

## **Abstract**

The feasibility of using loofa (*Luffa cylindrica*) sponge as a carrier for cell immobilization was investigated. In comparison with other carriers used for immobilization by cell adhesion, the density of loofa sponge is very low while the porosity and specific pore volume are very high. Furthermore, loofa sponge is stable over the whole range of pH and can be autoclaved many times without any visible change in the shape, structure and texture. By simply inserting loofa sponge in a flocculating yeast cell suspension, the flocs were entrapped within the lattice structure and the immobilization was completed in less than 20 min. The immobilized cells grew within the void volume, reaching a high cell concentration of over 4.4 g-cells/g-sponge. As an example, the immobilized cells were used for ethanol production from both sucrose and molasses media. More than 35 repeated batches on sucrose medium were performed without any loss in the activity of the immobilized cells. Also with both sucrose and molasses media, more than 500 h of stable continuous processing were possible. During the continuous processing, the cells remained firmly immobilized to the sponge and the free cell concentration in the effluent was less than 0.1 g/l throughout the fermentation period. The above results demonstrate that loofa sponge is an excellent carrier for immobilization of flocculating cells.

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