

Synthesis of Chalcone by *Prunus Amygdalus Batsch Shells* and *Saccharum Officinarum* and Determination of Antimicrobial Activity and Identification by IR And TLC

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ABSTRACT

Chalcone is an α,β -unsaturated ketone and central core for a variety of important biological compounds extracted from natural products and the experiment is conducted by performing identification tests to identify the chemical components in the compounds such as **Prunus amygdalus batsch shells** and **Saccharum officinarum** are the main components used in this procedure to mix with **Prunus amygdalus batsch shells** and **Saccharum officinarum** proved to the various electrophilic substitution reactions such as nitration, sulphonation, chlorination, and alkylation. IR interpretation proves that aldehyde and ketone groups are present. R_f value of the different derivatives are 0.04, 0.02, 0.10, 0.625, 0.03 respectively. Anti Microbial activity is found in sulfonated derivative.

Keywords: Prunus amygdalus batsch shells; Saccharum officinarum; TLC; Microbial activity; IR

INTRODUCTION

Bitter almond kernel shell (**Prunus amygdalus Batsch shell**): **Bitter Almond shells** correspond to the hard, lignified endocarp that is removed to obtain the kernels. Almond shells represent 33% of the total fresh weight of the almond fruit^[1]. Almond is the general name of *Prunus dulcis* or *Prunus amygdalus* L. Almond fruit consists of the hull, shell, and kernel (nut). It has been estimated that the annual output in north China is up to 40 thousand tons, and

the amount has tended to increase due to a strong demand for the fruit . During the harvest period, the hull and kernel are the desirable products; the almond shell consists of 70% of the dry mass of a whole almond fruit^[2].



Jaggery powder (*Saccharum officinarum* L.): Gur (Jaggery) is a natural, traditional sweetener made by the concentration of sugarcane juice and is known all over the world in different local names . It is a traditional unrefined non-centrifugal sugar consumed in Asia, Africa, Latin America and the Caribbean. Containing all the minerals and vitamins present in sugarcane juice, it is known as healthiest sugar in the world^[3]. In India, jaggery making is one of the ancient agro-processing industries that prepares 70% of the total jaggery produced in the world to different countries^[4].

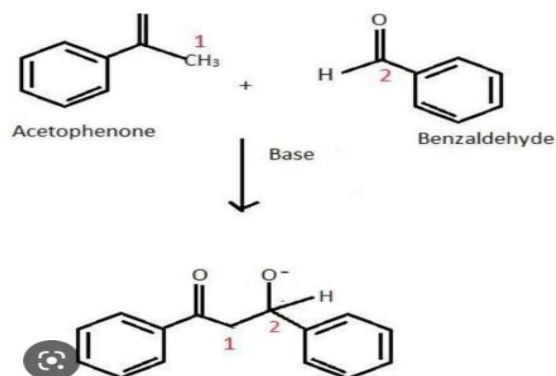


PROCEDURE

PREPARATION OF CHALCONE

- Apricots are cleanly washed and soaked for 4 hours and peel off the flesh of the apricot further dry the apricot seeds after some time smash the seeds and remove the bitter almond and keep the shells for drying. amount of apricot kernels shells required is taken and powdered by using a motor and Pestle made into a fine powder and stored for experimental use.

- The jaggery is also used for preparation in a similar way the jaggery is taken and weight is measured. The jaggery is transferred into the motor and pestle and powdered by trituration in a single direction.

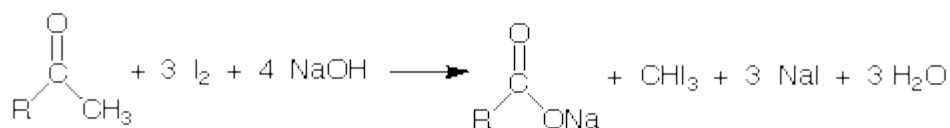


ACETOPHENONE

IDENTIFICATION TEST

1. THE IODOFORM TEST

Reactions: the methyl group of the ketone is removed from the molecule and produces iodoform (CHI_3)



- Three drops of the compound to be tested are added to 3 ml of water.
- 10 drops of KI/I_2 solution (a dark purple-brown solution).
- 10% NaOH solution is added drop wise until the dark color of the solution fades to yellow.
- The solution is heated at 60°C . If the colour of the solution becomes colourless, more KI/I_2 solution is added.

Result: Yellow crystals precipitate is formed, and Hence test passed.

2. 2,4 Dinitrophenyl hydrazine test:

- Take the sample quantity of 2-3 drops.
- Add a small amount of spirit and shake it.
- Add a small amount of 2,4 dinitrophenyl hydrazine.
- shake continuously.

Result:The orange precipitate is formed, and hence the test is passed.

BENZALDEHYDE

Identification test:

1. Schiffs reagent

- Take the sample in a test tube.

2. add a few drops of Schiff's reagent.

Result: The pink color is observed hence it is passed.

SAMPLE-1 CHALCONE

Procedure:

1. Take the A product 0.45 grams and the B product 0.45 grams.
2. Triturate the compounds in mortar and pestle in a single direction for better mixing.
3. Collect the sample, and store it in a jar.

Practical yield: 1.4grams

SAMPLE-2 NITRATED DERIVATIVE

Procedure:

1. Take the A product 0.45 grams and the B product 0.45 grams.
4. Now add 1 drop of concentrated nitric acid and 1 drop of concentrated sulphonic acid.
5. Continue to mix the mixture.

Practical yield: 1.56 grams

SAMPLE-3 SULFONATED DERIVATIVE

Procedure:

1. Take the A product 0.45 grams and the B product 0.45 grams.
2. Now add 1 drop of concentrated sulphonic acid.
3. Continue to mix the mixture.
4. Practical yield: 1.69 grams

SAMPLE-4 CHLORINATED DERIVATIVE

Procedure:

1. Take the A product 0.45 grams and the B product 0.45 grams.
2. Add 2 drops of ferric chloride.
3. Continue to mix the mixture.

Practical yield: 1.87 grams

SAMPLE-5 ALKYLATED DERIVATIVE

Procedure:

1. Take the A product 0.45 grams and the B product 0.45 grams.
2. Add 0.1 grams of aluminum chloride.
3. Add 2 drops of dimethyl sulfoxide.

Practical yield: 1.79 grams

METHOD DEVELOPMENT

IR INTERPRETATION

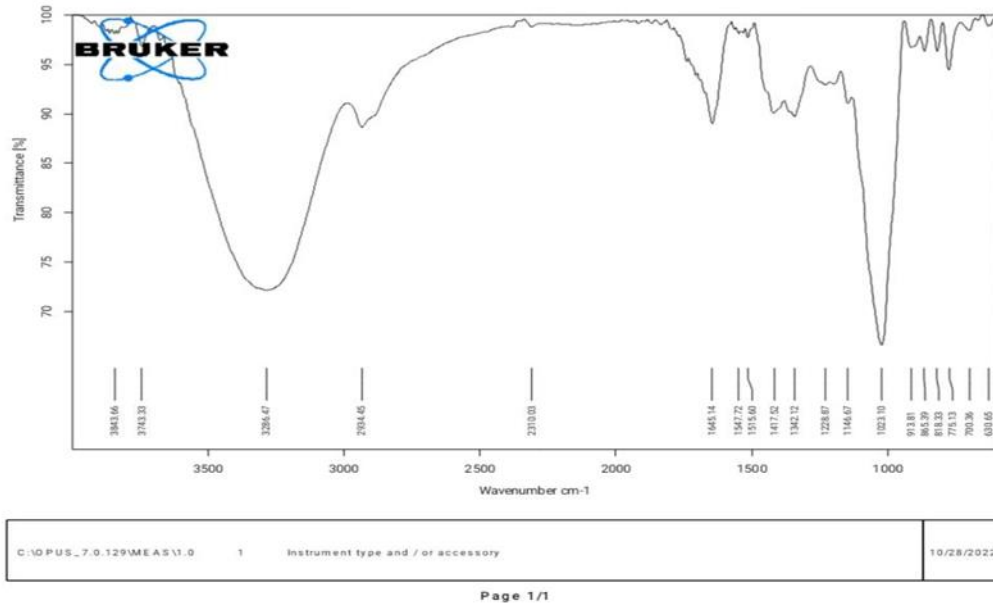


Figure 1: IR Interpretation of Sample 1

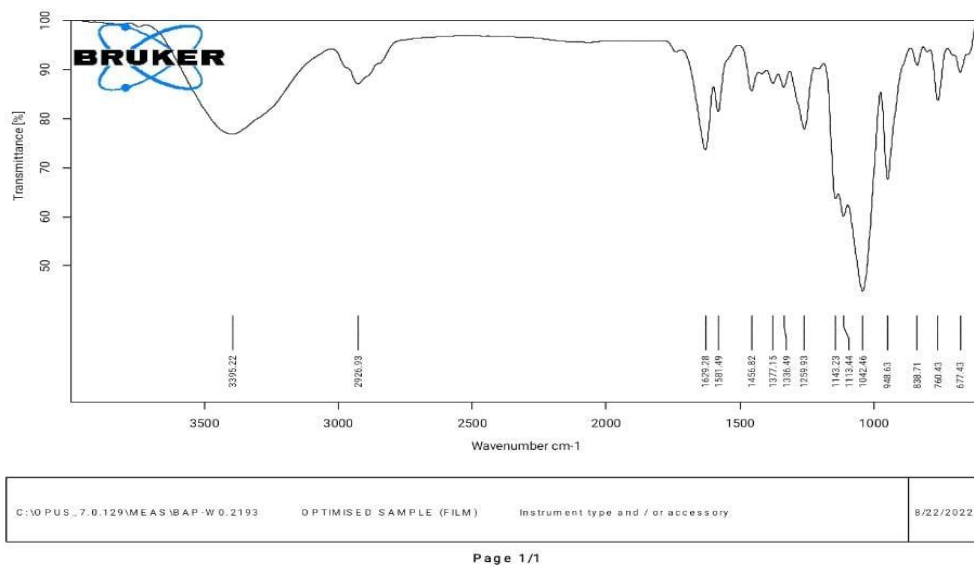
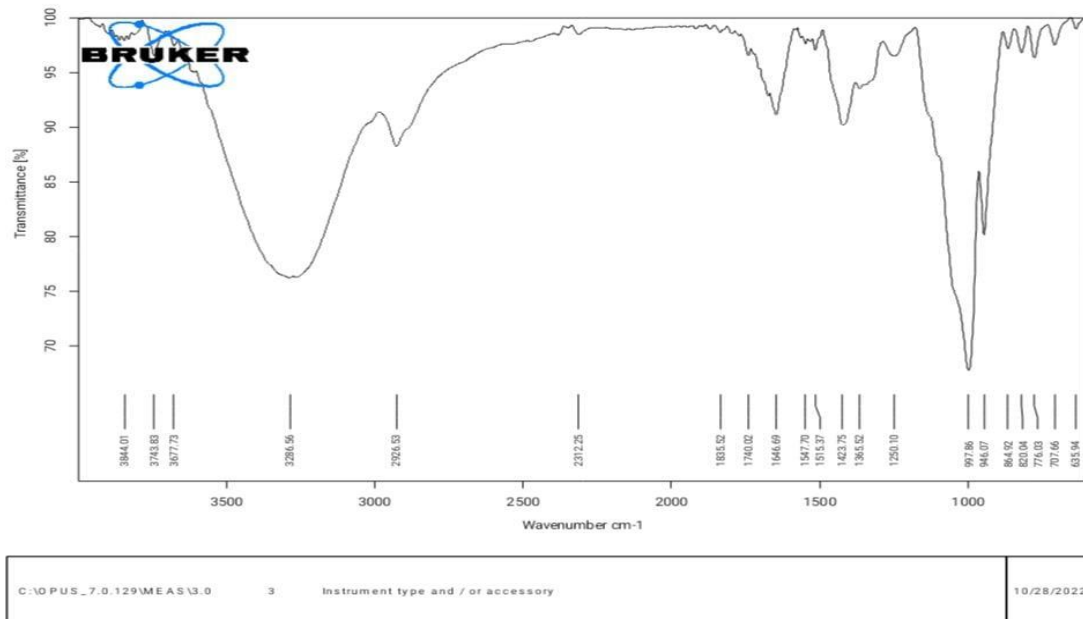
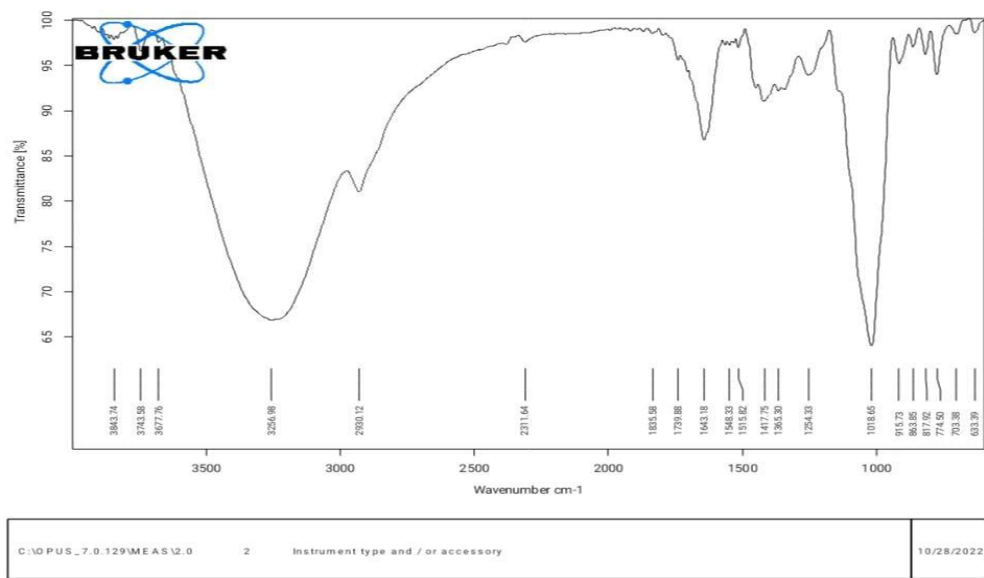


Figure 2: IR Interpretation of Sample 2.



Page 1/1

Figure 3: IR Interpretation of Sample 3.



Page 1/1

Figure 4: IR Interpretation of Sample 4.

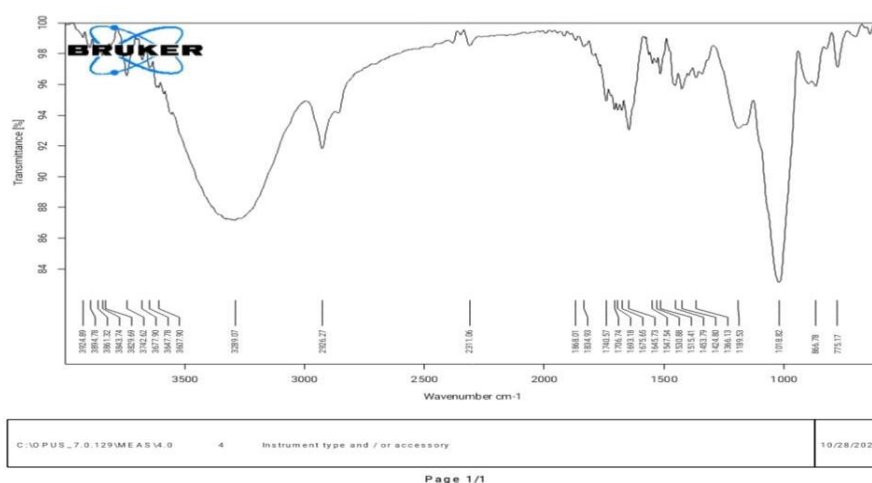


Figure 5: IR Interpretation of Sample 5

Table 1: IR data of synthesized compounds

Sample	Interpretation of functional groups
1	3395.22 (medium N-H Stretching aliphatic primary amine), 2926.93 (medium C-H stretching alkane), 1629.28 (medium C-H stretching alkene), 1042.46 (medium C-N stretching amine), 948.63 (strong C=C bending alkene).
2	3286.47 (medium N-H Stretching secondary amine), 2934.45 (medium C-H stretching alkane), 1645.14 (medium C-H stretching alkene), 1023.10 (medium C-N stretching amine), 913.81 (strong C=C bending alkene).
3	3286.56 (medium N-H Stretching secondary amine), 2926.53 (medium C-H stretching alkane), 1646.69 (medium C-H stretching alkene), 997.86 (medium C-N stretching amine), 946.07 (strong C=C bending alkene).
4	3256.98 (medium N-H Stretching secondary amine), 2930.122 (medium C-H stretching alkane), 1643.18 (medium C-H stretching alkene), 1018.65 (strong C-F stretching fluoro compound), 915.73 (strong C=C bending alkene).
5	3289.07 (medium N-H Stretching secondary amine), 2926.27 (medium C-H stretching alkane), 1645.73 (medium C-H stretching alkene), 1018.82 (strong C-F stretching fluoro compound), 866.78 (strong C=C bending alkene).

TLC (thin-layer chromatography)

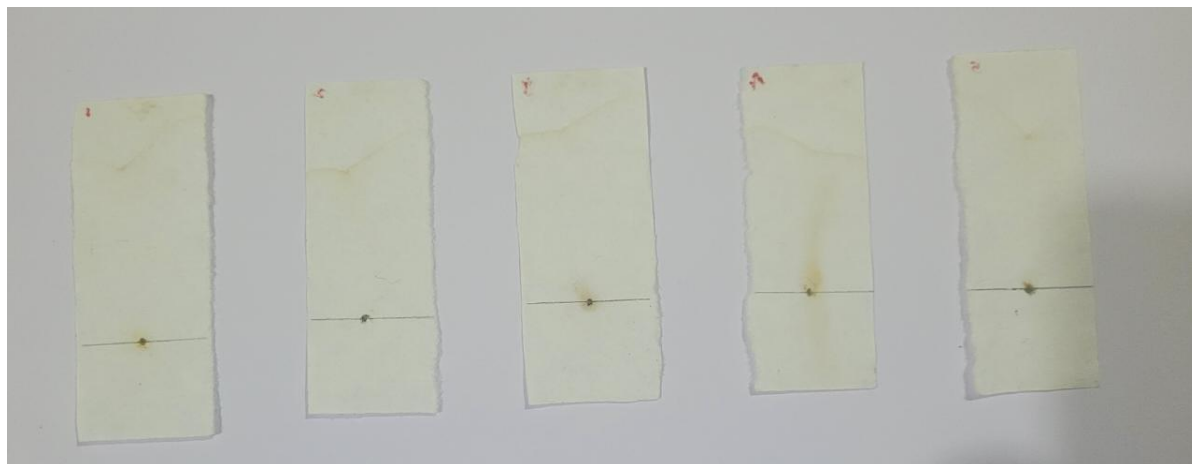
Performing a chromatographic experiment is a three-step process application of the sample, developing the chromatogram by allowing the mobile phase to move up the paper and calculating R_f values, and making conclusions.

1. A drop of the test solution is applied as a small spot on a filter paper and the spot is dried.

2. The paper is kept in a closed chamber and the edge of the filter paper is dipped into a developing solvent, made of 7 ml acetone and 7 ml water.

3. As soon as filter paper gets the liquid and reaches the suitable height the paper is dried and various spots have visualized the movement of substances relative to solvent is expressed in terms of R_f values.

$$R_f \text{ value} = \frac{\text{Distance traveled by Solute}}{\text{Distance traveled by Solvent}}$$



Microbiological assay

Principle: The method depends on the diffusion of an antibiotic from a vertical cavity or cylinder through the solidified Agar layer in a Petri dish the growth of the microorganism is inhibited entirely in a circular area or zone around the cavity or cylinder containing a solution of antibiotic.

PROCEDURE

- The nutrient Agar is melted, cooled, and poured into the Petri dish.
- Required the quantity of microbial test inaugurated on the surface of the solidified Agar by spread plate technique
- Different concentration of antibiotic is poured into an Agar plate and then incubated at a suitable temperature for 24 hours
- If the antibiotic has any antibacterial effect it will show the zone of inhibition
- The zone of inhibition is the clear region around the paper disk saturated with an antibody microbial agent on the Agar surface.
- Zone of inhibition was measured.



RESULTS AND DISCUSSION

Chalcone were prepared **Prunus amygdalus Batsch shell and Saccharum officinarum** by identification tests and reactions such as nitration, sulphonation, chlorination, and alkylation. tests of IR (interpretation) . Aldehyde and ketone compounds were found. TLC results such as $R_f 1=0.04$, $R_f 2= 0.02$, $R_f 3= 0.10$, $R_f 4 =0.625$, $R_f 5 = 0.03$. Anti microbial activity was seen in the sulfonated compound.

CONCLUSION

Identification tests reactions such as nitration, sulphonation, chlorination, and alkylation. tests of IR (interpretation) Aldehyde and ketone compounds were found. TLC results such as $R_f 1=0.04$, $R_f 2= 0.02$, $R_f 3= 0.10$, $R_f 4 =0.625$, $R_f 5 = 0.03$. Anti microbial activity is observed in the sulfonated derivative.

REFERENCES

1. <https://www.feedipedia.org/node/27>
2. Keyou Li, Haoyi Chen, Huang Yu, Hailan Zhu, Qiaozhi Mao, Xihan Ma, Zhong Zhao, Tiancun Xiao. Study on the Comprehensive Utilization of Bitter Almond Shell.2104:9(3), 4993-5006.
3. Nath A, Dutta D, Kumar P, Singh JP. Review on recent advances in value addition of jaggery based products. OMICS International. 2015.
4. Rakesh Kumar ,Mahesh Kumar. Technological upgradations in jaggery making plants.