

LAPORAN HASIL PENELITIAN

**Konversi Enzimatik Xilan Menjadi
Xilooligosakarida Hingga 80% dari
Tongkol Jagung Sebagai Prebiotik *Cookies***

SURAT PERJANJIAN PELAKSANAAN KEGIATAN

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PERTANIAN**

ENZYMATIC CONVERSION OF XYLAN CORNCOB TO XYLOOLIGOSACCHARIDES UP TO 80% AS PREBIOTIC COOKIES

EXECUTIVE SUMMARY

Corn cob waste is a high xylan source that can be utilized as raw material for xylooligosaccharides (XOS) production, which has high economic value. Different corn variety has different xylan content, therefore two corn varieties i.e. Bisi and Pioneer were first analyzed for its hemicellulose, cellulose and lignin contents and xylan yield to select the corn variety for the study. Process technology for XOS production was studied using available equipment such as oven. Xylooligosaccharide (XOS) from corn cob was produced in two stages i.e. xylan extraction by heating at high temperatures or autoclaving, followed by enzymatic hydrolysis. Analysis of two corn cob varieties showed that Pioneer variety contained higher hemicellulose content (39.11% bk) and xylan yield (18.32%) than Bisi variety (10.17% and 10.22%, respectively), therefore Pioneer variety were selected for the study. The corn cob particles were soaked in dilute acid (1 g/l H_2SO_4) for 12 h at 60°C, filtered and washed with tap water. The xylan corn cob soaked in water with various ratios (1:1 – 1:5) was then heated in oven at various temperatures (130°C, 140°C, dan 150°C for 0.5 h) and autoclaving at 121°C for 2 h with one and two heating cycles. During heating, the total sugar and reducing sugar were increase, while the degree of polymerization was decrease. The results showed that heating in oven to extract the xylan was affected by the ratio of corn cob and aquadest and heating temperature. Oven heating (130-150°C) successfully increased the xylan content from 3.98% up to 18.21 – 19.46%, while repeated heating cycle (two cycles) did not affect the xylan content. Heating the corn cob with aquadest (at the ratio of 1:3) in oven at 130°C for 0.5 h was considered as the most efficient method that produced 18.98% xylan. Enzymatic conversion of xylan by xylanase significantly increased the XOS content. Before hydrolysis the XOS content was 19.60% and after enzymatic conversion the XOS content increased up to 44.06%. Two strains of probiotic candidate i.e. *L. plantarum* kik and *L. plantarum* FNCC 136 could be able to grow in media containing corn cob XOS and the bacterial number were increase about one log unit, indicating the prebiotic properties of corn cob XOS. Application of the corn cob XOS in functional food model was studied and resulted in prebiotic cookies made by the addition of 5% corn cob XOS in the cookies formula.

Keyword : corn cob, enzymatic conversion, xylan, xylooligosaccharide, prebiotic