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Antimicrobial Activities of New Macrocyclic Esters Containing Furan and Thiophene Rings

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Extended Abstract

Cyclic polyethers, commonly known as crown ethers, were first synthesized by Pederson in 1967 [1,2]. Crown ethers were the first synthetic molecules which could, by virtue of their ability to assume a conformation resulting in an electron-rich cavity, function as macrocyclic hosts, [3] Prior to 1967 host/guest chemistry was restricted to biologically active hosts, with cyclodextrins being the most common. The oxygen atoms have been replaced by sulfur, [4] nitrogen, [5] and the ethyleneoxy units have been interchanged with heterocycle such as pyridine, furan, thiophene.

We have recently reported the synthesis of [2+2] condensed cyclic amides and investigated antimicrobial activities of these cycloheterophane amides [6]. As a continuation of this work new heterocyclic macrothioesters which contain furan and thiophene rings were synthesized with 2-mercaptoethyl ether and MICs were determined by the microbroth dilution method using the National Committee for Clinical Laboratory Standards (NCCLS) recommendations [7]. For this purposes Gram – *Escherichia co*li ATCC 25922, Gram - *Escherichia coli* 0157H7, Gram + *Staphylococcus aureus* ATCC 25923, Gram – *Listeria monocytogenes* ATCC 19115, Gram – *Salmonella thphimurium* ATCC 14028, Gram + *Bacillus cereus* ATCC 11778 and also *Candida albicans*ATCC 10231 as yeast were used for the investigation of the antimicrobial activity. For comparing antimicrobial activity, Ampicillin, Gentamycin and Amphotericin were used.Serial dilutions were made that furnished a concentration range from 16 to 256 μg/ml. Minimum inhibitory values (MIC) were determined at 600nm. As a result macro thioesters showed strong activity against*S. Aureus, Bacillus cereus, Candida albicans* and *Listeria.* After having these results we havesynthesized new heterocyclic macroesters with 2,2′-thiodiethanol and we are studying the antimicrobial activities of the compounds.

References

[1] F. Diederich, "Complexation of neutral molecules by cyclophane hosts," *Angew. Chem. Int. Ed. Engl.,* vol. 27, pp. 362-386, 1988.
[2] C. J. Pedersen, "Cyclic polyethers and their complexes with metal salts," *J. Am. Chem. Soc.*, vol. 89, pp.7017-7036, 1967.
[3] J. Cram, "The design of molecular hosts, guests, and their complexes," *Angew. Chem. Int. Ed. Engl.,* vol. 27, pp. 1009-1120, 1988.
[4] J. S. Bradshaw and J. Y. K. Hui, "Macrocyclic sulphide syntheses," *J. Heterocycl. Chem.*, vol. 11, pp. 649-674, 1974.
[5] D. H. Busch, "Distinctive coordination chemistry and biological significance of complexes with macrocyclic ligands," *Acc. Chem. Res.* vol. 11, pp. 392-400, 1978.
[6] N. M. Aghatabay, O. Parali, O. Zaim, Ç. Baydar, and B. Dulger, "Synthesis, structural aspects, antimicrobial activity and ion transportation investigation of four new [2 + 2] condensed 24-membered cycloheterphane peptides," *J. Incl. Phenom. Macrocycl. Chem*, vol. 79, pp. 415-424, 2014.
[7] National Committee for Clinical Laboratory Standards, *Specialty Collection: Susceptibility Testing. SC21-L.M7-A4. NCCLS*, Wayne, PA, 1997.