

ABSTRACT

Probiotic is helpful for human beings and animals when presenting in the intestinal tract. The probiotic is usually found in a high amount in the intestinal tracts of healthy animals. *Lactobacillus acidophilus* is a potential probiotic that has been used as an animal feed supplement. The medium that is commonly used for *L. acidophilus* cultivation is not a cost effective medium, so the seeking for another source of medium for the cultivation of the probiotic has become more interesting. Agricultural wastes are abundant in the worlds that are the lignocellulosic materials. Rice hull has been left as an agricultural waste in Thailand each year. Rice hull composes of cellulose, hemicelluloses that are the main carbon sources. Therefore, this research aims to produce a probiotic from rice hull. Rice hull was treated under the combination of physical and chemical treatments in order to hydrolyze the lignocellulosic compound to be reducing sugars that could be utilized by *L. acidophilus*. Rice hull samples were treated with base (sodium hydroxide) and acid (sulfuric acid and hydrochloric acid) at the various concentrations. Hydrochloric acid was found to be the most effective treatment based on the optimal amount of reducing sugar in hydrolysate after pre-treatment which was 27.45 g/L in comparison to MRS (20.88 g/L). As hydrolysate contained a high amount of reducing sugar, therefore hydrolysate was tested on the effectiveness over the growth of *L. acidophilus*. The result showed that medium formula of MRS: hydrolysate (25: 75 V/V) provided the growth kinetics that were similar to MRS medium with specific growth rate equal to 0.408 h^{-1} and the weight of dried cell was $2.61 \times 10^{-3}\text{ g/L}$, the number of viable cell was equal to $1.34 \times 10^8\text{ CFU/ml}$ at 24 hours and $2.07 \times 10^8\text{ CFU/ml}$ at 48 hours of incubation. The specific growth rate of *L. acidophilus* in MRS is 0.408 h^{-1} and the number of viable cell is up to $2.19 \times 10^8\text{ CFU/ml}$ at 9 hours of incubation. Therefore the mixture of hydrolysate and MRS is considered a cost effective medium to culture *L. acidophilus*.