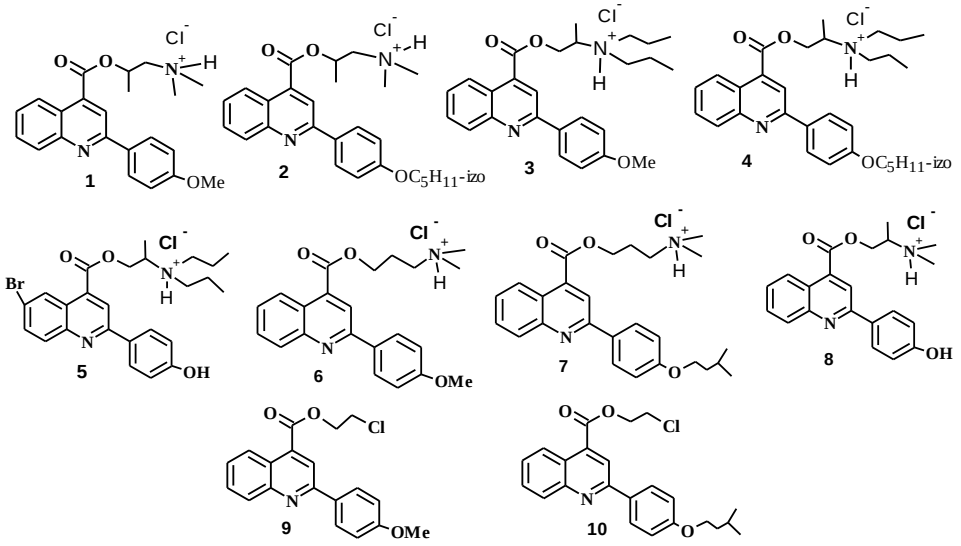
Infectious diseases are widely controlled by antimicrobial agents, but increasing the resistance of microorganisms to antimicrobial agents in the last few years has become a serious public health problem, and this has led to the need to develop some new, powerful and safe antimicrobial agents against resistant strains of microbes. It has been established that quinolines are becoming increasingly important due to their wide range of biological and pharmacological activities [1]. A number of biological activities are associated with quinoline-containing compounds, such as anti-malarial drugs [2,3], especially those that contain chalcones [4], anti-inflammatory agent, asthmatic, antibacterial [5,6], antihypertensive, anti-cancer [7], tyrosine kinase inhibitors and antinuclear inhibitors of the immunodeficiency virus [8]. In addition, quinoline derivatives were used to prepare nanostructures and polymers that combine improved electronic, optoelectronic, or nonlinear optical properties with excellent mechanical properties [9].

In the present work, the newly synthesized 2-dialkylaminoalkyl-4-[2-(4-substituted phenyl) quinolyl]carboxylate hydrochlorides **1-10** were screened for antibacterial activity against gram-positive staphylococci (*Staphylococcus aureus* 209p, 1) and gram-negative rods (*Sh. Fleaneri* 6858, *E. Coli* 0-55) [10].

The experimental pharmacological part

The antibacterial activity of compounds **1-10** was studied according to the procedure [11] with a bacterial load of 20 million microbial bodies per 1 *ml* of medium. Gram-positive staphylococci (*Staphylococcus aureus* 209p, 1) and gram-negative bacilli (*Sh. Fleaneri* 6858, *E. Coli* 0-55) were used in the experiments. Compounds were tested at a dilution of 1-20 prepared in DMSO. The molten agar media were poured in two layers into Petri dishes. For the lower layer, an inoculated medium 10 *ml* was used, and for the upper layer, agar medium 5 *ml* was previously seeded with the appropriate test culture. The temperature of the molten medium for seeding was 48-50°C. After solidification of the seeded agar on its surface, at a distance of about 28 *mm* from the center of the plate, 6 sterile stainless steel cylinders were placed. All cylinders were of the same weight and size with a height of 10 *mm* and an inner diameter of 6 *mm*. At the same time, 0.1 *ml* was pipetted into the cylinders of each cup (test compound solution).

Scheme



The cups were kept at room temperature for 2 *hours*, after which they were incubated in a thermostat at a temperature of 37°C for 20-24 *hours*. The results were taken into account by the diameter (d, *mm*) of zones of the absence of growth of microorganisms at the site of application of the compounds. The diameters of the zones were measured with great accuracy using a ruler or an enlarger. The experiments were repeated at least 3 times. Statistical processing was performed according to the Student-Fisher method. As a positive control, the well-known drug furazolidone in tablets was used, taking into account the pure substance.

Results and their discussion

Studies of the antibacterial activity of compounds **1-10** showed (Table) that some of them had antimicrobial properties. It turned out that compounds **2, 4, 7, 10** with 4-(3-methylbutoxy)] phenyl radical in position 2 of the quinoline ring exhibited weak antibacterial activity, inhibiting the growth of microorganisms used in the zone with a diameter of 10-13 *mm*. When the 4-(3-methylbutoxy)]phenyl radical was replaced at the 2nd position of the quinoline ring by the 4-methoxyphenyl **1, 3, 6,** the activity of the substances increased significantly (d = 17-21 *mm*). The introduction of 4-hydroxyphenyl radical led to a noticeable decrease in the activity of compounds **5, 8**. As can be seen from the Table, the aminoalkyl part of the molecule strongly affected the activity of the compounds.

Table

Antibacterial activity of compounds (1-10)

Compounds №	209p	1	Sh.lexneri 6858	E. coli 0-55209p
1	15.0±1.0	15.3±2.0	17.3±1.2	17.0±1.0
2	12.3±0.6	12.0±1.0	16.6±0.6	15.0±1.0
3	18.0±2.0	17.0±1.0	16.3±1.5	16.6±0.6
4	11.0±1.0	12.3±0.6	11.0±0	10.0±0
5	12.3±0.6	10.0±0	10.0±0	10.0±0
6	11.0±0	11.6±0.6	12.3±0.6	12.0±1.0
7	10.0±0	10.3±0.6	12.0±1.0	11.3±0.6
8	17.6±1.3	16.3±0.6	21.0 ±2.0	21.3±1.5
9	11.0±1.0	12.3±0	10.0±0	10.0±0
10	11.0±1.0	12.0±1.0	10.0±0	10.0±0
Furazolidone	25.0±2.0	4.0±1.0	4.6±1.0	24.3±0.6

So, in compounds **9, 10** there is no tertiary amine (-NR_2) group, antibacterial activity drops sharply, although other pharmacophore groups (ester, 2-methoxyphenyl, quinoline) are present. This allows us to conclude that the tertiary amine (-NR_2) group plays an important role in the appearance of activity. However, it should be noted that the studied compounds are inferior in activity to the control drug furazolidone (d = 24-25 *mm*).

Thus, the synthesis of new derivatives in the series of hydrochlorides of 2-dialkyl-aminoalkyl-4-[2-(4-substituted phenyl)quinolyl]carboxylates and the search among them for compounds with antibacterial activity will continue.

The experimental chemical part

IR spectra were recorded on a NICOLET AVATAR 330 FT-IR spectrometer. ^{1}H NMR spectra were recorded on a Mercury VX-300 spectrometer (300.08 *MHz*), in a DMSOd6-CF3COOD mixture, internal standard – TMS. The melting point of the obtained substances was determined on a Boetius instrument. The individuality of substances was controlled by TLC on Silufol-254 plates in the butanol – ethanol – acetic acid – water system (8–2–1–3) and the developer — iodine vapors.

2-Substituted quinoline-4-carboxylic acids were prepared according to the method of [12], acid chlorides according to [13], aminoalkyl esters of 2-substituted quinoline-4-carboxylic acids and hydrochlorides **1-10** - by [14].

Compounds **1-10** are crystalline substances with a bright yellow color, the structure of which is confirmed by ^{1}H NMR and IR spectrometry. In the IR spectra of esters, strong absorption bands of stretching vibrations of the carbonyl group at 1700-1725 cm^{-1} are observed. C-O ether in the region of 1100-1110 cm^{-1}, vibration $^+$NH hydrochloride in the region of 2400-2600 cm^{-1}. In the ^{1}H NMR spectra there is a wide singlet of hydrochloride protons at 10.81, 11.40, 12.08 ppm, a set of signals of the quinoline, benzene rings.

Hydrochlorides of 2-dialkylamino(chloro)alkyl-2-substituted quinoline-4-carboxylates (1-10). (General production method). To a solution (0.046 *mol*) of the corresponding acid chloride in 35 *ml* of dry benzene, while cooling, 0.061 *mol* of aminopropanol in 35 *ml* of dry benzene was gradually added dropwise. The mixture was boiled in a water bath for 6-7 *hours*, cooled, and 10 *ml* of a saturated solution of potassium carbonate was slowly added dropwise. The benzene layer was separated, and the aqueous was extracted with benzene (3×50 *ml*). The combined benzene extracts were dried with anhydrous sodium sulfate. After distillation of benzene, oily substances were obtained. To the ether solution 10 ml of a saturated ether solution of HCl (to pH1) was added dropwise with cooling. The precipitate was filtered off, recrystallized from absolute acetone.

2-({[2-(4-Metoxyphenyl)quinolin-4-yl]carbonyl}oxy)-*N*,*N*-dimethylpropan-1-aminium chloride (1). Yield 73%, mp 167-170°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1715 (COO). ^{1}H NMR spectrum, ppm: 1.54 d (3H, CH_3CH, J 6.3 Hz); 2.88-2.89 both d (3H each, N (CH3) 2, J 3.0 Hz); 3.47 dd (1H, CH_2, J1 14.0, J2 6.7, J3 2.3 Hz); 3.66 dd (1H, CH_2, J1 14.0, J2 9.2, J3 3.5 Hz); 3.90 s (3H, OCH_3); 5.72 m (1H, OCH); 7.03-7.039 and 8.45-8.50 (2H, both m, $C_6H_4OCH_3$); 7.63 dd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.4 Hz); 7.79 dd (1H, C_6H_4, J1 8.6, J2 6.8, J3 1.5 Hz); 8.31 dd (1H, C_6H_4, J1 8.5, J2 1.4 Hz); 8.63 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 8.87 s (1H, H-3); 12.16 wide (1H, HCI). Found, %: C 65.90; H 5.94; N 6.96; CI 8.84. C_{22} H_{25} N_2 O_3 CI. Calculated, %: C 65.91; H 5.99; N 6.99; CI 8.66.

2-({[2-(4-(3-Methylbutoxy)phenyl)quinolin-4-yl]carbonyl}oxy)-*N,N*-dimethylpropan-1-aminium chloride (2). Yield 71%, mp 163-165°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1711 (COO). ^{1}H NMR spectrum, ppm: 1.00 d (6H,$(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 1.16 d (3H, CH_3) $2CHCH_2CH_2O$, J 6.6 Hz); 2.81-2.84 both d (3H each, $N(CH_3)_2$, N $(CH_3)_2$, J 4.9 Hz); 2.95 dd (1H, N CH_2, J1 13.0, J2 9.7, J3 3.9 Hz); 3.07 dd (1H, NCH_2, J1 13.0, J2 6.3, J3 2.6 Hz); 4.09 t (2H, OCH_2, J 6.6 Hz); 4.16 dcd (1H, OCH, J1 9.7, J2 6.3, J3 2.6 Hz); 7.00-7.05 and 8.25-8.30 both m (2H each, $C_6H_4OC_5$ H_{11}); 7.62 dd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.4 Hz); 7.79 dd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.5 Hz); 8.39 dd (1H, C_6H_4, J1 8.4 Hz); 8.43 s (1H, H-3); 8.76 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 10.81 wide (1H, HCI). Found, %: C 68.32; H 7.21; N 6.10; CI 7.75. $C_{26}H_{33}N_2O_3CI$. Calculated, %: C 68.34; H 57.22; N 6.13; CI 7.77.

2-({[2-(4-Metoxyphenyl)quinolin-4-yl]carbonyl}oxy)-*N,N*-Dipropyl-propan-1-aminium chloride (3). Yield 76%, mp 188-189°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1714 (COO). ^{1}H NMR spectrum, ppm: 0.95 and 1.01 both t (3H each, $CH_3CH_2CH_2$), J 7.3 Hz); 1.55 d (3H CH_3CH, J 6.8 Hz); 1.82-2.08 m (4H, $N(CH_2CH_2CH_3)_2$); 2.96-3.26 m (4H, $N(CH_2CH_2CH_3)_2$); 3.90 s (3H, OCH_3); 4.02 m (1H, OCH); 4.77 dd (1H, CH_2CH, J1 12.6, J2 4.1 Hz); 4.87.d.d. (1H, CH_2CH, J1 12.6 Hz, J2 5.3 Hz); 7.03-7.08 and 8.36-8.41 both m (2H, $C_6H_4OCH_3$ each); 7.64 dd (1H, C_6H_4, J1 8.5, J2 6.9, J3 1.4 Hz); 7.81 dd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.5 Hz); 8.34.dd (1H, C_6H_4, J1 8.5, J2 1.4 Hz); 8.65 s (1H, H-3); 8.66 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 12.08 wide (1H, HCI). Found, %: C 68.30; H 7.20; N 6.12; CI 7.76. $C_{26}H_{33}N_2O_3CI$. Calculated, %: C 68.34; H 7.22; N 6.13; CI 7.77.

2-({[2-(4-(3-Methylbutoxy)phenyl)quinolin-4-yl]carbonyl}oxy)-*N,N*-Dipropylpropan -1-aminium chloride (4). Yield 78%, mp 98-199°C, Rf 0.56. IR spectrum, υ, cm^{-1}: 1713 (COO). ^{1}H NMR spectrum, ppm: 0.95 and 1.01 both t (In 3H, $CH_3CH_2CH_2$) 2, J 7.3 Hz); 1.00 d (6H, $(CH_3)_2CHCH_2$, CH_2O, J 6.6 Hz); 1.16 d (3H, CH_3CHO, J 6.3 Hz); 1.53 d (3H, CH_3CH, J 6.3 Hz); 1.70 k (2H, $(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 1.78-1.91 m (4H, $N(CH_2CH_2CH_3)_2$); 1.88 n (1H, $(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 3. 01-3.19 m (4H, N $(CH_2CH_2\ CH_3)_2$); 3.38-3.47 and 3.60-3.70 both m (1H, OCH_2 each); 5.62 m (1H, $CHCH_3$); 7.00-7.05 and 8.25-8.30 both m (2H each, $C_6H_4OC_5H_{11}$); 7.62 dd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.4 Hz); 7.79.ddd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.5 Hz); 8.39 dd (1H, C_6H_4, J1 8.4 Hz); 8.43 s (1H, H-3); 8.76.dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 10.81 wide (1H, HCI). Found, %: C 70.21; H 8.00; N 5.44; CI 6.90. C_{30} $H_{41}N_2O_3CI$. Calculated, %: C 70.24; H 8.00; N 5.46; CI 6.92.

1-({[6-Bromo-2-(4-hydroxyphenyl)quinolin-4-yl]carbonyl}oxy)-*N,N*-dipropylpropan-2-aminium chloride (5). Yield 64%, mp. 206-207°C, Rf 0.53. IR spectrum, υ, cm^{-1}: 1713 (COO). ^{1}H NMR spectrum, ppm: 0.95 and 1.01 both t (3H each, $CH_3CH_2CH_2)_2$), J 7.3 Hz); 1.55 d (3H, CH_3CH, J 6.8

Hz); 1.82-2.08 m (4H, $N(CH_2CH_2CH_3)_2$); 2.963.26 m. (4H, $N(CH_2CH_2CH_3)_2$); 3.90 s (3H, OCH_3); 4.02 m (1H, OCH); 4.77 dd (1H, CH_2CH, J1 12.6, J2 4.1 Hz); 4.87 dd (1H, CH_2CH, J1 12.6, J2 5.3 Hz Hz); 6.88-6.93 and 8.17-8.22 both m (2H, C_6H_4OH each); 7.84 dd (1H, C_6H_3Br, J1 8.9, J2 2.28 Hz); 8.00 d (1H, C_6H_3 Br, J1 8.9 Hz); 8.66 s (1H, H-3); 8.89 d (1H, C_6H_3Br, J 2.2 Hz); 9.71 br (1H, OH); 11.40 wide (1H, HCI). Found, %: C 57.50; H 5.73; N 5.33; CI 6.79. $C_{25}H_{30}BrN_2O_3CI$. Calculated, %: C 57.52; H 5.75; N 5.36; CI 6.80.

3-({[2-(4-Methoxyphenyl)quinolin-4-yl]carbonyl}oxy)-*N*,*N*-dimethyl-propan-1-aminium chloride (6). Yield 69%, mp 207-209°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1724 (COO). ^1H NMR spectrum, ppm: 2.34-2.43 m (2H, $OCH_2CH_2CH_2$); 2.81d (6H, $N(CH_3)_2$, J 4.9 Hz); 3.26-3.33 m (2H, NCH_2), 3.90 s (3H, OCH_3); 4.58 t (2H, OCH_2, J 6.1 Hz); 6.88-6.93 and 8.17-8.22 both m (2H, C_6H_4OH each); 7.84 dd (1H, C_6H_3Br, J1 8.9, J2 2.28 Hz); 8.00 d (1H, C_6H_3Br, J1 8.9 Hz); 8.66 s (1H, H-3); 8.89 d (1H, C_6H_3Br, J 2.2 Hz); 9.71 br (1H, OH); 11.40 wide (1H, HCI). Found, %: C 55.80; H 4.85; N 3.10; CI 7.84. $C_{21}H_{22}BrNO_3CI$. Calculated, %: C 55.81; H 4.87; N 3.10; CI 7.86.

3-({[2-(4-3-Methylbutoxy)phenyl)quinolin-4-yl]carbonyl}oxy)-*N*,*N*-dimethylpropan-1-aminium chloride (7). Yield 70%, mp. 166-167°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1713 (COO). ^1H NMR spectrum, ppm: 1.00 d (6H, $(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 1.70 k (2H, (CH_3) $2CHCH_2CH_2O$, J 6.6 Hz); 1.82-1.96 m (3H, $(CH_3)_2CHCH_2CH_2O$ and $OCH_2CH_2CH_2N$); 2.77 d (6H, $N(CH_3)_2$, J 4.6 Hz); 3.10-3.16 m (2H, $OCH_2CH_2CH_2N$); 3.56 t (2H, $OCH_2CH_2CH_2N$, J 5.8 Hz); 4.6 t (2H, $(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 6.97-7.00 and 8.17-8.22 both m (2H each, $C_6H_4OC_5H_{11}$); 7.53 dd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.5 Hz); 7.69.ddd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.5 Hz); 8.09 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 8.39 s (1H, H-3); 8.78.dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 11.34 wide (1H, HCl). Found, %: C 68.33; H 7.21; N 6.11; CI 7.76. $C_{26}H_{33}N_2O_3CI$. Calculated, %: C 68.34; H 7.22; N 6.13; CI 7.77.

3-({[2-(4-Hydroxyphenyl)quinolin-4-yl]carbonyl}oxy)-*N*,*N*-dimethylpropan-1-aminium chloride (8). Yield 69%, mp 207-209°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1724 (COO). ^1H NMR spectrum, ppm: 2.34-2.43 m (2H, $OCH_2CH_2CH_2$); 2.81 d (6H, $N(CH_3)_2$, J 4.9 Hz); 3.263.33 m (2H, NCH_2), 3.90 s (3H, OCH_3); 4.58 t (2H, OCH_2, J 6.1 Hz); 6.88-6.93 and 8.17-8.22 both m (2H, C_6H_4OH each); 7.84 dd (1H, C_6H_3Br, J1 8.9, J2 2.28 Hz); 8.00 d. (1H, C_6H_3 Br, J1 8.9 Hz); 8.66 s (1H, H-3); 8.89 d. (1H, C_6H_3Br, J 2.2 Hz); 9.71 br (1H, OH); 11.40 wide (1H, HCI). Found, %: C 55.80; H 4.85; N 3.10; CI 7.84. $C_{21}H_{22}BrNO_3CI$. Calculated, %: C 55.81; H 4.87; N 3.10; CI 7.86.

2-Chloroethyl-2-(4-methoxy)phenyl]quinoline-4-carboxylate (9). Yield 91%, mp 167-169°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1722 (COO). ^1H NMR spectrum, ppm: 3.89 s (3H, OCH_3); 3.99 m (2H, OCH_2CH_2CI); 4.71 m

(2H, OCH_2CH_2CI); 7.027.70 and 8.21-8.26 both m (2H each, $C_6H_4OCH_3$); 7.61 dd (1H, C_6H_4, J1 8.6, J2 6.8, J3 1.4 Hz); 7.78 m (1H, C_6H_4); 8.24 dd (1H, C_6H_4, J1 8.6, J2 1.4 Hz); 8.44 s (1H, H-3); 8.66 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz). Found, %: C 66.76; H 4.71; N 4.09; CI 10.36. $C_{19}H_{16}CI\ NO_3$. Calculated, %: C 66.77; H 4.72; N 4.10; CI 10.37.

2-Chloroethyl-2-[4-(3-methylbutoxy)phenyl]quinoline-4-carboxylate (10). Yield 93%, mp 170-172°C, Rf 0.55. IR spectrum, υ, cm^{-1}: 1723 (COO). ^{1}H NMR spectrum, ppm: 1.00 d (6H, $(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 1.71 q (2H, $(CH_3)_2CHCH_2CH_2O$, J 6.6 Hz); 1.89 n (1H, $(CH_3)_2CHCH_2$, J 6.6 Hz); 3.98 m (2H, OCH_2CH_2CI); 4.08 t (2H, $OCH_2CH_2CH\ (CH_3)_2$, J 6.6 Hz); 4.71 m (2H, OCH_2CH_2CI); 7.00-7.05 and 8.25-8.30 both m (2H each, $C_6H_4OC_5H_{11}$); 7.62 dd (1H, C_6H_4, J1 8.45, J2 6.8, J3 1.5 Hz); 7.79 ddd (1H, C_6H_4, J1 8.5, J2 6.8, J3 1.5 Hz); 8.30 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); 8.44 s (1H, H-3); 8.66 dd (1H, C_6H_4, J1 8.5, J2 1.5 Hz); Found, %: C 69.42; H 6.07; N 3.51; CI 8.90. $C_{23}H_{24}CINO_3$. Calculated, %: C 69.43; H 6.08; N 3.52; CI 8.91.

ՆՈՐ ԴԻԱԼԿԻԼԱՄԻՆԱ(ՔԼՈՐ)ԱԼԿԻԼ-4-[2-(4-ՏԵՂԱԿԱԼՎԱԾ ՓԵՆԻԼ)ՔԻՆՈԼԻԼ]ԿԱՐԲՕՔՍԻԼԱՏՆԵՐԻ ՀԻԴՐՕՔԼՈՐԻԴՆԵՐԻ ՍԻՆԹԵԶԸ ԵՎ ՀԱԿԱՄԱՆՐԷԱԿԱՆ ԱԿՏԻՎՈՒԹՅԱՆ ՈՒՍՈՒՄՆԱՍԻՐՈՒԹՅՈՒՆՆԵՐԸ

Ա. Ղ. ԻՍԱԽԱՆՅԱՆ, Հ. Մ. ՍՏԵՓԱՆՅԱՆ,
Ռ. Վ. ՊԱՐՈՆԻԿՅԱՆ և Ա. Ա. ՇԱՀԽԱՏՈՒՆԻ

Այս աշխատանքում ներկայացված են նոր 2-դիալկիլամինաալկիլ-4-[2-(4-տեղակալված փենիլ)քինոլիլ]կարբօքսիլատների հիդրոքլորիդների սինթեզը և հակամանրէական ակտիվության ուսումնասիրությունները: Ցույց է տրվել, որ այս շարքի որոշ միացություններ ունեն նշված ակտիվությունը գրամդրական ստաֆիլակոկկերի (Staphylococcus aureus 209p,1) և գրամբացասական(Sh.Fleaneri 6858, E.Coli 0-55) ցուպիկների նկատմամբ: Հայտնաբերվել են կառուցվածքի և կենսաբանական ակտիվության միջև որոշ օրինաչափություններ:

СИНТЕЗ И ИЗУЧЕНИЕ АНТИБАКТЕРИАЛЬНОЙ АКТИВНОСТИ НОВЫХ ГИДРОХЛОРИДОВ 2-ДИАЛКИЛАМИНО(ХЛОР)АЛКИЛ-4-[2-(4-ЗАМЕЩЕННЫХ ФЕНИЛ)ХИНОЛИЛ]КАРБОКСИЛАТОВ

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В данной работе представлены исследования антибактериальной активности вновь синтезированных гидрохлоридов 2-диалкиламино(хлор)алкил-4-[2-(4-замещенных фенил)хинолил]карбоксилатов. Показано, что некоторые соединения этого ряда обладают указанной активностью в отношении грамположительных стафилококков (Staphylococcus aureus 209p,1) и грамотрицательных палочек

(Sh.Fleaneri 6858, E.Coli 0-55). Обнаружены закономерности между структурой и биологической активностью.

REFERENSES

[1] *Revanasiddappa C.B., Subrahmanyan S.V.E., Satyanarayana D., Thomas J.* // International J. Chem. Tech. Res., 2009, v. 1, №4, p. 1100.

[2] *Iniyavan P., Sarveswari S., Vijayakumar V.* // Canadian chemistry transactions, 2014, v. 2, №3, p. 286.

[3] *Bawa S., Kumar S., Drabu S., Kumar R.* Structural modifications of quinoline-based Antimalerial agents: Recent developments // J Pharm. Bioallied Sci., 2010, v. 2, №2, p. 64.

[4] *Kirandeep K., Meenakshi J., Ravi P., Rahul J.* // European J of med. Chem., 2010, v. 45, p. 3245.

[5] *Amir M., Javed A.S., Hassan Z.M.* // Indian Journal of chemistry, 2013, v. 52B, p.1493.

[6] *Ramjith U.S., Radhika G., Muhammed Shakeel K.V., Nabeel C.K., Ayda C.* // Int. J. Pharm Pharm Sci., 2013, v. 5, №l4, p. 521.

[7] *Balaji P.N., Sai Sreevani M., Harini P., Johnsi Rani P., Prathusha K., Chandu T.J.* // J. Chem. Pharm. Res., 2010, v. 2, №4, p. 754.

[8] *Pritam N.D.* // JCBPSC, 2014, v. 4, №2, p. 1152.

[9] *Xiao C., Cai Z.M., Sheng R.S, Hu S.Q., Zhan L.X.* // J. Chin. Chem. Soc., 2011, v. 58, p.18.

[10] *Isakhanyan A.U., Gevorgyan G.A., Stepanyan G.M., Paronikyan R.V., Panosyan G.A.* // FARMA, 2015, №10, p. 46.

[11] *Першин Г.Н.* Методы экспериментальной химиотерапии, М., Медицина, 1971, p. 507.

[12] *Pfitzinger W.* // J. Prakt. Chem., 1886, v. 33, p. 100.

[13] *Титце, Айхер.* Препаративная органическая химия, М., 1999, p. 128.

[14] *Исаханян. А.У., Геворгян Г.А., Арутюнян Н.С., Токмаджян Г.Г., Пароникян Р.В., Татевосян А.А., Шахатуни А.А.* // Хим.-фарм. ж., 2013, т. 47, №9, с. 97 [Isakhanyan A.U., Gevorgyan G.A., Arutyunyan N.S., Tokmadjyan G.G., Paronikyan R.V., Tatevosyan A.A., Shakhatuni A.A., Pharm.Chem J., 2013, v. 47, №9, p. 481].