ABSTRACT

Bioethanol is one of the good sources of liquid energy for automobiles and industries. The bioethanol market has continued to grow rapidly in recent years. Thai government aims to increase ethanol consumption from 1.2 billion liters in 2015 to 3.3 billion liters by 2021 and up to 4.1 billion liters by 2036. *Z. mobilis*, a gram-negative bacterium, is considered as an alternative organism in large-scale fuel ethanol production. The bacterium *Z. mobilis* is a highly potent ethanol producer already used in industrial-scale fermentations which converts sugars to ethanol and carbon dioxide. Levans are natural polymers of the sugar fructose found in many plants and microbial products. They are formed as an undesirable by-product of sugar juice processing. This project aimed to study survivor rate of *Z. mobilis* encapsulated at different concentration of sodium alginate 2%, 2.5% and 3%., from simulated practical conditions including simulated food tract condition (acidic pH at 1.55 and 0.6% bile salt) and high temperature environment (85°). The encapsulated beads were separated into four different sizes according to their average size by sieving process. Results indicated that survival rates of encapsulated cells of *Z. mobilis* were significantly higher ($p < 0.05$) from all simulated conditions compared to free cells. Furthermore, the highest survival rate was obtained from sieve 10 with 3% sodium alginate for both heat and bile salt tests, while the lowest survival rates were performed by 2% alginate beads obtained from sieve 70 with survival rate of 19.52% and 14.72%, and 0.22% and 0.77%, respectively. Levan production was also determined from encapsulated cells providing the highest survivor rate which was beads from sieve 10 of 3% sodium alginate. Results showed they that there was no significant difference ($p > 0.05$) in levan production between free cell and encapsulated cells from high temperature condition test.