

## Summary

In the present work, methacrylic ester of N-(2-hydroxyethyl)phthalimide (NHEP) were synthesized and polymerized. The synthesis of 2-(N-phthalimido) ethyl methacrylate (PEMA) monomer was prepared in a Fair yield by the reaction of methacryloyl chloride with N-(2-hydroxyethyl) phthalimide (NHEP) in presence of triethylamine. Also, PEMA was prepared by the reaction of N-(2-hydroxyethyl) phthalimide (NHEP) with methacrylic acid in the presence of N,N-Dicyclohexyl carbodiimide( DCCI).The prepared monomer was collected and polymerized by solution polymerization and the polymer was collected by filtration.

The ability of poly-2-(N-phthalimido) ethyl methacrylate (PEMA) to enter into an exchange reaction with amines was tested with amines (ethylamine, pipridine, p-anisidine) and hydroxylated compounds (phenol, p-hydroxy benzoic acid, salycilic acid and cyclohexanol).And prenent exchange reactions were almost qunantitative as indicated by elemental and spectroscophtotometric analysis. And prenent exchange was found to be :( 92, 43, 54) for ethyl amine, pipridine, p-anisidine and was found to

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be :( 62.825, 100, 37.2922, 58.77) for phenol, salicylic acid, p-hydroxy benzoic acid and cyclohexanol.

The copolymerization reactions of 2-(N-phthalimido) ethyl methacrylate (PEMA) with methylacrylate, ethylacrylate and butylacrylate, styrene and vinylacetate, were carried out by solution polymerization in dimethylformamide (DMF) at 60<sup>0</sup>C in presence of 1 mol % azobis-isobutyronitril (AIBN). The copolymer composition of each sample was calculated from Nitrogen analysis. The monomer reactivity ratios ( $r_1$  and  $r_2$ ) of each system were calculated according to Fineman-Ross and Kelen-Tüdös methods as illustrated in the following Table:

System	Fineman-Ross method		Kelen-Tüdös method	
$M_1-M_2$	$r_1$	$r_2$	$r_1$	$r_2$
PEMA-MA	1.53	0.103	1.49	0.0995
PEMA -EA	3.18	0.826	3.41	0.826
PEMA -BA	1.04	1.399	1.01	1.41
PEMA -ST	0.93	1.624	0.83	1.6
PEMA -VA	31.168	0.37	32.174	0.3908

In all system studied no azeotropic copolymers appears.

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Some of the newly synthesized compounds were screened for their antimicrobial activity using the diffusion agar techniques were tested against bacterial species as well as against fungal species .these species are:

1. Gram positive bacteria.

*Staphylococcus aureus.*

2. Gram negative bacteria.

*Escherichia coli*

3. *Aspergillus flavus.*

4. *Candida albicans.*