Glycerol as solvent to the synthesis of thiazolidinones

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INTRODUCTION

Solvents are most utilized in organic reaction, enhanced contact among reactants. The solvents have generated great part of the pollution by chemical processes. [1,2]

The use of green solvent is of high interesting for organic transformations. Glycerol is produced as byproduct of biodiesel, a biodegradable solvent has least volatility and negligible vapor pressure. It is compatible with most organic and inorganic compounds. [2]

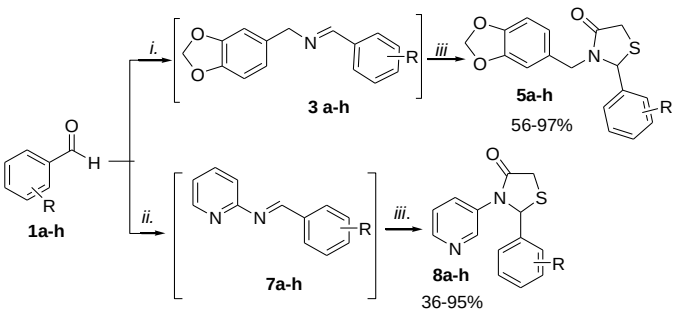
Thiazolidinones are important five-membered heterocycles that have biological activities in the areas of medicine for example, anticancer, anti-viral, anti-microbial.[3]

Generally, the solvent used to the synthesis of thiazolidinones is toluene.[4] In this work, we report the synthesis of some thiazolidinones from piperonilamine or 2-aminopyridine, arenealdehydes and mercaptoacetic acid using glycerol as solvent.

RESULTS AND DISCUSSION

The desired compounds **5a-h** and **8a-h** were obtained using a green solvent glycerol according Scheme 1. The reaction of corresponding amine **2** or **6** (5 mmol) and arenealdehydes **1a-h** (10 mmol) gave the intermediated imine that reacts with mercaptoacetic acid **4** (15 mmol) to produce the thiazolidinones**.**

Scheme 1. Synthesis of thiazolidinones in glycerol.



i. piperonilamine **2**, glycerol 60°C, 3h.

ii. 2-aminopyridine **6**, glycerol 60°C, 3h.

iii. $HSCH_2COOH$ **4**, 60°C, 16h.

After the reaction time, water was added and the precipitates obtained were filtered through over a Büchner funnel under vacuum and washed with cold water to give the products.

The thiazolidinones were obtained in moderate to goods yields. The structure of heterocycles **5a-h** and **8a-h** were confirmed by ^{1}H NMR and purity from CG and melting points. When necessary, the compounds were purified by washing with hot mixture of hexane/ethyl acetate 8:2.

Table 1. Yields and melting points of **5a-h** and **8a-h**.

Product	R	m.p. (ºC)[a]	Glicerol (%)[b]
5a	2-NO_2	145-146	94
5b	3-NO_2	137-139	88
5c	4-NO_2	149-151	97
5d	3-OCH_3	Oil	93
5e	4-OCH_3	116-118	77
5f	2-F	93-94	94
5g	3-F	135-136	94
5h	4-F	95-97	56
8a	2-NO_2	162-164	72
8b	3-NO_2	153-155	68
8c	4-NO_2	152-154	77
8d	3-OCH_3	129-131	95
8e	4-OCH_3	102-105	92
8f	2-F	78-80	71
8g	3-F	Oil	36
8h	4-F	79-82	94

a – melting points are uncorrected. b – yields of pure compounds.

CONCLUSION

In summary, glycerol was an efficient solvent to promote the synthesis of thiazolidinones. This procedure can be used as a replacement for toxic solvents as toluene.

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