PROBLEM

Lysozyme is to be purified by cation exchange adsorption in the batch mode from 1000 litres of egg white protein solution (total protein concentration = 10 g/1). Lysozyme makes up 5% of egg white proteins on a weight basis. Preliminary laboratory-scale lysozyme binding experiments were carried out using two cation exchange adsorbents and the free and bound concentrations determined are shown below:

Lysozyme concentration in solution (g/l)	Adsorbent #1 Bound lysozyme concentration (g/l)	Adsorbent #2 Bound lysozyme concentration (g/l)
0.2	15	10
0.4	18	15
0.6	20	20
0.8	22	25

Comment on the nature of the adsorption isotherms. Which adsorbent will be better for the above mentioned separation?

PROBLEM

A hormone is being recovered from 10 litres of a biological fluid by affinity adsorption. The adsorption follows linear isotherm and the concentration of the hormone in the fluid is 0.01 g/l. 80% of the hormone could be adsorbed in the batch mode by 10 ml of affinity adsorbent. How much hormone would be adsorbed if 50 ml of adsorbent were used?