# BIOLOGICAL EVALUATION OF HYDROXY CHALCONES

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**Abstract**
*The Chalcones is a class of α,β-unsaturated ketones, are widely recognized for their broad spectrum of biological activities. Among them, hydroxy-substituted chalcones have garnered significant attention due to their enhanced pharmacological properties and structural similarity to natural flavonoids. In this study, a series of hydroxy chalcone derivatives were synthesized and evaluated for their biological activities, including antioxidant, antibacterial, and Anti-inflammatory. Structural confirmation was carried out using spectroscopic techniques such as IR, NMR, and mass spectrometry. The in vitro biological assays demonstrated that hydroxyl substitutions on the aromatic rings significantly influenced the activity profile of the compounds. Notably, derivatives with hydroxyl groups exhibited potent free radical scavenging and antibacterial effects. The findings highlight hydroxy chalcones as promising lead compounds for further development in drug discovery programs.*
***Keywords*** *:- chalcone, Antibacterial, Antioxident, Anti-inflammatory.*

**Introduction:**
The Hydroxy Chalcone shows many biological activity. Their wide scope and simplicity of synthesis have made them attractive candidates in medicinal chemistry. Over the past few decades, numerous studies have reported diverse biological activities of chalcones, including anti-inflammatory, antioxidant, antimicrobial, anticancer, and antidiabetic effects. The presence and position of functional groups, particularly hydroxyl groups, play a critical role in modulating these activities.
Hydroxy chalcones, bearing one or more hydroxyl substituents on the aromatic rings, naturally occurring polyphenolic compounds and have shown promising biological activity due to their enhanced ability to interact with biological targets through hydrogen bonding and radical stabilization. The hydroxyl groups also increase solubility which can impact bioavailability and pharmacokinetic properties.
Although the promising potential of hydroxy chalcones, systematic biological evaluation of structurally diverse hydroxy-substituted derivatives remains limited. In this context, the present study aims to synthesize a series of hydroxy chalcones with varied substitution patterns and assess their biological activities. Emphasis is placed on understanding the structure-activity relationships (SAR) and identifying potent candidates for further pharmacological development.

**Experimental Method :-**
**Biological Activity:-**The Disc Diffusion Method is used for to checked Antibacterial Activity of the compound against E.Coli and S.aureus Bacteria the methods are given below.

**Antibacterial Activities :-**
**Test organisms used:**
1. *E. coli* (MTCC 118)
2. *S. aureus* (MTCC 1430)

**Media used:**
1. Nutrient broth (M002) procured from Himedia® Pvt. Ltd. Mumbai.
2. Mueller Hinton Agar (M173) procured from Himedia® Pvt. Ltd. Mumbai.

**Procedure:**
**Preparation of sample:**
1. The mycelium of respective sample was taken and was grinded in a sterile mortar and pestle.
2. The grinded mycelium was then squeezed through sterile muslin cloth in order to extract the liquid.
3. This liquid (extract) was further used for disc diffusion test.

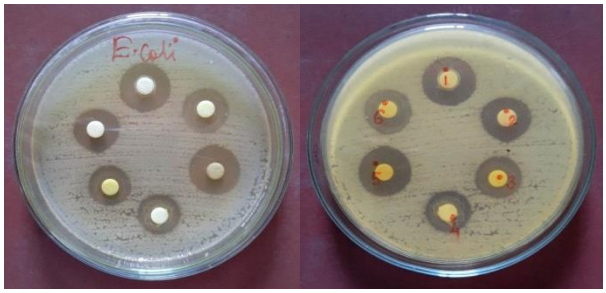
**Disc Diffusion Method :-**
1. In the disc diffusion test sterile Whatman filter paper (number 1) discs were impregnated with 20µl of different samples.
2. The broth culture's CFU was $10^8$ used for the study.
3. A broth culture of each of the respective species mentioned above was spread on the surface of sterile Mueller Hinton Agar plates.
4. The impregnated discs with respective samples were then placed on the inoculated surface of the agar plates (maximum of 8 discs per plate including negative control).
5. The agar plates were incubated at 37ºC for 24hr. Antimicrobial activity of each sample against the test species was measured by

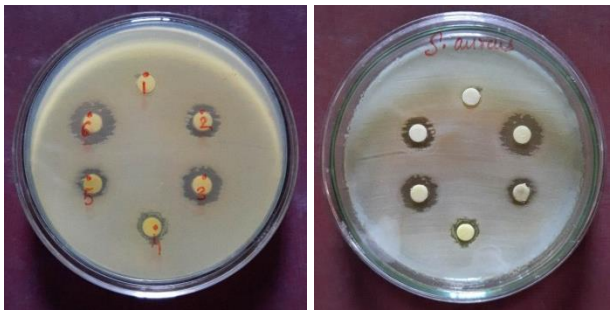
growth free "zone of inhibition" near the respective discs.

6. The assay was performed in triplicate.

**Result**:-

| Sr.No. | Samples | Zone of Inhibition (In mm) | |
|---|---|---|---|
| | | ***E. coli*** | ***S. aureus*** |
| 1 | Sample 5 | 19 mm | 09 mm |
| 2 | Sample 3 | 16 mm | 11 mm |
| 3 | Sample 6 | 16 mm | 12 mm |



**Anti-inflammatory Activity:-** The Inhibition of Protein Denaturation method was used to checked the Activity, diclofenac is used for + control.

**In Vitro Anti-Inflammatory Assays**
**Inhibition Of Protein Denaturation**

To evaluate the antiinflammatory effects of the extracts, the protocol described by Padmanabhan and Jangle and Elias and Rao was used with small modifications. A volume of 1 ml of drug (aqueous and ethanolic) or of diclofenac (positive control) at concentrations (1mg/ml) was homogenised with 1 ml of aqueous solution of bovine serum albumin (5%) and incubated at 27°C for 15 minutes. The mixture of distilled water and BSA constituted the control tube. Denaturation of the proteins was caused by placing the mixture in a water bath for 10 minutes at 70°C. The mixture was cooling inside the ambient room temperature, and the activity each mixture was measured at 660 nm. Each test was done three times. The following formula was used to calculated inhibition percentage:

$$(\%)\text{inhibition} = \frac{[\text{Absorbance of control (Ac)} - \text{Absorbance of sample(As)}]}{\text{Absorbance of control (Ac)}} \times 100$$

**Used Concentration: 1mg/mL**

| No. | Group | | Inflammatory Potential (in %) (Mean±SD) |
|---|---|---|---|
| 1 | **A** | 2HC | 12.571±1.243 |
| 2 | | 3HC | 15.793±1.33 |
| 3 | | 4HC | 23.801±1.696 |
| +Ve Control (diclofenac) | | +Ve Control (diclofenac) | 46.153±2.705 |

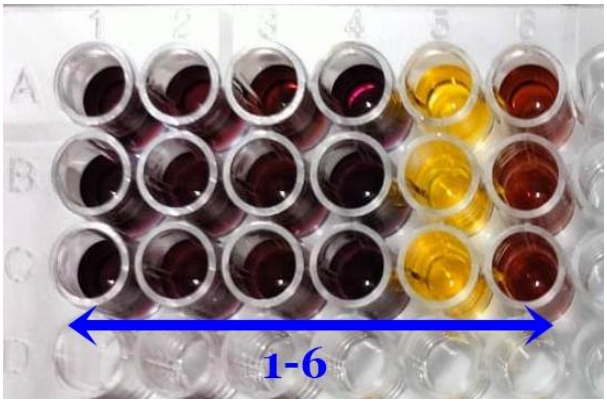
**Antioxident Activity:-** The Percent Antioxident Potential using DPPH Assay Method (Conc.used 5mg) & (Positive control Ascorbic acid i.e. +Ve)

**Preparation Of Sample:**

The free-radical scavenging activity was estimated by DPPH assay. The reaction mixture contained 10 µl of test sample and positive control ascorbic acid with 10 mg concentration and 190 µl of methanolic solution of 0.1 mM DPPH radical. The mixture was then shaken vigorously and incubated at 37° C for 5 min. The absorbance was measured at 517 nm on ELISA plate reader indicated higher free radical scavenging activity, which was calculated using the following equation:

$$(\%)\text{Free radical scavenging effect} = \frac{[\text{Absorbance of control (Ac)} - \text{Absorbance of sample(As)}]}{\text{Absorbance of control (Ac)}} \times 100$$

| No. | Group | Antioxidant Potential (Mean±SD) |
|---|---|---|
| 1 | A | 66.18±1.89 |
| 2 | | 32.14±1.53 |
| 3 | | 16.10±2.69 |
| | +Ve | 84.33±1.62 |
| | -Ve | - |




**Conclusion:-**All three hydroxy chalcone shows Antibacterial activity against E.coli & S.aureus Anti-inflammatory Activity of 4HC shows Moderate Activity and other hydroxy chalcone shows minimum Activity.Antioxidant activity cheked with the help of DPPH Assay Method by using positive control Ascorbic acid result shows that 2HC shows antioxidant potential value 66.18 ±1.89, 3HC shows 32.14±1.53 and 4HC shows 16.10 ± 2.69 it means 2HC shows good Antioxident activity and other two shows Moderate Activity

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