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Chemistry

DEVELOPMENT OF A METHOD FOR THE ALDOL CONDENSATION BY ACID CATALYSIS AND RESULTS WERE CONFIRMATION OF RESULTS BY TLC TECHNIQUE

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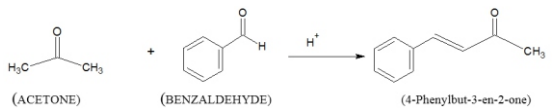
ABSTRACT Aldol condensation is generally carried out in the presence of base to give β-hydroxy derivatives. But we did a green synthesis in aldol condensation for two different reactants by using an acid i.e. citric acid to give α,β- unsaturated ketone. Formations of product(s) for different two reactants were confirmed by Thin Layer Chromatography. Crude product is recrystallized from ethyl acetate. The product formed has wide range applications.

KEYWORDS : aldol condensation, β-hydroxy derivatives, α,β-unsaturated ketone, recrystallization.

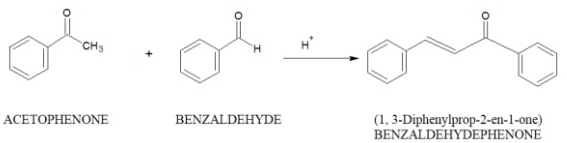
INTRODUCTION

In the present study we did the reaction between ketone and aldehyde having number of a-hydrogen(s) in the presence of acid gives b-hydroxy aldehyde which on dehydration gives a,b- unsaturated ketone. By using same procedure we did two different reactions, for different reactants acetone/acetophenone to react with benzaldehyde in the presence of citric acid to give a,b- unsaturated ketone, and these product(s) has wide range of applications.

Reaction-1:



Reaction-2:



METHOD OF PREPARATION

Pipette out 1.8 mL acetone/acetophenone and 3.6 mL benzaldehyde (densities are referred for the determination of proper volumes) in a 250 ml Erlenmeyer flask. Add a magnetic stirrer bar to Erlenmeyer flask and set the motor for the faster stirring possible without splatter. In a 100 mL beaker thoroughly mix 20 mL of 6 M citric acid and 20 mL of 95% ethanol. Pour this mixture into Erlenmeyer flask containing acetone and benzaldehyde and adjust the stirrer motor to maintain maximum stirring. Continue stirring for an additional 15 minutes a till color change is noted. Weigh the crude product and melting point is determined. Crude product is recrystallized from 15 mL of ethyl acetate. The formation of product is confirmed from TLC technique.

RESULTS AND FUTURE SCOPE

This reaction is useful for the synthesis of b-Ionone which is required for the synthesis of Vitamin A. It is also useful for the synthesis of monosaccharaides. Further is used in dye industries for the synthesis of cyanine dye which is photographic sensitizers. It is used for the synthesis of pentaerythritol which is used in alkyd resins, radiation cure monomers, polyvinyl chloride (PVC) stabilizers, polyurethanes, rosin esters, synthetic lubricants, pigment treatment, antioxidants, and explosives.

CONCLUSIONS

But we did a green synthesis in aldol condensation for two different reactants by using an acid i.e. citric acid to give a,b- unsaturated ketone. Formations of product(s) for different two reactants were confirmed by Thin Layer Chromatography.

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REFERENCES

1. Mia T. Casalea, Science Direct, Atmospheric Environment 41 (2007) 6212–6224.
2. Charles L. Perrin* and Kuei-Lin Chang, J. Org. Chem., 2016, 81 (13), pp 5631–5635.
3. Adedayo I. Inegbenebor, IJASBT A.I. Inegbenebor et al. (2015) Int J Appl Sci Biotechnol, Vol 3(1): 1-8
4. Jonathan Clayden, Nick Greeves, Stuart Warren, Organic Chemistry, 2nd Edition