CALIFORNIA STATE SCIENCE FAIR
2013 PROJECT SUMMARY

Name(s)

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Project Number

33629

Project Title

A Study of Various Factors Concerning the Selectivity and Adsorption Rate of Molecular Imprinted Polymers

Abstract

Objectives/Goals

The purpose of this experiment was to find out how the amount of ethylene glycol dimethacrylate (EGDMA) and the concentration of solvent used to remove the templates from the molecular imprinted polymers affected the selectivity and adsorption rate of the polymers.

Methods/Materials

The molecular imprinted polymers were made with acrylic acid, MMA, 4-hydroxybenozic acid, and EGDMA along with the tetrahydrofuran (THF) solvent and the radical initiator azobisisobutyronitrile (AIBN). Then, the templates were removed from the grinded polymers by the ethanol solvent. The polymers without the templates were put in the solutions of hydroxybenzoic acid isomers to test their selectivity and adsorption rate.

Results

The selectivity of the polymers whose templates were removed in 10% ethanol averaged 2.42686629, while that of the ones with their templates removed in 100% ethanol averaged 1.56319778. The polymers whose templates were removed in 10% ethanol averaged 14.3582031mg/MIP 1g, while the ones with their template removed in 100% ethanol averaged 15.80058197mg/MIP 1g.

Conclusions/Discussion

The selectivity of the polymers was not affected by the amount of EGDMA but by the concentration of the ethanol solvent. The adsorption rate was also concluded to be affected by the concentration of the solvent not by the amount of EGDMA. Although it is proven through the experiment that that the selectivity and the adsorption rate of the molecular imprinted polymers are higher for the 10% ethanol solvent than for the 100% solvent, because only the two concentrations were tested in the experiment, it cannot be concluded that 10% is the best concentration in raising the selectivity and the adsorption rate.

Summary Statement

Amount of ethylene glycol dimethacrylate and concentration of ethanol solvent that is used to remove the templates are manipulated to see how they affect the selectivity and the adsorption rate of the molecular imprinted polymers.

Help Received

Although I got a permission to use the lab at the University of California, Irvine, there was not any assistance given for me to complete the experiment.