

CELLULOLYTIC BACTERIA IN RUMEN CONTENTS OF CARCASSES FROM MAJIMBO ABATTOIR IN
EMBU COUNTY KENYA

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Abstract

Cellulose is a biopolymer that is found widely distributed on earth and it is a constituent of the plant cell walls and some algae. Cellulose hydrolyzing bacteria are adapted well to the environments containing cellulose biomass. The rumen of the ruminants can serve as an ideal source of cellulolytic bacteria since they help in the digestion of the cellulose in their feeds. Other cellulolytic microorganisms are the protozoa and fungi but bacteria constitutes the majority in the rumen. These bacteria that are able to degrade cellulose, can be utilized or rather applied in the clothing and fiber industry for the partial or complete synthesis of clothing and fiber materials. They can also be used in the environmental cleanup of the environments polluted with cellulose biomass. The main aim of the study was to explore the rumen content for the presence of the cellulolytic bacteria. The screening was able to determine the diversity of the cellulolytic bacteria in the rumen contents of the cattle in Majimbo abattoir and also helped determine the diversity of the substrates that these bacteria were able to utilize as sole carbon sources. Enumeration of these cellulolytic bacteria entailed spread plating in cellulose agar. The colonies grew differently were separated and cultured in fresh cellulose media. The streaked plates were cultured until pure cultures were obtained. The isolates were screened for utilization of selected sole carbon sources. Those negative for cellulolytic activity test were considered non-cellulose hydrolyzing. The morphological was done on the isolates to determine their characteristics. This research generated bacterial isolates that can be utilized for degradation of cellulosic biomass. In addition, the isolates would act as bioresource for future studies. There were thirty isolates from the four samples. Three of the isolates (A308, D316 and C328) were Gram negative with the other twenty isolates being Gram positive. The morphological features showed that there were rods and cocci with only two isolates (B301 and A321) being rods and the rest being cocci. After screening the isolates for the utilization of various selected substrates they showed to be able to utilize a number of them but at varying extents. The cellulolytic bacteria are the ones that were able to utilize cellulose and CMC as sole source of carbon. CMC is made up of cellulose molecules and it is more complex in terms of the structure as compared to cellulose.