



## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 CONCLUSIONS

1. A model was developed to simulate a single column PSA system equipped with a product surge tank and comprising a two step cycle. Step 1 is a pressurization step and step 2 a blowdown/purge step. Product is however being produced in both steps.

2. The simulations result when compared with Sundaram and Wankat's model show very similar trends indicating that the limiting conditions of the model for a condition of no product gas and no product surge tank is correct.

3. Simulation results for the variation of molar ratios indicate that increase input/output ratio (moles in product stream on the average / moles in feed stream on the average ) result in increase in oxygen concentration in product gas and a small increase in oxygen recovery (%).

4. Simulation results of effect of feed time indicates that increase in feed time results in decreased oxygen concentration in product gas as well as decrease in oxygen recovery (%).

5. Simulation results of the effect of exhaust time indicates that an increase in exhaust time results in increased oxygen concentration in product gas and slight variations in oxygen recovery (%)

6. Simulation results of the effect of adsorbent particle diameter indicates that a decrease in diameters of particles results in increased oxygen concentration in product gas.

7. The simulations undertaken show favorable trends for pressure, mole fraction, and velocity profiles during feed time and exhaust time; however some slight discontinuities in the profiles appear near some boundaries.

## 5.2 RECOMMENDATIONS

1. In order to eliminate apparent discontinuities near some boundaries it may be necessary to review some boundary conditions used at the back end of the adsorber.

2. The product stream E ought to be rewritten to be a function of the pressure difference in the product surge tank and the outlet pressure so that the model more realistically reflect the phenomena inside the column.

3. New and quicker numerical methods ought to be used to develop this present model mainly to save calculation time.