Adhesion and Utilization of Native Starch Granules by *Lactobacillus amylovorus*

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ABSTRACT

This study investigated the correlation between adhesion and utilization of native starch granules by Lactobacillus amylovorus TISTR 1110 (L. amylovorus). Starch granules were used in place of a standard carbon source in the culture medium. To test whether the starch granules were still intact after media preparation, the shape, size, and birefringence of native starch granules of glutinous rice starch (GS), corn starch (CS), potato starch (PS), and mung bean starch (MS) were examined using an optical microscope under normal and polarized light. The results revealed that after treatment at a prepared temperature of 47±2°C, the morphology of starch granules at 2% (w/v) suspension did not change. The granules remained intact and maintained their birefringence. These starch granules were further evaluated for their potential to be hydrolyzed by L. amylovorus. L. amylovorus only consumed and produced a clear zone on the medium plates containing GS or CS. This hydrolysis was confirmed by observing the morphological change of the starch granules to a porous network using scanning electron microscopy (SEM). Adhesion of L. amylovorus to the native GS, CS, PS, and MS granules was also performed to verify the relation between adhesion and starch hydrolysis. High adhesion of the bacteria was found with GS and CS granules, approximately 90% of 2% (w/v) of the starch suspension in PBS pH 7.0. These results were confirmed by Gram staining.

In conclusion, L. amylovorus adhered and hydrolyzed the GS and CS granules better than the PS and MS granules. Given this, GS and/or CS offer potential as prebiotic ingredients in nutraceutical products.

Keywords: Native starch, *Lactobacillus amylovorus,* Adhesion, Prebiotic, Probiotic