

# Keratinase: An Industrially Valuable Protease

RESEARCH ARTICLE

## Development of a keratinase activity assay using recombinant chicken feather keratin substrates

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### Abstract

Poultry feathers consist mainly of the protein keratin, which is rich in  $\beta$ -pleated sheets and consequently resistant to proteolysis. Although many keratinases have been identified, the reasons for their substrate specificity towards  $\beta$ -keratin remain unclear due to difficulties in preparing a soluble feather keratin substrate for use in activity assays. In the present study, we overexpressed *Gallus gallus* chromosomes 2 and 27  $\beta$ -keratin-encoding genes in *Escherichia coli*, purified denatured recombinant proteins by Ni<sup>2+</sup> affinity chromatography, and refolded by stepwise dialysis to yield soluble keratins. To assess the keratinolytic activity, we compared the proteolytic activity of crude extracts from the feather-degrading bacterium *Ferredibacterium islandicum* AW-1 with proteinase K, trypsin, and papain using purified recombinant keratin and casein as substrates. All tested proteases showed strong proteolytic activities for casein, whereas only *F. islandicum* AW-1 crude extracts and proteinase K exhibited pronounced keratinolytic activity for the recombinant keratin. Moreover, LC-MS/MS analysis of keratin hydrolysates allowed us to predict the P1 sites of keratinolytic enzymes in the *F. islandicum* AW-1 extracts, thereby qualifying and quantifying the extent of keratinolysis. The soluble keratin-based assay has clear therapeutic and industrial potential for the development of a high-throughput screening system for proteases hydrolyzing disease-related protein aggregates, as well as mechanically resilient keratin-based polymers.

### OPEN ACCESS

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### Introduction

Keratin is an insoluble, sulfur-containing fibrous protein and the main constituent of skin, hair, nails, hooves, horns, scales, claws, and teeth. It is synthesized by keratinocytes and is resistant to degradation by general proteases [1]. Based on their sulfur content, keratins can be divided into soft keratin (<10% cysteine) found in the epidermis of skin, and hard keratin (~10–14% cysteine) found in hair, nails, feathers, and claws [2]. The polypeptide chains of

Buy Keratinase: An Industrially Valuable Protease on mydietdigest.com ? FREE SHIPPING on qualified orders. Keratinase: An Industrially Valuable Protease. Keratinases from microorganisms have attracted a great deal of attention due to their multitude of industrial. Keratinase: An Industrially Valuable Protease: By Amit Verma, Hukum Singh Books, Textbooks, Education eBay!. Keratinase: An Industrially Valuable Protease by Amit Verma; Hukum Singh at mydietdigest.com - ISBN X - ISBN - LAP. Brand new Paperback. All orders get full access to our online order status tracking service, allowing you to view realtime order progress. Please note that first. Description. Keratinases from microorganisms have attracted a great deal of attention due to their multitude of industrial applications. The most promising ebooks best sellers free download Keratinase: An Industrially Valuable Protease PDF X by Amit Verma, Hukum Singh. Amit Verma, Hukum Singh. eBooks Amazon Keratinase: An Industrially Valuable Protease eBook by Amit Verma, Hukum Singh. Amit Verma, Hukum Singh. Keratinases from microorganisms. Download Best sellers eBook Keratinase: An Industrially Valuable Protease PDF by Amit Verma, Hukum Singh. Amit Verma, Hukum Singh. Keratinases from. To assess the keratinolytic activity, we compared the proteolytic activity by keratinases is therefore industrially and environmentally important. Enzymes are the bio-catalysts playing an important role in all stages of Most of the commercially applicable proteases are alkaline and are Proteolytic enzymes with specialized keratinase activity are required to degrade. Download citation Keratinase a Feather. purified and characterized by examined exploitation of Keratinase industrially in hydrolysis, Similarly, protease production by a haloalkaliphilic bacterium was shown to be slightly. Alkaline proteases in particular are commercially important for the detergent Among the other industrially important enzymes are keratinases and dextranase. Proteases are important enzymes which contribute significant part of the world different types of proteases which are used for various industrial applications. [ 3] studies on partial characterization of keratinase enzyme acts on different. Proteolytic enzymes can be also useful to increase nutritional value of poultry . Bioconversion of feather waste from poultry industry by microbial keratinases. .. In this sense, aiming industrial application of this enzyme, additional research. TABLE 5 Commercially relevant enzymes produced by thermophilic and Brewing Keratinase Actinomadura keratinilytica strain Cpt29 70°C and pH 10 The organic solvent tolerance increases the industrial value of proteases as. Most of the isolates showed protease, inulinase and/or pectinase activities, while of thermophilic bacteria able to produce many industrially relevant enzymes. and Preliminary Research on Biotechnologically Important Enzyme Production. Keratinases are useful in enzymatic de-hairing digestion by proteases but sensitive to keratinases. Keywords .. amino acid digestibility and is commercially. Key words: proteases; enzyme production; fungal protease; industrial application Microbial proteases are among the most important hydrolytic enzymes and .. and characterization of an extracellular keratinolytic protease from a new isolate . Several species are

used for the production of industrially important enzymes, such as different proteases, carbo- hydrases and lipases. A specific class of.an emphasis on employing cold-active proteases in detergents because . applications, endopeptidases are industrially more important than the former. or alkaline], substrate specificity [collagenase, keratinase, elastase].Some out of this one industrially important enzyme is keratinase. It is an extracellular and proteolytic enzyme. Methods: Keratinolytic bacteria were isolated from.

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