

## PREFER<sup>®</sup> P 300

Protease for use in liquid laundry detergent products

### Introduction

PREFER P 300 is a bacterial proteolytic enzyme for use in the formulation of liquid detergent products and characterized by its ability to hydrolyze or degrade proteins even after storage in a detergent. PREFER P 300 hydrolyzes proteins in to soluble peptides and amino acids that are more readily removed from the fabric during the washing process. PREFER P 300 helps to remove every day stains such as grass, milk, blood and protein containing foods. PREFER P 300 works across a broad range of wash pH and temperatures.

### Typical product characteristics/properties

Product	PREFER P300
Min. activity [DSLU/g]	6000
Product form	Liquid
Appearance	Clear brown liquid
pH	5.0-6.5
Target specific gravity	1.1

### Packaging

PREFER P 300 is available in pails, drums, totes and bulk. Please contact your sales representative for details.

### Composition

The liquid contains enzyme concentrate, stabilizers and preservatives. Detailed composition data may be made available, please contact your sales representative for more Information.

### Usage recommendations

### Application

PREFER P 300 is suitable for washing conditions ranging from cool (20°C) to hot (60°C). The optimal performance can be expected between pH 7 and pH 10. Results may vary dependent upon detergent composition.

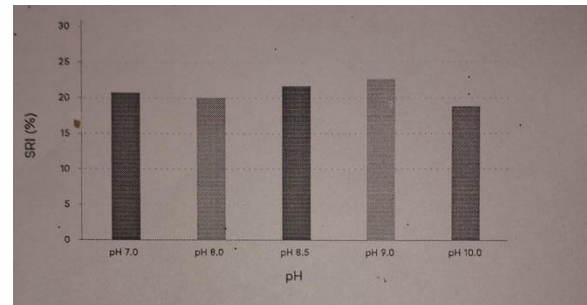


Figure 1 Stain Removal as function of pH. Wash machine: LOM Wash temperature: 20°C, Water hardness: 25°FH. Wash time: ramping 15 minutes Detergent dosage: 5.6 g/l Eu liquid detergent. Enzyme dosage, 1.5% w/w PREFERENZ P 300. Stain: CFT C-10 Pigment/il/milk on cotton

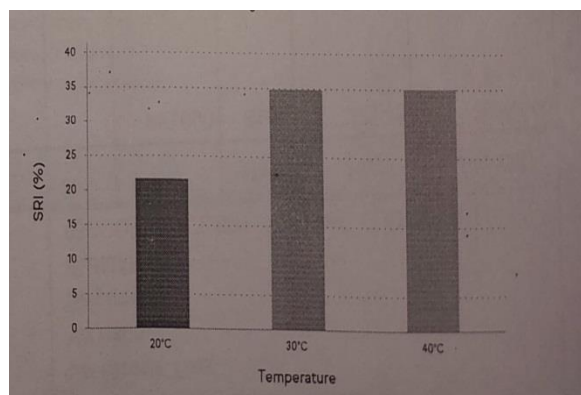


Figure 2% Stain Removal as function of temperature. Wash machine: LOM Water hardness: 25 FH. Wash time: ramping 15 minutes. Outergent dosage: \$4 gn Eu liquid detergent, pii detergent: 8.5. Enzyme dosager 1.5% w/w PREFER P 300. Stain: CFTC-10 Pigment/il/milk on cotton

## Dosage

Typical dosage range of PREFER P 300 is 0.3-2% w/w in detergent for European formulations, 0.4-2.0% w/w in detergent for Northern American formulations, 0.1-0.6% w/w in detergent for Asian/Pacific formulations and 0.15-0.5% w/w for Latin American formulations. Exact dosage should be based upon wash conditions, detergent formulation, detergent dosing and the desired level of performance.

## Formulation recommendation

Use of sodium formate, tri-methyl glycine and polyols as well as nonionic instead of anionic surfactants has a general positive effect on enzyme stability. Use of hydrophobic solvents as well as formaldehyde generating anti-microbial agents should be avoided. Protease stability in liquid detergents can be increased by addition of 0.5% boric acid or related compounds like MEA borate. Protease stability will also increase in detergents with low water activity. In dilute detergents, substituting 2-5% of water with glycerol or preferentially mono propylene glycol will lead

to increased stability. Most detergent enzymes benefit from the addition of small amounts of calcium. The amount of stabilization package required will vary based upon the liquid protease product used.

## Product and manufacturing certifications

This product does not contain genetically engineered organisms. The enzyme product is manufactured by fermentation of microorganisms that are not present in the final product. The production organisms and the enzyme effectiveness are improved by means of modern biotechnology.

## Safety and enzyme handling

Inhalation of dust from granulated enzymes should be avoided. In case of accidental spillage or contact with the skin or eyes, promptly rinse with water for at least 15 minutes. For detailed handling information, please refer to the appropriate Material Safety Data Sheet, the Enzyme Technical Association (ETA) handbook Working Safely With Enzymes, and the Association of Manufacturers of Fermentation Enzyme Products (Amfep) handbook Guide to the Safe Handling of Microbial Enzyme Preparations, and the Soap and Detergent Association (SDA) handbook Work Practices for Handling Enzymes in the Detergent Industry

## Contact information

For more information, please contact your sales representative, a member of the E Home- and Personal Care team.

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