

ULTRASOUND-INDUCED SYNTHESIS OF QUINOLINES VIA REDUCTIVE COUPLING WITH ZINC IN WATER

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Abstract:

Ultrasound-induced intramolecular reductive cyclization of suitably substituted aryl nitro derivatives with zinc in water has been performed for the synthesis of quinolines.

Keywords: Ultrasound, Quinoline, Zinc

Introduction:

Quinolines are important natural products and have wide range of medicinal activities.¹ In continuation of our research on ultrasound-assisted synthesis of organic molecules, we describe here an excellent method for the preparation of quinolines by reductive cyclization pathways with zinc in water.^{2,3}

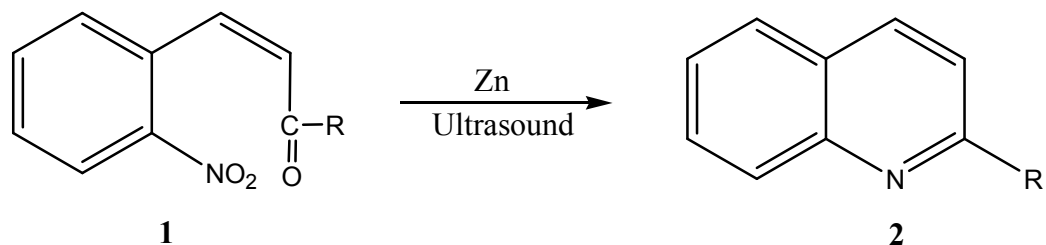
Results and Discussion:

Many methods are known for the synthesis of quinolines.⁴ In previous publication, we reported the synthesis of heterocycles by reductive cyclization with indium metal.³ Our research also used ultrasound-mediated reactions. In this paper, we combined our approaches of ultrasound-assisted reductive cyclization of substituted aromatic nitro compounds to quinolines mediated by zinc metal in water.

The nitro derivative **1** was reacted with zinc powder in water in an ultrasonic bath for 2 hour at 50°C. This reaction produced quinoline **2** (**Scheme 1**). Other method is simple and mild compared to the other available methods for the synthesis of quinolines.

The aryl nitro group is reduced to an amino group and this undergoes an intramolecular aza Michael reaction in the presence of zinc and water. Organic solvents afford products with relatively low yield. The reaction proceeded well in water.

Scheme 1:



R= Phenyl and Methyl

Conclusion:

An excellent zinc/water-mediated ultrasound-assisted intramolecular reductive cyclization method for the preparation of quinolines has been demonstrated using appropriately substituted aromatic nitro compounds.

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