

# OPTIMASH™ VR

## Xylanase/Cellulase for Rye and Triticale Ethanol Manufacturing

### DESCRIPTION

OPTIMASH™ VR xylanase/cellulase is an enzyme preparation intended for the fuel ethanol industry. This product is capable of reducing viscosity and improving separation of different grain fractions of rye and triticale mashes. OPTIMASH™ VR xylanase/cellulase contains a combination of enzymes which effectively modify and digest non-starch carbohydrates, the structural material of plant cells. OPTIMASH™ VR xylanase/ cellulase is produced by submerged fermentation of a non-genetically modified strain of *Penicillium funiculosum*.

### PERFORMANCE BENEFITS

The advantages of using OPTIMASH™ VR xylanase/cellulase are:

- Improved starch utilization
- Hydrolysis of non-starch carbohydrates
- Reduced mash viscosity enabling higher gravity fermentation
- Reduced fouling of evaporators and distillation equipment

OPTIMASH™ VR xylanase/cellulase is especially effective on arabinoxylans,  $\beta$ -glucans and cellulose.

### TYPICAL CHARACTERISTICS

As a xylanase/cellulase enzyme complex, the product contains multiple enzyme activities but is standardized on the basis of its activity on carboxymethyl cellulose (CMC). The performance of this enzyme preparation is a result of the synergistic effect of all main and side activities and cannot be evaluated only on the basis of the declared activity.

**Activity:** 3150 CMC-DNS U/g (minimum)

**Appearance:** Amber liquid

**Solubility:** Completely miscible in water

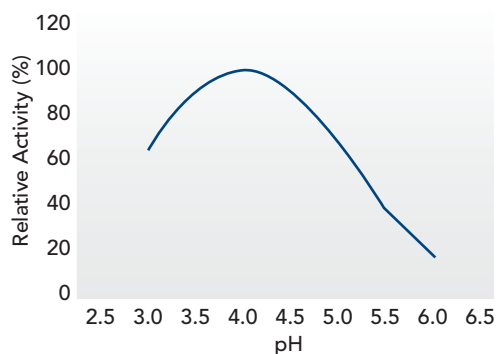
**Specific gravity:** 1.05 to 1.10 g/ml

The activity of OPTIMASH™ VR enzyme is expressed in carboxymethyl cellulose (CMC-DNS) activity units.

### DOSAGE GUIDELINES

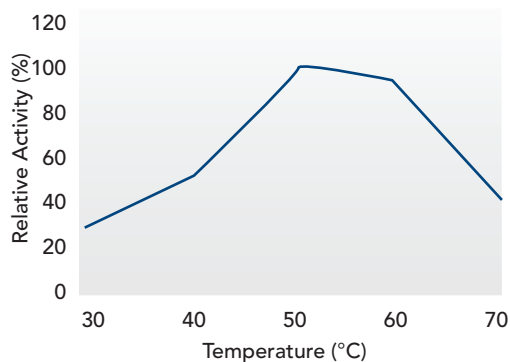
The optimum dosage levels of OPTIMASH™ VR enzyme will vary with different substrates and operating conditions such as pH, temperature, and reaction time. With no previous use information, OPTIMASH™ VR enzyme should be initially tested at 0.10 - 0.30 kg/metric ton dry substance (DS) for rye mashes and 0.05 - 0.10 kg/metric ton dry substance (DS) for triticale mashes, after which the dosage can be lowered gradually to determine the lowest level at which the enzyme has the required effect.

### EFFECT OF pH



**Figure 1:** pH Activity Profile of OPTIMASH™ VR xylanase/cellulase Resultant rate of activity on xylan at 50°C (122°F)

### EFFECT OF TEMPERATURE



**Figure 2:** Temperature Activity Profile of OPTIMASH™ VR xylanase/cellulase Resultant rate of activity on xylan at pH 4.0

## PACKAGING

OPTIMASH™ VR enzyme is available in various standard package sizes. Please contact DuPont for detailed information.

## STORAGE

This product will meet the declared activity upon arrival at the customer's plant. It is advisable to store OPTIMASH™ VR enzyme under refrigerated conditions. Storage above 25°C (77°F) should be avoided.

## SAFETY & ENZYME HANDLING

Inhalation of enzyme dust and mists should be avoided. In case of 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 and Formulators of Enzyme Products (AMFEP) handbook *Guide to the Safe Handling of Microbial Enzyme Preparations*. All are available from DuPont.

## TECHNICAL SERVICE

Information covering specific applications of this product is available. DuPont will work with customers to enhance processes and solve problems. Let us know what you need and we will assist you.

## CONTACT INFORMATION

### NORTH AMERICA

Rochester, New York (USA)

☎ +1 800 847 5311

☎ +1 585 256 5295

### ASIA/PACIFIC

Singapore

☎ +65 6511 5600

☎ +65 6511 5666

### EUROPE, MIDDLE EAST & AFRICA

Leiden, The Netherlands

☎ +31 71 5686 168

☎ +31 71 5686 169

Shanghai, P.R. China

☎ +86 21 2307 9588

☎ +86 21 2307 9599

### LATIN AMERICA

Buenos Aires, Argentina

☎ +54 11 4875 9500

☎ +54 11 4875 9529

Mumbai, India

☎ +91 22 3008 7131

☎ +91 22 3008 7150

Lahore, Pakistan

☎ +92 300 8476 404

☎ +92 423 5437 866

### SÃO PAULO, BRAZIL

☎ +55 11 4613 3800

☎ +55 11 4612 1101

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