Neutrase®

Description
Neutrase is a bacterial protease produced by submerged fermentation of a selected strain of Bacillus amyloliquefaciens.
Neutrase is an endoprotease which can be used in most cases where proteins have to be broken down either moderately or more extensively to peptides.
Neutrase contains only the neutral part of Bacillus amyloliquefaciens proteases, whereas most other commercial preparations also contain the alkaline proteinase.
Neutrase is a metallo proteinase (Zn), which is stabilized with Ca²⁺ and consequently inhibited by EDTA.
Neutrase contains a non-standardized amount of beta-glucanase and is free of any alpha-amylase activity.

Product Properties

Product Type
Neutrase 0.8 L is a clear brown liquid. Neutrase 1.5 MG is a light brown, free-flowing, non-dusting microgranulate with an average particle size of around 300 microns. The colour may vary from batch to batch and colour intensity is not an indication of product strength.

Activity
Neutrase is standardized in Anson Units per gram (AU/g).

Neutrase 0.8 L..................................Declared activity: 0.8 AU/g
Neutrase 1.5 MG............................Declared activity: 1.5 AU/g

For further information, see the Analytical Method, which is based on denatured hemoglobin in a 0.02 M Ca⁺⁺ buffer.

Solubility
The active components of Neutrase are readily soluble in water at all concentrations that occur in normal usage.

Food-grade status
Neutrase complies with the recommended purity specifications for food-grade enzymes given by the Joint FAO/WHO Expert Committee on Food Additives (JECFA) and the Food Chemicals Codex (FCC).

Packaging
See the standard Packaging List for more packaging information.
Application
Neutrase is used to upgrade proteins of vegetable and animal origin. Detailed recommendations with respect to applications are given in separate papers.

Reaction Parameters
The optimal working conditions for Neutrase are at 45-55°C (113-131°F) and pH 5.5-7.5. The activities shown in Figures 1 and 2 are measured according to a modified Anson method in aqueous solutions without the stabilizing effect of proteinaceous matter. The stability of Neutrase at a certain temperature is influenced by the type and concentration of the proteins present.

![Fig. 1. The influence of pH on the activity of Neutrase at 45°C (113°F).](image)

![Fig. 2. The influence of temperature on the activity of Neutrase at pH 6.](image)

Inactivation
Neutrase can be inactivated by heat treatment, e.g. 2 minutes at 85°C (185°F). However, the inactivation is very much dependent on the substrate (substrate concentration, pH, etc.). Thus, the documentation for efficient elimination of Neutrase must be based on actual analysis for detection of residual activity. The stability of Neutrase at a certain temperature is influenced by the type and concentration of the proteins present. In Figure 3, the stability of Neutrase is measured without the stabilizing effect of protein substrate.
Fig. 3. The stability at pH 6.0 (phosphate buffer) of Neutrase at various temperatures.

**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. Wear suitable protective clothing, gloves and eye/face protection as prescribed on the warning label. Wash contaminated clothes.

*Liquid enzyme product:* 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.

*Granulate enzyme product:* This product has been developed to resist mechanical effects. However, excessive mechanical wear and tear or crushing may create dust. All spills, however minor, should be removed immediately. Use respiratory protection. Major spills should be carefully shovelled into plastic-lined containers. Minor spills and the remains of major spills should be removed by vacuum cleaning or flushing with water (avoid splashing). Vacuum cleaners and central vacuum systems should be equipped with HEPA filters.

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 and humidity. It is recommended to store the product under cool and dry conditions in closed containers at 0-10°C (32-50°F). Extended storage and/or adverse conditions including higher temperature or high humidity, may lead to a higher dosage requirement. Further information on product stability is available on request.