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Research Paper

SYNTHESIS OF NOVEL COUMARIN DERIVATIVES

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The study of coumarin dates back to 1820 when coumarin was first extracted from tonka bean by Vogel. Compounds containing coumarin backbone are a very important group of compounds due to their usage in pharmacy and medicine. Properties and biological activities of coumarin derivatives have a significant role in the development of new drugs. Therefore, many different methods and techniques are developed in order to synthesize coumarin derivatives. Coumarin derivatives could be obtained from different starting materials with various methods but with big differences in yield. This review summarized various methods, techniques and reaction conditions for synthesis of coumarins from different compounds such as aminoacids.

Keywords: Knoevenagel condensation; Pechmann reaction; coumarins; synthesis.

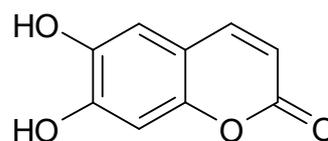
INTRODUCTION

Coumarin has clinical medical value by itself, as an edema modifier i.e. anti-inflammatory activity. Coumarin and other benzopyrones, such as 5,6 benzopyrone, 1,2 benzopyrone, diosmin and others are known to stimulate macrophages to degrade extracellular albumin, allowing faster resorption of edematous fluids. Coumarin is also used as a gain medium in some dye lasers. Coumarin has appetite-suppressing properties, suggesting one reason for its widespread occurrence in plants, especially grasses and clovers, is because of its effect of reducing the impact of grazing animals. Although the compound has a pleasant odor, it has a bitter taste, and animals will avoid it, if possible. Coumarin is used in the pharmaceutical industry as a precursor

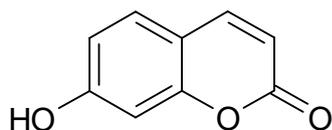
molecule in the synthesis of a number of synthetic anticoagulant dicoumarol, notably warfarin (which has a common and confusing brand name *Coumadin*) and some even more potent rodenticides that work by the same anticoagulant mechanism.

Coumarin and its derivatives are all considered phenylpropanoids.

Some naturally occurring coumarin derivatives include umbelliferone (7-hydroxycoumarin), aesculetin (6,7-dihydroxycoumarin), herniarin (7-methoxycoumarin), psoralen and imperatorin. 4-phenylcoumarin is the backbone of the neoflavones, a type of neoflavonoids.



Aesculetin



Umbeliferon

aesculetin (6,7-dihydroxycoumarin), herniarin (7-methoxycoumarin), psoralen and imperatorin. 4-phenylcoumarin is the backbone of the neoflavones, a type of neoflavonoids.

MATERIALS AND METHOD

The chemicals are used as of analytical grade i.e. Resorcinol, Ethylacetoacetate, Conc. H₂SO₄, 7-hydroxy-4-methylCoumarin, acetic anhydride, Conc. HNO₃, benzene, Iron powder, Ethanol, conc. HCl, Pyridine, NaOH, dil. HCl, acetic/ maleic/ succinic/ phthalic anhydride, Glacial acetic acid, benzaldehyde, p-nitrobenzaldehyde, 4-bromo benzaldehyde, 3,4-dichloro benzaldehyde, dichloroacetyl chloride, anhydrous potassium carbonate, chloroacetyl chloride, anhydrous potassium carbonate and acetone. The synthetic studies of the compound were carried out using laboratory grade and analytical grade reagent as the case may be standard procedure or reported methods were followed with or without modification appropriately as and when required. Initially, the purity of synthesized compounds was confirmed using silica gel-G TLC plates. Melting points were determined using an open capillary method.

Synthetic Procedure of Coumarin (1)

The above product 7-hydroxy-4-methyl Coumarin was obtained by mixing (0.1mol, 11gm) of Resorcinol and (0.1mol, 13ml) of ethyl aceto acetate in 40ml of 85% sulfuric acid solution, heated for 1.30 hrs to get reddish brown solution cool and pour into crushed ice. The separated bright yellow colored solid was washed with excess cold water, dried and recrystallized from methanol to obtain pure product. M.p - 176 ± 20 C

RESULT AND DISCUSSION

The attempt to synthesize mannich bases of 7-hydroxy-4-methyl coumarin were successfully carried out as per the scheme mentioned. The entire synthesized compounds are primarily characterized by running T.L.C. and melting point analysis

Compound	R _f	%Yield	Melting point range (°C)
1	0.70	65	178-180
1 ^a	0.68	52	154-176
2	0.18	42	186-196

SUMMARY AND CONCLUSION

The research work was aimed to synthesized mannich bases of 7-hydroxy-4-methyl coumarin with different secondary amine. Review of literature survey reveals various biological



activities for the chemical compounds containing 7-hydroxy-4-methyl coumarin nucleus and mannich reaction. On these observations it was planned to synthesized mannich bases of 7-hydroxy-4-methyl coumarin such that may be of interest.

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Conflict of Interest

The authors declare that they have no conflict of interest