DISTILLATION INSTRUMENT DESIGN FOR OPTIMUM ETHANOL CONCENTRATION

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Packed column distillation is usually used to do separation process in laboratory scale when a small size would make the design of conventional fractionating plates difficult and the construction would be relatively more expensive. Packing is arranged inside the column to increase the area contact surface between liquid flow down and the vapor flow up inside the column. In this research, we design a continuous packed column distillation, to get ethanol in optimum concentration. The type of packing is 3/8 in of ceramic Raschigh ring. We use MATLAB 6 Program to compute diameter number and height number of column. The test of instrument using ethanol-water solution, with inlet variables of ¼, ½ and ¾ of column height, and for the validation, we compare the simulation result and the testing of the instrument. We use picnometers and GC method to measure the concentration of ethanol. Simulation result give the number of diameter is 0.2504 ft or 7.07 cm and the number of height is 2.0736 ft or 63.2042 cm. Distillation using this device can produce ethanol with constant concentration, and the optimum condition to produce ethanol in optimum concentration is gain if the feed is in from inlet position of ½ Z, it produce ethanol concentration of 83.396 % of w/v or 66.288% of mole with 41.543% of column efficiency and 63 ml/hr of distillation rate.

Key words : ethanol, distillation, packed bed, continuous