Abstract

Cells of Acetobacter aceti were used together with an oxygen electrode to determine the concentration of ethanol, initially by studying the responses of the cell suspension of Acetobacter aceti to ethanol. This was achieved by determining the rate of oxygen consumption of the cells in the presence of ethanol using an oxygen electrode unit. The responses of the microbial cells to various concentrations of ethanol were obtained. The optimum conditions for this free cell system was found to be : pH 5.8, temperature 30°C and cells should be in the log phase. It was also found that the larger the quantity of the cells the better the response.

Alginate was used to immobilize Acetobacter aceti. At pH 5.8 the most suitable buffer, that is the buffer that caused the least dissolving of the gel, was found to be maleate buffer. The responses of Acetobacter aceti to ethanol were obtained by placing the immobilized cells in close proximity to an oxygen probe. The relationship between the responses and the log of concentrations was linear in the concentration range 0.01 - 0.10 % (v/v).

Keywords : ethanol; Acetobacter aceti ; immobilized cells ; alginate; oxygen electrode