

Multienzyme System as Detergent Additive to Improve Cleaning Potential

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ABSTRACT

The detergent industry represents approximately 30% of the industrial contribution of enzymes. Detergents are widely used in dishwashing liquids, laundry materials, domestic, industrial and institutional cleaning agents. Various harmful effects has been associated with incomplete degradation of synthetic detergents after utilization. Enrichment of the detergents with enzymes significantly influence the growth and development of detergent industry¹. The enzyme-added detergents are ecofriendly, economic, and highly efficient in cleaning action. Hydrolytic enzymes have been extensively exploited for removing the stains². In present research, bacterial protease and lipase produced separately and washing potential of crude enzymes had been investigated. Lipase and protease used separately and with detergents in eleven different combinations to remove tea and oil stains. According to the results, combination of these hydrolases along with detergent has been shown to possess the highest cleaning action³. The diameter of the tea stain reduced to 64 % and 72% reduction was observed in oil stain along with significant decline in its visibility. These findings suggests the potential use of lipase and protease combination in biodetergent formulation.

Keywords: Detergent industry, Lipase, Protease, Washing potential.

INTRODUCTION

Enzymes are eco-friendly catalysts, which reduces the activation energy of the reaction and thereby accelerates the rate. This potential of enzymes has been using extensively since ancient days. According to the prediction of current surveys, there is a high potential in growth of enzyme market as it may achieve 13 to 14 billion US dollars in 2025. Being organic in nature, enzymes are highly specific in their action. Furthermore, these biocatalysts speed up the reaction efficiently by generating less by products. The chemicals used in detergents are harmful for the environment as they persist in the environment for longer period of time and present greater risk to the living organisms. This high demand of enzymes in industries is due to their specific, economic and eco-friendly nature¹. Use of hydrolytic enzymes in detergent industry represents their largest application in terms of both value and volume. The major enzymes used in detergency are proteases but other potentially detergent compatible hydrolases such as lipases, amylases and cellulases has also been add in the category due to their efficient cleaning actions. Moreover, mannanase, pullulanase, and pectinase are also extensively used in detergent applications.

OBJECTIVES

As different enzymes are used in detergent industry, present research involves the development of enzyme combination comprising of proteases and lipases along with the detergent to improve the washing potential.

METHODOLOGY

In current study, bacterial protease and lipase produced separately and washing potential of crude enzymes had been investigated. Lipase and protease used separately and with detergents in eleven different combinations (Table 1) to remove tea and oil stains.

Table 1. Combinations used for destaining.

Protease	SDS
Lipase	Protease + SDS
Protease +Lipase	Protease + Detergent
Commercial Detergent	

RESULTS

According to the results, combination of these hydrolases along with detergent has been shown to possess the highest cleaning action. The diameter of the tea stain reduced to 64 % and 72% reduction was observed in oil stain along with significant decline in its visibility. These findings suggests the potential use of lipase and protease combination in biodetergent formulation.

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