

A Major Project report

On

**“Esterification Analysis and Kinetic study of Esterification Reaction of
Valeric Acid and n-butanol ”**

Of

Bachelor of Technology

In

Chemical Engineering

Submitted By:-

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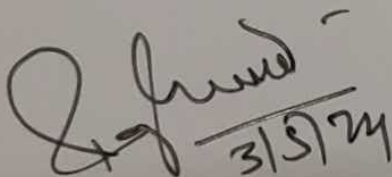
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CERTIFICATE OF APPROVAL

This is to certify that thesis titled "Esterification Analysis and Kinetic study of Esterification Reaction of Valeric Acid and n-butanol" submitted **Gourav Kumar** (Roll no.- 20101020), **Md Danish Nadeem** (20101032), **Parag Shrivastava** (Roll no.- 20101041) & **Vaibhav Jaiswal** (Roll no.-20101060) in partial fulfillment of the requirements for degree of **Bachelor of Technology** in **Department of Chemical Engineering** is a record of Bonafide and original research work carried out by them under our guidance and the thesis does not include any work which has previously being submitted for the award of other degree, diploma, associate-ship, fellowship or other similar title to them. We further certified that the work reported in this thesis was carried out independently by the candidates.



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ABSTRACT

In this work, Esterification kinetics of Valeric acid with n-butanol in the presence of an ion acid catalyst resin Amberlite IR-120 as a heterogeneous catalyst was studied with isothermal batch experiments at a temperature range of (70-100)°C, with different catalyst concentration (1-5%) (w/w) and at different molar ratio of Valeric acid to n-butanol (1:1-1:5). Investigation of kinetics of the reaction showed that when the temperature was increased from 70 °C to 100°C by keeping catalyst concentration at 1% (w/w) and molar ratio at 1:1, the conversion of valeric acid increases. As percentage conversion at 70°C is 57.1%, which then increases to 71.2% at 100°C. When the catalyst concentration was increased from (1-5)%(v/v) by keeping reaction temperature at 80°C and molar ratio at 1:3 the conversion of Valeric acid increases for increase in catalyst concentration from (1-3%) (w/w) and very slightly increase for catalyst concentration variation from (3-5%) (w/w). When molar ratio was varied from 1:1 to 1:5 by keeping reaction temperature at 90°C and catalyst concentration at 1% (w/w), it was observed that the conversion of Valeric acid increased with the change in the molar ratio from 67.5% at 1:1 to 87.62% at 1:5.

Keywords:-Esterification, Valeric Acid, n-Butanol, Amberlite IR-120 .