Compiled by Dr. Shantanu, Department of Veterinary Biochemistry, College of Veterinary Science,
Assam Agricultural University, Khanapara, Guwahati. 781022.

BIOCONVERSION OF LIGNOCELLULOSE

Lignocellulose is the major structural component of plants. It consists of lignin, hemicelluloses and cellulose. The lignin containing cellulose have less digestibility than lignin free cellulose. The lignin containing cellulose have less digestibility than lignin free cellulose. The lignin is polymer of phenolic compounds, cellulose is polymer of β-D-glucose and hemicelluloses is hetero-polysaccharide that is rich in xylose. Apart from xylose, the hemicelluloses also contain mannose, galactose and arabinose. The bioconversion of lignocellulose indicates the degradation of lignocellulose through chemical or enzymatic process that would increase digestibility of the cellulose.

Bioconversion of Lignocellulose by fungus (White Rot Fungi)

Ruminal fungi secrete enzymes that degrade the lignocellulose are ligninase, cellulose, hemicellulase, pectinase, and xylanase. As the lignin physically covers the cellulose and hemicelluloses preventing the access of digestive enzymes that digest cellulose, it is removed by the fungal enzymes.

Alkali and Acid Method

Weak acids and alkali tend to remove lignin but result in poor hydrolysis of cellulose. Disposal of acid and alkali is a problem.

Use of lignolytic enzymes

The class of lignolytic enzymes that can break down lignin is ligninases. There are two families of ligninases quite common are phenol oxidases and peroxidases.