**Development of a Sustainable Bioprocess for the Production of Novel Xylooligosaccharides (XOS) and Their Potential Application**

**XOS: Prebiotics for Disease Prevention and Health Promotion**

*Let food be thy medicine and medicine be thy food* (Hippocrates, 460–370 BC).

“A prebiotic is a non-viable food component that confers health benefit on the host associated with modulation of microbiota.”

XOS are sugar oligomers made up of xylose units. They are the only nutraceuticals that can be produced from lignocellulosic biomass. XOS have favorable physicochemical features, including stability at a wide pH range (2.5–8.0) and temperature (100 °C).

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**Market Opportunity**

**Global Prebiotics Market**

Europe retains big lead in the world market. Key players include Beneo, Cargill, and BOQUETTE. Major markets for XOS are food & beverages, dietary supplements, and animal feed. Future growth belongs to Asia, specifically Asia-Pacific (13.5% CAGR through 2022).

**Challenge**

To increase healthy foods production in a sustainable way.

- **Economy**: Use of abundant and cheap resources
- **Society**: XOS prevent diseases and promote health
- **Environment**: Reuse of agro-industrial wastes

**Production**

Key application areas include food uses (fortified foods, synbiotic foods), pharmaceutical uses (immunomodulator, anti-cancer, antimicrobial, growth regulator), and agricultural uses (yield enhancer, ripening agent, growth stimulator, feeds for animals).

**New Approach**

Direct fermentation with *Trichoderma* produces XOS. TLC results for Brewers’ spent grain directly fermented by *T. viride* in water at pH 5.0.

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