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The Comparative Study Between Cellulase Enzyme Extracted From Goat and Gold Fish

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Abstract: *Rumen is an excellent environment for microbial growth consisting of bacteria, fungi and protozoa which are widely known to play important role in the fermentation process of ruminant cattle feed [1]. Cellulase is an enzyme produced by cellulolytic microbes capable of hydrolizing β-1,4 glycoside bond in cellulose, a polysaccharide structure often found in plants Cellulose degradation by cellulolytic bacteria is a product of synergy in a group of cellulase enzymes. Cellulase enzyme system consists of three groups of hydrolytic enzymes, i.e. (1) endo-(1,4)-β-D-glucanase (endoglucanases), (2) exo-(1,4)-β-D-glucanase (exoglucanases), and (3) β -glucosidase Endo-(1,4)-β-D-glucanase enzyme hydrolyzes β bonds randomly in a morphous regions of cellulose fibers [4], generates oligosaccharides of different lengths, and can form a new chainend [5]. Exo-(1,4)-β-D-glucanase enzyme works towards reducing and non-reducing end of polysaccharide chains, especially on crystalline cellulose region, and liberates glucose as the main product resulted by β-glucosidase enzyme. Hydrolysis of crystal line cellulose part can only be done efficiently by exoglucanase enzyme. The synergy between endoglucanases and exoglucanases enzymes produces cellobiose molecules. Cellulose hydrolysis effectively requires an enzyme (β-glucosidase) that breaks down cellobiose into two molecules of glucose. Lignocellulosic materials are the most abundant resource for the production of renewable bioenergy and fermented products. Cellulosic materials need to be first hydrolyzed into fermentable sugars since they are not useful in their polysaccharide form (Li et al., 2009). The biohydrolysis of cellulose through the use of cellulolytic microorganisms is an attractive approach since the degradation of cellulose by chemical agents produces environmental pollution. Fungal species have been primarily used commercially for cellulase production because of their capacity to secrete cellulolytic enzymes into their medium, which allows for easy purification and extraction (Maki et al., 2009). Among the cellulolytic fungi, Trichoderma spp. and Aspergillus spp. have been extensively investigated since they can produce all three types of cellulose-degrading enzymes (Wang et al., 2008). However, bacterial cellulases have several advantages. First, bacteria have higher growth rates than fungi and can easily grow to high cell densities in inexpensive nutrient sources (Maki et al., 2009). Second, the enzyme expression system of bacteria is more convenient. Third, bacteria can not only survive harsh conditions but can also excrete enzymes that are stable under extreme conditions of high temperature and low or high pH.*

Keywords: Lignocellulosic Material, Cellulolytic Fungi And Bacteria , Degradation, Cellulose