

Enzymatic Hydrolysis of Animal Hair Using Commercial Proteases

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Abstract: Processing of animal hides/skins into leather generates large quantities of solid and liquid wastes. India currently processes 0.75 million tons of raw hides/skins annually and solid wastes such as animal hair and buffing dust do not find gainful utilization. Only a small quantity of good quality of hair is used for carpet and brush making and the rest of the hair is dumped in the vacant site near the tanneries. This on long storage leads to foul smell and leads to environmental and health problems, this also results in significant economic loss. Animal hair is rich in cystine, aspartic acid, glutamic acid, glycine, serine, valine, leucine and alanine. Although hydrolysis of animal hair employing acids and alkalis for recovery of bio-products is known, use of these chemicals result in significant loss of some of valuable amino acids. In the present study different commercial enzymes have been used to check their suitability for hydrolysis. Among seven commercial enzymes, two of them found suitable to hydrolyze the keratin up to the amino acid level. The results indicate that up to 85% of the hair can be hydrolyzed when enzymes are used along with reducing agent such as dithiotheritol or sodium sulphite. Analysis of the hydrolysate showed that the hydrolysis had gone up to the amino acid level and most of the amino acids are intact. In this way animal hair can be hydrolysed to amino acids and these amino acids can be used for different purposes and separation into individual amino acids.

Key words: Amino acids; Animal hair; Enzymatic hydrolysis; Proteases