



Termamyl 120 L, Type L

Description

Termamyl is a liquid enzyme preparation containing an outstandingly heatstable alpha-amylase expressed in and produced by a genetically modified strain of *Bacillus licheniformis*. The systematic name for the enzyme is 1,4-alpha-D-glucan glucono-hydrolase (EC 3.2.1.1).

Select a product...

Select an Enzyme...

Product Properties

Appearance

Termamyl 120 L, Type L is a brown liquid with a density between 1.20 and 1.25 g/ml.

Activity

Termamyl 120 L, Type LDeclared activity: 120 KNU/g

Activity Determination

One Kilo Novo alpha-amylase Unit (KNU) is the amount of enzyme which breaks down 5.26 g starch per hour at Novozymes' standard method for determination of alpha-amylase. See the [Analytical Method](#) [133K PDF] for further information.

Food-grade status

Termamyl 120 L, Type L complies with FAO/WHO JECFA and FCC recommended purity specifications.

[Packaging List](#)

Application

Termamyl is used in the following industries:

- Starch
- Alcohol
- Brewing
- Sugar

The enzyme is an endoamylase which hydrolyzes 1,4-alpha-glucosidic linkages in amylose and amylopectin. Starch is therefore rapidly broken down to soluble dextrans and oligosaccharides. In the starch industry, Termamyl is used for continuous liquefaction of starch in steam jet-cookers or similar equipment operating at temperatures up to 105-110°C (221-230°F), thereby taking advantage of the extreme heat stability of this enzyme.

In the alcohol industry, Termamyl is used for the thinning of starch in distilling mashes. Here too, advantage is taken of the heat stability of the enzyme. Furthermore, it is possible to work without pH adjustment and Ca addition, despite conditions not being optimal. This is due to the relatively broad pH tolerance and low Ca requirements of the enzyme. This simplifies the process and minimizes the risk of Ca scaling in the distillation column.

In the brewing industry, Termamyl is used for adjunct liquefaction. Due to the extreme heat stability of the enzyme, the cooking programme can be simplified; an increase in proportion of adjuncts is also a possibility.

In the sugar industry, Termamyl is used to break down the starch present in cane juice. Thereby the starch content in the raw sugar is reduced and filtration at the refinery facilitated.

Our more detailed recommendations with respect to operating conditions are provided in separate papers for each industry and are available on request.

Reaction Parameters

Activity and Stability

In a starch slurry, Termamyl is satisfactorily stabilized in the presence of 50-70 ppm Ca⁺⁺. In Table 1, figures for Termamyl stability in a 30% starch slurry are shown as a function of pH and temperature for three different levels of Ca⁺⁺ (ppm). Data is considered valid for DE values in the range of 0-12.

Temperature	93°C 199°F	98°C 208°F	103°C 217°F	107°C 225°F
Ca++ 70 ppm pH 6.5	1500	400	100	40
pH 6.0	800	200	75	20
pH 5.5	300	75	25	10
Ca++ 20 ppm pH 6.5	450	125	40	10
pH 6.0	250	75	20	5
pH 5.5	100	25	5	2
Ca++ 5 ppm pH 6.5	150	40	10	4
pH 6.0	75	20	5	2

Enzyme activity can also be expressed as an initial rate of DE (dextrose equivalent) increase for a given enzyme concentration. The average rate of DE increase over a given time will also depend on the stability. Initial rates for a 0.05% w/w dosage of Termamyl 120 L are as follows:

Temperature	90°C 194° F	95°C 203° F	100° C 212° F	105° C 221° F
Initial DE increase/hour	5.1	5.5	5.9	6.2
Average DE increase over first hour (standard cond.)	5.1	5.3	5.3	4.3

Inactivation

For certain purposes it is very important to inactivate any residual Termamyl activity in a dextrin or syrup. This can best be accomplished by thermal treatment at low pH. Table 2, showing figures for Termamyl stability at low pH, may serve to establish guidelines for such treatment.

Temperature	90°C 194°F	95°C 203°F	100°C 212°F
Ca++ 70 ppm pH 3.5	0.1	0.02	(0)
pH 4.0	2	0.4	0.2
pH 4.5	17	7	3
Ca++ 34 ppm pH 3.5	0.03	0.01	(0)
pH 4.0	0.7	0.2	0.04
pH 4.5	10	4	2

Example

In a 20 DE dextrin solution at pH 4.0, 95°C, containing 70 ppm of Ca⁺⁺, it takes 4 minutes to reduce the activity to 0.1% of the initial activity (about 10 half-lives).

Safety

Enzymes are proteins. Inhalation of dust or aerosols may induce sensitization and may cause allergic reactions in sensitized individuals. Some enzymes may irritate the skin, eyes and mucous membranes upon prolonged contact. This product may create easily inhaled aerosols if splashed or vigorously stirred. Spilled product may dry out and create dust.

Spilled material should be flushed away with water. Avoid splashing. Left-over material may dry out and create dust. Wear suitable protective clothing, gloves and eye/face protection as prescribed on the warning label. Wash contaminated clothes.

A Material Safety Data Sheet is supplied with all products. See the Safety Manual for further information regarding how to handle the product safely.

Storage

Enzymes gradually lose activity over time depending on storage temperature. Cool and dry conditions are recommended. When stored at 5°C (41°F), the product will maintain its declared activity for 6 months. When stored at 25°C (77°F), the product will maintain its declared activity for 3 months. Extended storage and/or adverse conditions, including higher temperature or high humidity, may lead to higher dosage requirement.

Product Specification:

Termamyl 120 L, Type L

Valid from 2003-1-15

Appearance: Brown liquid

Enzyme: Amylase

Diluents: Sucrose, Sodium chloride

Stabilisers: Methionin

Preservatives: None

Analysis name	Lower limit	Upper limit	Unit
Alpha Amylase Units KNU-T	120	138	/g
Total Viable Count	-	50,000	/g
Coliform Bacteria	-	30	/g
Enteropathogenic E.Coli	None Detected		/25g
Salmonella	None Detected		/25g

The product complies with FAO/WHO JECFA and FCC recommended purity specifications.

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