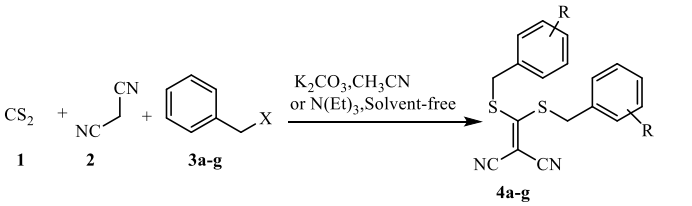
Abstract

2-(Alkylsulfonyl-methylene)malononitriles are organic thioethers that applied as the final products or intermediates in the synthesis of heterocyclic compounds. Synthesis of these compounds is important because of their many biological properties. In this study, eight new 2-(alkylsulfonyl-methylene)malononitrile derivatives were synthesized *via* two multicomponent processes. The products were prepared with simultaneous reaction of malononitrile, carbon disulphide and benzyl halides in the presence of potassium carbonate and acetonitrile as the solvent or in the presence of triethylamine under solvent-free conditions. Solvent-free conditions improved significantly reaction time and products yield. The inhibitory effects of all synthesized derivatives were evaluated on 22 pathogenic Gram-positive and -negative bacteria and 3 fungi and the results were reported as inhibition zone diameter, the minimum inhibitory concentration (MIC) and The minimum bactericidal concentration (MBC) values. Thioether 4b as the most effective antimicrobial agent could inhibit the growth of all bacterial and fungal strains. They could be introduced as new antibacterial and antifungal agents due to their widespread inhibitory activities.



1 **2** **3a-g** **4a-g**

R = 4a: H; 4b: 2,4-$(NO_2)_2$; 4c: 2-NO_2; 4d: 4-NO_2; 4e: 2,4-$(Cl)_2$; 4f: 2-Cl; 4h: 5f; 4g: 2-CN

Keywords: 2-(Alkylsulfunyl- methylene)malononitrile, Carbon disulfide, Malononitrile, Solvent-free reactions

University of zabol

Graduate School

Faculty of Science

Department of Chemistry

The Thesis Submitted for the Degree of Master of Science

(In the Field of Organic Chemistry)

Multicomponent synthesis of 2-(alkylsulfunyl-methylene)malononitriles and the study of their antibacterial and antifungal activities

Supervisors:

Dr. Hamid Beyzaei

Dr. Reza Aryan

By: **Parviz Baranipoor**

October 2017