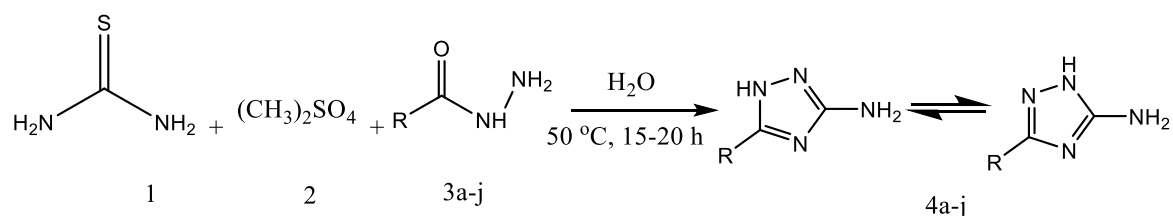


## Abstract

An efficient procedure was proposed for the synthesis of 3-substituted 1,2,4-triazol-5-amines *via* three-component reaction of thiourea, dimethyl sulfate and various hydrazides. 1,2,4-Triazoles were prepared in aqueous media under mild conditions while adhering to some principles of green chemistry. Inhibitory activities of all compounds were evaluated against some pathogenic bacteria and fungi. The best antibacterial effects were observed with 3-phenyl-1*H*-1,2,4-triazol-5-amine according to its MIC values ( $4-8 \mu\text{g ml}^{-1}$ ). All derivatives could block the growth of fungi. Acceptable antioxidant properties were recorded only in 3-(4-nitrophenyl)-1*H*-1,2,4-triazol-5-amine. Biologically active compounds and industrial chemicals can be designed based on these potential antifungal agents in future researches.

Keywords: Green synthesis, Multi-component reaction, 1,2,4-Triazoles, Antimicrobial activity, Antioxidant property



R= a: 4-CH<sub>3</sub>-C<sub>6</sub>H<sub>4</sub>, b: 4-O<sub>2</sub>N-C<sub>6</sub>H<sub>4</sub>, c: 4-(CH<sub>3</sub>)<sub>3</sub>C-C<sub>6</sub>H<sub>4</sub>, d: 3-H<sub>3</sub>CO-C<sub>6</sub>H<sub>4</sub>, e: 3-Br-C<sub>6</sub>H<sub>4</sub>,  
f: 3-HO-C<sub>6</sub>H<sub>4</sub>, g: Pyridine-4-yl, h: Furan-2-yl, i: 4-H<sub>3</sub>C-1,2,3-thiadiazol-5-yl, j: 5-Cl-thiophen-2-yl



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**Green multicomponent synthesis of 3-substituted 1,2,4-triazol-5-amine derivatives and evaluation of their antibacterial and antifungal and anti oxidant effects**

Supervisors:  
Dr. Hamid Beyzaei  
Dr. Reza Aryan

Advisor:  
Dr. Ashraf Moradi

By:  
Zahra Khosravi

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