

Activity of cellulase and ligninase enzymes in a local bioactivator from cattle and buffalo rumen contents

ABSTRACT

Lignin is the main component of agricultural and plantation wastes, such as bagasse, straw and oil palm fronds. Lignocellulosic bonds in lignin, cellulose and hemicellulose can be broken down by enzymes. Numerous studies have utilised plantation waste as feed ingredients. Lignin is the limiting factor that affects the digestibility of this material. Therefore, the lignin content of plantation waste must be reduced before it is used as a feed ingredient. The use of local bioenzymes will be effective in breaking lignocellulose bonds. Thus, finding sources of enzymes that are easy to obtain, inexpensive to produce and effective as lignocellulose-degrading enzymes is necessary. This study aims to determine the activity of cellulase and ligninase enzymes in a bioactivator from rumen contents incubated for 7 days with different enzyme energy sources. The treatments included cattle and buffalo rumen contents added with molasses, palm frond, palm leaf extract and each enzyme. The parameters observed were the enzyme activities of cellulase, laccase, lignin and manganese peroxidase (MnP). Microbial identification was also performed. The results of statistical analysis showed insignificant differences ($P > 0.05$) amongst the parameters of the enzyme activities of cellulase (2.22–3.51 U/ml), laccase (10.62–20.11 U/ml), lignin peroxidase (1.74–4.93 U/ml) and MnP (2.40–7.06 U/ml). *Lactobacillus* sp. was identified through bacterial identification. Therefore, the live microbes discovered in the local microorganism solution originated from the study environment and not from the rumen contents.