Technical Data Sheet

PREFERENZ® P 400

Stable protease for use in liquid laundry detergent products

Where science & creativity meet

Introduction

PREFERENZ® P 400 is a proteolytic enzyme for use in the formulation of liquid detergent products. It is characterized by its ability to hydrolyze or degrade proteins even after storage in a detergent. PREFERENZ® P 400 was specifically engineered for inherent stability and is part of a Stable Liquid Portfolio by IFF.

PREFERENZ® P 400 hydrolyzes proteins into soluble peptides and amino acids that are more readily removed from the fabric during the washing process. PREFERENZ® P 400 helps to remove every day stains such as blood, milk, grass and protein containing foods. PREFERENZ® P 400 works across a broad range of wash pH and temperatures.

Typical product characteristics/ properties

Product	PREFERENZ® P 400
Min. activity[1] [NSPU/g]	9000
Product form	Liquid
Appearance	Clear, yellow to brown liquid
pH	5.5–6.5
Target specific gravity	1.1

Usage recommendations

Dosage

Typical dosage range of PREFERENZ® P 400 is 0.3–2.0 % w/w in detergent for European formulations, 0.3–2.0 % w/w in detergent for Northern American formulations, 0.1–0.6 % w/w in detergent for Asian/Pacific formulations and 0.1–0.6 % w/w for Latin American formulations. Exact dosage should be based upon wash conditions, detergent formulation, detergent dosing and the desired level of performance.

Application

PREFERENZ® P 400 is suitable for washing conditions ranging from cold (20°C) to warm (60°C) wash. The optimal performance can be expected between pH 7 and pH 9. Results may vary dependent upon detergent composition.

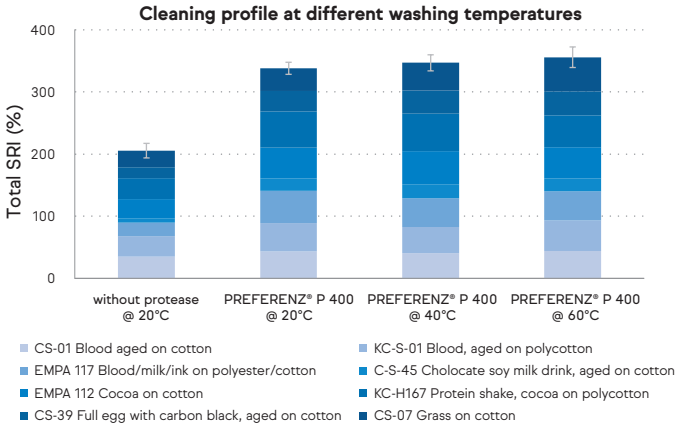

Figure 1: Stain Removal Index SRI (%) as function of temperature. PREFERENZ® P 400 achieves excellent cleaning performance at 20°C demonstrating its cold wash feature.
Wash test: Miele W1935 WPS EcoLine (Cotton, Short 109 mins, 1400 rpm, wash volume 10L), water hardness 14°GH. Detergent: 35 ml/wash commercial laundry liquid at pH 8. Enzyme dosage: 0.5% w/w PREFERENZ® P 400.

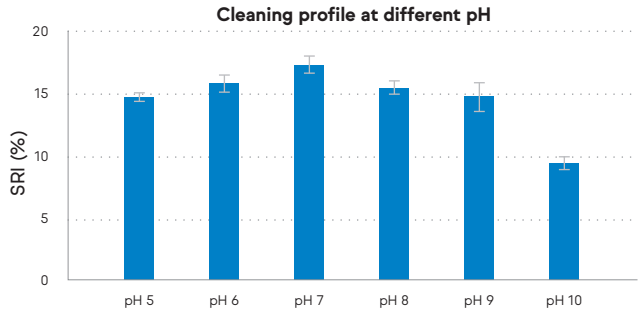

Figure 2: Stain Removal Index SRI (%) as function of pH. PREFERENZ® P 400 achieves robust cleaning performance over the typical laundry liquid pH 7-9 range.
Wash test: Laundrometer (LOM), 20°C, water hardness 14°GH, wash time 15 minutes. Detergent dosage: 3.7 g/l commercial laundry liquid. Enzyme dosage: 1.0% w/w PREFERENZ® P 400. Stain: C-10 Pigment/ oil/milk on cotton.

[1] Assay methodology is available upon request.

Formulation recommendation

PREFERENZ® P 400 is protein engineered for robust stability in liquid detergents and reduces the need for additional stabilizers in laundry liquid formulations. In dilute detergents, substituting 2–5% of water with glycerol or preferentially mono propylene glycol (PG) will lead to increased stability due to the reduction of water activity. Most detergent enzymes benefit from the addition of small amounts of calcium. The amount of stabilization package required will vary depending on the detergent matrix. Protease stability improvements can also be achieved by increasing the nonionic to anionic surfactant ratio. Use of hydrophobic solvents as well as formaldehyde generating anti-microbial agents should be avoided.

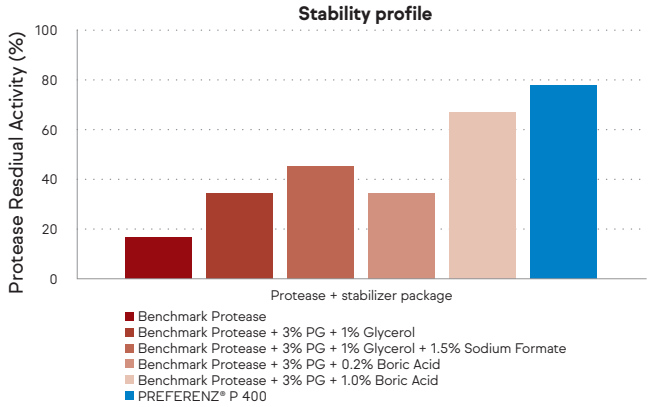

Figure 3: Protease stability in model screening laundry liquid HDL formulation with different stabilizing packages. Biochemical stability after 4 weeks @ 37°C using the artificial substrate N-succinyl-ala-ala-pro-phe-p-nitroanalide (AAPF). PREFERENZ® P 400 achieves superior stability without the addition of stabilizers.

Storage and stability

Recommend to store refrigerated, not exceeding 10°C. Packaging must be kept intact, dry, and away from sunlight. This product is formulated for maximum storage stability. Specific product storage stability data is available upon request.

Packaging

PREFERENZ® P 400 is available in pails, drums, totes and bulk. Please contact your sales representative for details.

Product and manufacturing certifications

ISO 9001, Kosher

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 aerosols from enzyme 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 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 IFF Home and Personal Care team or visit our website at **iff.com/portfolio/markets/home-care**

Health & Biosciences

Home & Personal Care

Welcome to IFF

At IFF (NYSE: IFF), an industry leader in food, beverage, health, biosciences and sensorial experiences, science and creativity meet to create essential solutions for a better world – from global icons to unexpected innovations and experiences. With the beauty of art and the precision of science, we are an international collective of thinkers who partners with customers to bring scents, tastes, experiences, ingredients and solutions for products the world craves.

Together, we will do more good for people and planet.

Learn more at **iff.com**, **Twitter** , **Facebook**, **Instagram**, and **LinkedIn**.

08.23.V1

Where science & creativity meet