Modeling and Kinetic Determination in 
Affinity Precipitation of Trypsin

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ABSTRACT

A mathematical model was proposed to allow the analysis of kinetic enzyme in 
experimental of affinity precipitation system. The methodology was tested using a 
system composed of enzyme, ethylene glycol and conjugated PABA-poly (NIPAM). 
N-isopropylacrylamide (NIPAM) is one of the monomers that have appealed to a 
great deal of investigation in the recent years. Its homopolymer NIPAM possesses 
temperature sensitivity and can act as a functional polymer with great potential. A 
water soluble ligand bound polymer has been synthesized by Electron Beam 
Irradiation for the purpose of affinity precipitation of tryps in. The affinity polymer 
was formed by ligand-PABA. The binding efficiency of trypsin to this polymer was 
dependent upon the ratio of (NIPAM), mercaptopropionic acid (MPA) as a chain 
transfer reagent and p-aminobenzamidine (PABA) as ligand that used in the polymer 
synthesis. The amount of precipitated of poly (NIPAM) present in the polymer 
solution also greatly affected the trypsin binding efficiency. The total binding 
capacity of trypsin molecules to ligand molecules approached the theoretical value 
which was considerably higher than that of insoluble gel matrices. Bound trypsin 
could be easily eluted by the ethylene glycol solution. At low molecular weight of 
poly (NIPAM), the conjugate polymer solution was very stable and retained its high 
capacity for trypsin recovery over a long period of time. The proposed analysis and 
simulation of kinetic parameters may be helpful in affinity precipitation technique for 
advanced application.

Keywords: modeling, mathematics, enzyme kinetics, PABA-ligand, trypsin, affinity 
precipitation