

## FACILE SYNTHESIS OF CHALCONE DERIVATIVES AND THEIR CHARACTERIZATION

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### ABSTRACT

Much research has been carried out with the aim to discover the therapeutic values of chalcone derivatives. The presence of reactive  $\alpha,\beta$ -unsaturated keto group in chalcones is found to be responsible for their biological activity. The derivatives of chalcones were prepared using Claisen-Schmidt condensation scheme with appropriate acetophenone and benzaldehyde derivatives in presence of base and ethanol at room temperature. The yield of the compound was found to be good. The characterizations of the compound have been confirmed by IR spectroscopy,  $H^1$ NMR spectroscopy, TLC method and Melting point.

**Keywords:** Chalcone derivatives, Claisen-Schmidt condensation

### INTRODUCTION

The chemistry of chalcones has generated intensive scientific studies throughout the world. The name "Chalcones" was given by Kostanecki and Tambor. Chalcones are also known as benzyl acetophenone or benzylideneacetophenone. Chalcones (trans-1, 3-diaryl-2-propen-1-ones) are  $\alpha,$   $\beta$ -unsaturated ketones consisting of two aromatic rings (ring A and B) having diverse array of substituents. Chalcones have been used as intermediate for the preparations of compounds having therapeutic value. Chalcones have been identified as interesting compounds that are associated with several biological activities. The most common chalcones found in foods are phloretin and its glucosidephloridzin (phloretin 2'-O- $\beta$ -glucopyranoside), and chalconaringenin. Chalcone derivatives shows inhibitory effect against *M. Gypsum* species of fungus. These are naturally occurring compounds exhibiting broad spectrum biological activity including anticancer through multiple mechanism. Lots of derivatives can be synthesised and were biologically screened for antifungal activity. It also possesses wide range of pharmacological activity such as antibacterial, antituberculosis, antigout, antiinflammatory, antiplasmodic, etc. The chemistry of chalcone remains as a fascination among researchers in 21<sup>st</sup> century due to large number of replaceable hydrogen atoms that allows a large number of derivatives and a variety of promising biological activity to be generated. The presence of reacting  $\alpha,\beta$  unsaturated keto group in chalcones is found to

be responsible for their biological activity. The derivatives of chalcone were prepared using Claisen-Schmidt condensation scheme with appropriate acetophenone and aldehyde derivatives.

### EXPERIMENTAL

Determining the melting point of a compound is one way to test if the substance is pure. So, melting point of the compound has been taken in an oil bath using thermometer. IR spectral data were recorded on FTIR-RX1 spectrophotometer.  $H^1$ NMR data were measured using  $CDCl_3$  solvent on 300 MHz frequency. And their chemical shift values ( $\delta$ ) are in (ppm) units using TMS (Tetramethylsilane) as an internal standard. The reaction progress has been monitored by Thin Layer chromatography (TLC) using 3:1, Hexane :Ethyl acetate solvent system and spots of the compound was visualised using iodine chamber and  $KMnO_4$  spray.

### METHOD OF PREPARATION

In a 250 ml conical flask placed in an ice bath KOH (1.2 eq.) was dissolved in ethanol (50ml). then acetophenone derivatives (1 eq.) was added slowly to the reaction mixture with continue stirring using magnetic stirrer. After 20 minutes Benzaldehyde (1 eq.) derivative was added slowly to the reaction mixture. Then reaction mixture was kept for 12-16 hrs with constant stirring at room temperature. Finally work up with water recrystallized it by ethanol. The residue obtained







## RESULT AND DISCUSSION

Code of Compound	R1	R2	Molecular Formula	Molecular weight (g/mol)	Percent Yield (%)	Melting point (°C)
A	-H	2-OH	C <sub>15</sub> H <sub>12</sub> O <sub>2</sub>	224.254	75.80	87-89
B	-4-chloro	2-OH	C <sub>15</sub> H <sub>11</sub> O <sub>2</sub> Cl	258.699	84.22	136-138
C	-2-chloro	2-OH	C <sub>15</sub> H <sub>11</sub> O <sub>2</sub> Cl	258.699	78.00	101
D	-H	3-OH	C <sub>15</sub> H <sub>12</sub> O <sub>2</sub>	224.254	77.20	125
E	-4-chloro	3-OH	C <sub>15</sub> H <sub>11</sub> O <sub>2</sub> Cl	258.699	83.00	---
F	-2-chloro	3-OH	C <sub>15</sub> H <sub>11</sub> O <sub>2</sub> Cl	258.699	76.88	115-117

The characterizations of the compound have been confirmed by IR spectroscopy, <sup>1</sup>H NMR spectroscopy, TLC method and Melting point. IR data shows that there is a sharp band observed between 1650-1654 cm<sup>-1</sup> due to presence of conjugated carbonyl group and second peak 1590, 1542 cm<sup>-1</sup> due to presence of >C=C< in conjugation with carbonyl group. This is a single step and easy method for the preparation of Chalcone derivatives obtained in good yield.

## CONCLUSION

The synthesised product were characterised by IR spectroscopy, <sup>1</sup>H NMR spectroscopy, TLC (Thin layer Chromatography), and melting point. On the basis of which the product obtained was confirmed. The yield of the product was good by this method. Preparation of chalcones beneficial for the medicinal purposes like anti-cancer agents, anti-tuberculosis, anti-hepatic, and have many other pharmacological applications. This will encourage further research related to chalcones.

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