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Molecular Cloning and Enzymatic Properties of Novel Amylase Gene (*amy*A) from Cow Rumen Metagenomic Library

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The metagenomes of complex microbial communities are rich sources of novel biocatalysts. The gene encoding an extracellular α-amylase from a genomic library of rumen was isolated from Korea cow was cloned in *Escherichia coli* DH5α and sequenced. The α-amylase (*amy*A) gene was 1,893 bp in length, encoding a protein of 631 amino acid residues with calculated molecular weight of 70,734 Da. The molecular weight of the enzyme was also estimated to be about 70 kDa by activity staining of a SDS-PA gel. The enzyme was 21-59% sequence identical with other amyloyltic enzymes. The amylolytic enzyme (AmyA) was optimally active at pH 6 and 40℃. The AmyA had a calculated pI of 5.87. AmyA expressed in *E. coli* DH5α were enhanced in the presence of Mg^{2+} (20 mM) and Ca^{2+} (30 mM) and were inhibited in the presence of Fe^{2+} and Cu^{2+}. The origin of *amy*A gene could not be confirmed by PCR from extracted genomic DNA (49 species) using designed ORF internal primer.