



## MMS5 e-Conference

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### **Production of water-soluble and alkali-soluble hemicelluloses-derived oligosaccharides from rice production residues by microwave-assisted enzymatic hydrolysis and their effects on behaviors of probiotic bacteria under simulated gastrointestinal conditions**

Wannaporn Klangpetch Ueno<sup>1\*</sup>, Adisorn Swetwiwathana<sup>2</sup>

<sup>1</sup>*Department of Agro-Industry, Faculty of Agriculture, Natural Resources and Environment, Naresuan University, Phitsanulok 65000, Thailand*

<sup>2</sup>*Faculty of Agro-industry, King Mongkut's Institute of Technology Ladkrabang (KMITL), Chalong-krung Road, Ladkrabang, Bangkok 10520, Thailand*

\*E-mail: wannapornk@nu.ac.th

#### **Abstract:**

Rice straw (RS) is a by-product from rice production process. It is rich in cellulose, hemicellulose and lignin. RS hemicellulose mainly composes of arabinoxylan (AX). This research aimed to investigate the potential of microwave-pretreatment in AX extraction from RS and substrate to produce xylooligosaccharides (XOS) via enzymatic hydrolysis. The extractive-free RS was pretreated by microwave process at 160°C for 5-15 min then the AX was extracted with 4% sodium hydroxide. The total sugar and reducing sugar content of AX exhibited that increasing microwave-pretreatment time increased the yield of AX. The highest AX content was found at 160°C for 10 min as 7.73%, reducing sugar content as 11.89 mg/g, and total sugar as 165.85 mg/g. The purified AX obtained by microwave-pretreatment was then used as a substrate for XOS production by two commercial xylanases of Pentopan mono BG (BG) and Ultraflo Max (UM), at the enzyme concentration of 50-300 U/g AX (50°C, pH 6.0) for 24 h. The reducing sugar content and sugar profiles revealed that BG 50 U/g at 12 h and UM 50 U/g at 24 h showed the promising reducing sugar of 16.4 and 25.44 mg/g, respectively. The composition of XOS derived from RS prepared by BG was xylobiose, xylotriose, xylo-tetraose, and xylopentaose while by UM was xylobiose, xylotriose and xylo-tetraose. Moreover, XOS produced by BG contained very low amount of xylose. In addition, the RS-XOS could enhance the growth of *Lactobacillus* spp. and resist to the simulated gastrointestinal condition proving prebiotic potentials.