

# *The Aldol Condensation Reaction*

## *Preparation of Benzalacetophenone*

### *(Chalcones)*

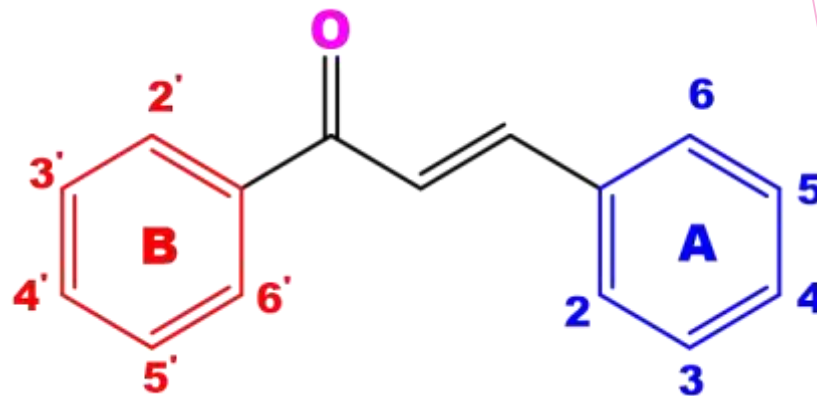
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*2<sup>nd</sup> lab. from the 2<sup>nd</sup> course for 4<sup>th</sup> stage*

## CHALCONES

are  $\alpha$ ,  $\beta$  unsaturated aromatic ketones containing the reactive keto ethylene group  $-\text{CO}-\text{CH}=\text{CH}-$ . Many of the chalcones are highly biological active which have medicinal and pharmaceutical applications

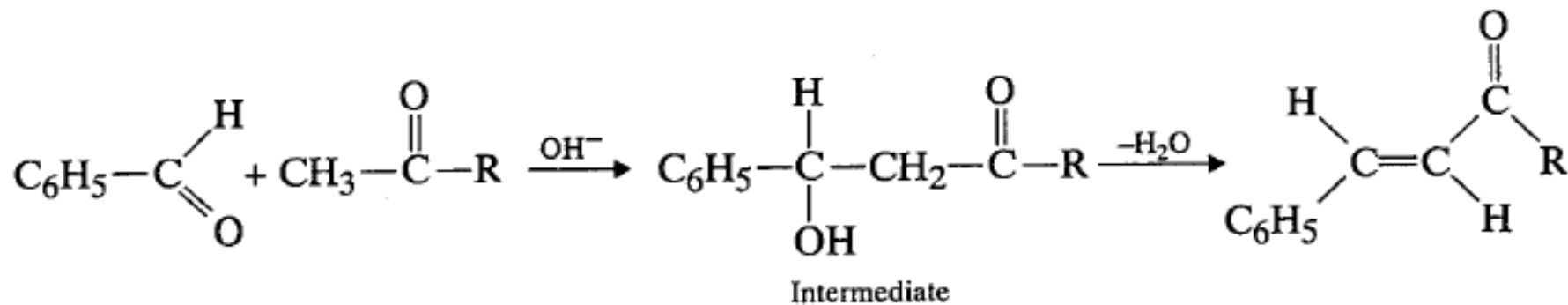


**The alternative name given to chalcone are phenyl styryl ketone, benzalacetophenone,  $\beta$ -phenylacrylophenone and  $\alpha$ -phenyl- $\beta$ -benzoylethylene.**

**Chalcones and their derivatives demonstrate wide range of biological activities such as anti-diabetic, anti-neoplastic, anti-hypertensive, anti-retroviral, anti-inflammatory, anti-parasital, anti-histaminic, anti-malarial, anti-oxidant, anti-fungal.**

**anti-obesity, anti-platelet, anti-tubercular,  
immunosuppressant, anti-arrhythmic, hypnotic, anti-  
gout, anxiolytic, anti-spasmodic, anti-nociceptive,  
hypolipidemic, anti-filarial, anti-angiogenic, antiprotozoal,  
anti-bacterial, anti-steroidal**

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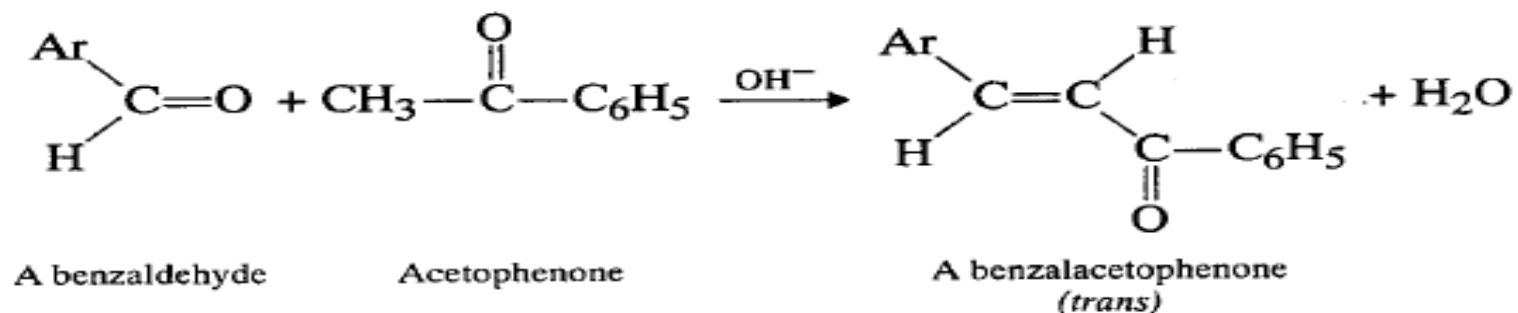


**Aldol condensation:** is the reaction of two carbonyl compounds to form a new  $\beta$ -hydroxy carbonyl compound. This reaction can be performed under acidic or basic conditions.

One of the reacting species must contain a protonated  $\alpha$ -carbon adjacent to the carbonyl centre.

Crossed aldol condensation of this type proceed in a high yield, because benzaldehyde cannot with itself by an aldol condensation reaction because it has no  $\alpha$ -hydrogen. likewise, ketones do not react easily with themselves in aqueous base. Therefore, the only possibility is for a ketone to react with benzaldehyde.

**Benzalacetophenones (Chalcones) are prepared by the reaction of a substituted benzaldehyde with acetophenone in aqueous base.**



**Chemicals Required:**

Benzaldehyde , acetophenone , Sodium hydroxide solution (40% ) and ethanol.

## Procedure:

1-Place 1 mL of benzaldehyde in 50ml flask and add 1mL of acetophenone.

Add 1 mL of 95% ethanol .

2-stir the mixture (you may need to warm the mixture on a hot plate to dissolve the solids ).

3-Cool the solution to room temperature.

4-Add 10mL of sodium hydroxide solution(20%) to the mixture, stir the mixture until it solidifies or until it become very cloudy.

5-Add 2mL ice water to the mixture and neutralize with 2N HCL.

6-Transfer the mixture to a small beaker with 3mL of ice water, stir the precipitate to break it up and then collect the solid on a Buchner funnel .

7-Wash the product with cold water.

**Recrystallization:** The product may be recrystallize by dissolving it in a hot ethanol (95%) and filter the hot solution. Cool it and collect the crystals by filtration.



