RESEARCH ON ESTERIFICATION REACTION UNDER, MICROWAVE ASSISTED SYNTHESIS OF BUTYL BENZOATE FOR GREEN CHEMISTRY

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***Abstract*: In this research we explain all the detailed information about, Microwave assisted synthesis of Butyl Benzoate for esterification reaction in working green chemistry esterification reaction under Microwave assisted synthesis very much beneficial into assisted synthesis chemical reaction for green chemistry. Work by synthesis of butyl benzoate. This is initially used by the save energy and rate of reaction is fast. On this research work esterification reaction process of combining an organic acid (RCOOH) with and alcohol (ROH) to form Ester (RCOOR) and water. Some alcoholic groups are changes than chemical reaction resulting in formation least product butyl benzoate is ester obtained by esterification reaction, so alcoholic group are using n-Butanol and carboxylic group benzoic acid in the presence of conc. Sulfuric acid so, finally product butyl benzoate is forming an ester this synthesis microwave capable of predicting many properties and role of synthesis reaction is fast in small period of time to get form product. All type esterification chemical reaction synthesis is also done by microwave. Analyzed product by studying Thin Layer Chromatography. Various authors work on their subject by using this microwave assisted synthesis I show interest into microwave because of this is very beneficial for performing synthesis of butyl benzoate.**

***Keywords*: esterification reaction Microwave assisted synthesis, green chemistry, Microwave, synthesis of butyl benzoate, Thin Layer Chromatography.**

INTRODUCTION 1

Green chemistry is defined as environmentally benign chemical synthesis of esterification reaction Microwave assisted synthesis in that microwave is a general-purpose green chemistry for performing organic synthesis reaction in small period of time and no purification necessary as compared to conventional heating method.[1] Microwave initially started used in or released in 1986 by the groups of Gedye and Giguere/ Majetich although the use is microwave heating in chemical purpose can be back to 1950. Esterification reaction Microwave assisted synthesis if focusses on a process whether carried out in industry or chemical laboratory. The reduced the use and generation of harmful substance or byproduct. On this research work esterification reaction process of combining an organic acid (RCOOH) with and alcohol (ROH) to form Ester (RCOOR) and water. Some alcoholic groups are changes than chemical reaction resulting in formation least product butyl benzoate is ester obtained by esterification reaction, so alcoholic group are using n-Butanol and carboxylic group benzoic acid in the presence of conc. Sulfuric acid so, finally product butyl benzoate is forming an ester this synthesis microwave capable of predicting many properties and role of synthesis reaction is fast in small period of time to get form product. [1][2] Analyzed product (Butyl benzoate) by studying method: Thin Layer Chromatography. Microwave assisted synthesis is the benefits of microwave esterification reaction process of combining an organic acid (RCOOH) with and alcohol (ROH) to form Ester (RCOOR) and water. Some alcoholic groups are changes than chemical reaction resulting in formation least product butyl benzoate is some reagent or reaction are benefits of microwave assisted synthesis [3]

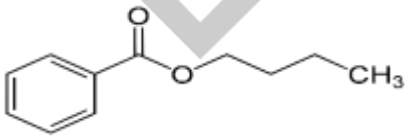


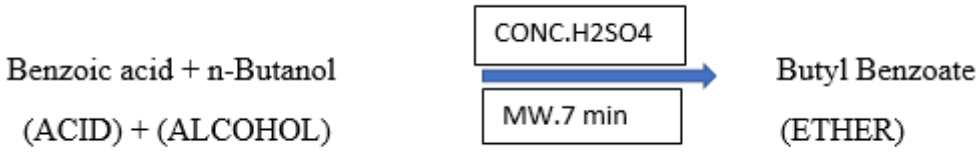
Fig. structure of Butyl benzoate

Butyl benzoate is a benzoate ester obtained by condensation of benzoic acid and butanol. It is used as a perfume ingredient and as a solvent for cellulose ether, a dye carrier for textiles. It has a role as an antimicrobial food preservative, a fragrance and a plant metabolite.[3]

1) Faster reaction synthesis of esterification reaction esterification reaction in microwave 7 min.
2) Better yield and higher purity (microwave synthesis of Butyl benzoate).
3) Energy saving for esterification reaction microwave synthesis of Butyl benzoate.
4) Uniform and selective heating.
5) Esterification reaction microwave synthesis of Butyl benzoate is green synthesis. [4–7]

PRINCIPLE OF ESTERIFICATION REACTION MICROWAVE SYNTHESIS OF BUTYL BENZOATE AS COMPARED TO CONVENTIONAL HEATING METHOD: 2

In microwave assisted synthesis and conventional heating method synthesis are same reaction but only heating method are deferent in microwave heating method are very beneficial for performing synthesis of butyl benzoate. Or other esterification reaction and all chemical reactions. And also rate of reaction is fast. By using dehydrating reagent Sulphuric acid (H2SO4). Also, Sulphuric acid acts as a catalyst in this reaction and removing water molecule. [9-12]



Some esterification reaction synthesis on microwave in general working on following way in short period of time and rate of reaction is fast.[13]

As compared to conventional heating method by synthesis of butyl benzoate in general working on round bottom flask add 3gm benzoic acid and add Butanol 5ml and CONC.H2SO4 are 2 to 3 drops. Then conventional heating 45min product are obtained. Same process working on microwave heating apply (electrical heating is converted to heat energy) product are obtained only 6min.very fast reaction in microwave as compared to conventional heating method by synthesis of butyl benzoate. [14-15]

Butyl Benzoate are compared by two heating method, microwave synthesis heating method and conventional synthesis heating method: 3

Sr.NO.	Heating Method	Green chemistry applies	Temperature 0C	Time	Purity after recrystallization	Stability 1gm in 1ml H2O
1.	Microwave	yes	60 W	6min	96%	Practically insoluble
2.	Conventional	No	60 0C	45min	84%	Practically insoluble

Table No.1

ANALYZED PRODUCT (MICROWAVE SYNTHESIS OF BUTYL BENZOATE) BY STUDYING THIN LAYER CHROMATOGRAPHY:4

Analyzed Product (Microwave Synthesis of Butyl Benzoate) By Studying Thin Layer Chromatography in that thin layer of silica gel spread on a glass surface than Butyl Benzoate spot the plate using a capillary tube.[16] Press the tube firmly to the plate in order to deposit the solution. We will use solvent to develop the plate. put solvent in a beaker and insert the plate. Mark sure the line sits above the solvent (Butyl Benzoate) and cover the beaker. than now we watch the plate develop.[16]

Mobile phase are water and methanol (1:2) ratio. And stationary phase by using silica applying spot Butyl Benzoate than calculate difference between Microwave Synthesis product and Conventional synthesis product are following:

Formula: RF Value = $\frac{\text{distance travelled by solute}}{\text{distance travelled by solvent}}$

i.e., d0 = travel distance of the solvent.

dA = travel distance of the compound A (microwave synthesis product).

dB = travel distance of the compound B (Conventional synthesis product).

R1 = (Ratio of front) value for A = dA /d0.

R2 = (Ratio of front) value for B = dB /d0.

Sr.NO.	Heating Method	travel distance of the solvent. (d0)	travel distance of the compound (d)	Ratio of front value (R)
1.	Microwave	6cm	(Spot A) 5.2cm	0.79
2.	Conventional	6cm	(Spot B) 4.7cm	0.71

Table No.2

Result: The Analyzed Product (Microwave Synthesis of Butyl Benzoate) By Studying Thin Layer Chromatography are less absorption in that less affinity, So Butyl Benzoate are movement fast. And as compared to conventional synthesis of Butyl Benzoate are more absorption in that more affinity, So Butyl Benzoate are movement are slow.[17]

REVIEW OF LITRETURE

Reich E, Schibli A. High-performance thin-layer chromatography for the analysis of medicinal plants. New York: 2007.[14]

Microwave radiation, an electromagnetic radiation, which is widely used as a source of heating in organic synthesis Microwave-Assisted Synthesis: Review of Recent Developments Neha Gupta Department of Chemistry, Dev Samaj College for Women, Ferozepur City.18th-19th march 20017. [15]
Esters are among the highest volume of industrial organic compounds produced. faces serious limitations of low conversion and high reaction time attributed largely to establishment of equilibrium. And then Fischer esterification regarded as the most common and widely practiced process of ester synthesis Journal of Industrial and Engineering Chemistry Volume 103, 25 November 2021, Pages 80-101.[16]
A review of synthesis of esters with aromatic, emulsifying, and lubricant properties by biotransformation using lipases Renata N. Vilas Bôas,Heizir F. de Castro First published: 27 December 2021.[17]

CONCLUSION: Esterification Reaction Microwave Synthesis of Butyl Benzoate as Compared to Conventional Heating Method to change the alcoholic group (butanol) product Microwave Synthesis of Butyl Benzoate are within 6min are Obtained synthesized product. And Conventional Heating Method synthesis product are within 45min are Butyl Benzoate are Obtained synthesized product.
To Analyzed Product (Microwave Synthesis of Butyl Benzoate) By Studying Thin Layer Chromatography and to check purity of Butyl Benzoate was found to be 0.79 As Compared to Conventional Heating Method by Studying Thin Layer Chromatography and to check purity of Butyl Benzoate was found to be 0.71.

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