



NATUREN®

Product Information

Liquid Rennet

Description NATUREN® Liquid is a standardized rennet manufactured from extracts of the fourth stomach of calves and/or adult bovines.

NATUREN® Liquid contains milk-clotting enzymes with a high specific cleaving effect on kappa-casein, resulting in a very good curd formation. The general proteolytic activity has also significant influence on the flavor and texture development of cheeses.

NATUREN® Liquid complies with JECFA (FAO/WHO) and FCC recommended specifications for food grade enzymes as well as with the proposed guidelines of the Scientific Committee on Food (SCF) of the European Union for food enzyme preparations. This product is suitable for organic cheeses.

Chr. Hansen's rennets are produced in strict compliance with the regulations of Danish and other relevant health authorities for the production of food enzymes.

Appearance NATUREN® Liquid is a yellowish to amber liquid with a characteristic smell. NATUREN® Liquid might have batch to batch color variations. This has no influence on the clotting activity.

Enzyme content The active milk-coagulating enzymes in NATUREN® Liquid are chymosin (EC 3.4.23.4) and bovine pepsin (EC 3.4.23.1). The enzymes are of pure calf/adult bovine origin.

Product range The NATUREN® Liquid range consists of the following standard products.

Type	Prod no	Chymosin %*	Average activity IMCU/ml	Min. activity at expiry date IMCU/ml
NATUREN® Extra 220	1152	95-100	220	209
NATUREN® Premium 225	1131	83-88	225	213
NATUREN® Premium 145	1135	83-88	145	138
NATUREN® Plus 190	1121	77-83	190	180
NATUREN® Plus 175	1134	77-83	175	165
NATUREN® Stamix 160	1144	47-53	160	152
NATUREN® Stabo 230	1182	10-30	230	218

The average activity in IMCU/ml (International Milk Clotting Units) is given as suffix in the name and measured according to ISO 11815 / IDF 157. The enzymatic composition of NATUREN® products is measured according to IDF 110B. *The remaining part is bovine pepsin.

NATUREN® custom made products are available on request.

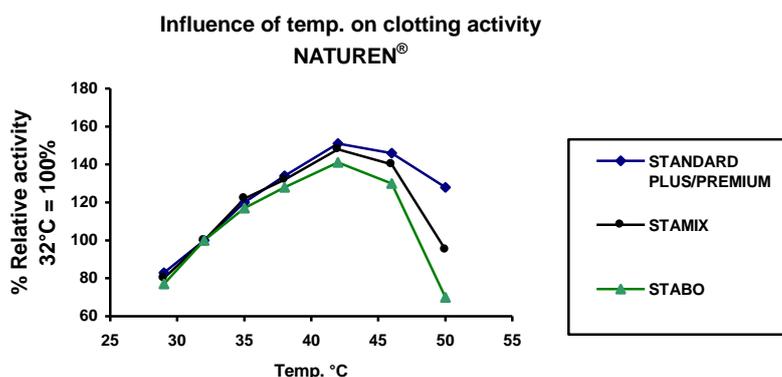
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Chr. Hansen A/S, Bøge Allé 10-12, DK-2970 Hørsholm, Denmark - Phone: +45 45 74 74 74/Fax: +45 45 74 88 13 - www.chr-hansen.com

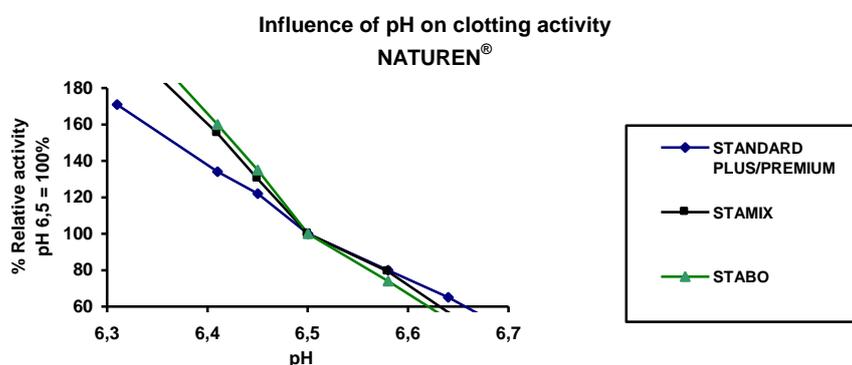
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NATUREN® is patent protected by EP 0758380, US 5,888,966, AU 684162, AU 701254, NZ 285373.

- Packing** Depending on the type of product, **NATUREN® Liquid** is available in the following packing sizes: 1l, 5 l, 20 l, 1.000 l.
- Specification** Specifications for activity, composition, microbial quality and other technical data are available upon request. A Certificate of Analysis will normally accompany the goods.
- Residual activity** All **NATUREN® Liquid** products are inactivated (> 98%) during normal pasteurization of whey (72°C for 15 sec) at pH ≥ 6.0.
- Temperature** The relative activity of different rennet types depends on the temperature. The temperature optimum for **NATUREN® Liquid** is around 43°C.



- pH** The activity of rennets is dependent on the pH in the milk. The lower the pH is, the higher activity. The least sensitive to changes in pH is Standard Plus/Premium because of the high chymosin content, whereas Stabo has the highest bovine pepsin content and is the most sensitive.



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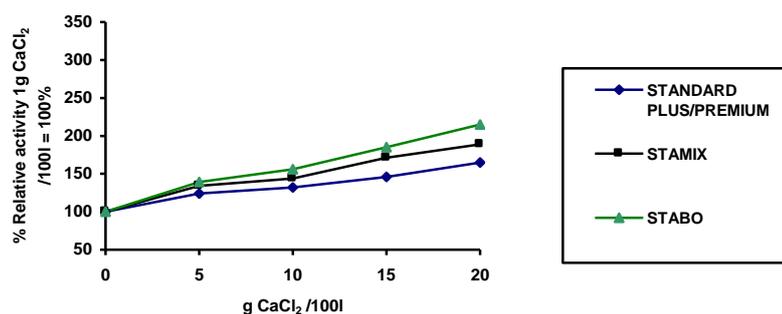
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Calcium

Addition of Calcium Chloride to the milk increases the activity of **NATUREN® Liquid** mainly due to a decrease in pH, but also has an effect on the aggregation. Excessive use of Calcium Chloride could induce bitterness in the cheese.

Influence of CaCl_2 on clotting activity
NATUREN®



Storage/Transport

NATUREN® Liquid should preferably be stored in a cool place at temperatures between 0°C and 8°C in the closed original container.

NATUREN® Liquid should be transported between -5°C and 20°C with a possible transit time of 4 days outside this temperature interval. Prolonged exposure to excessive heat may influence the shelflife of the product.

Stability/Shelflife

When handled as mentioned under **Storage/Transport**, the products will comply with the specifications for at least 12 months. The shelflife is limited to 3 months after opening, provided the product is kept at recommended storage conditions.

Application

NATUREN® Liquid is suitable for cheese making of any type of cheese - hard cheeses, semi-hard cheeses, soft cheeses and mould cheeses.

How to use

Heat the milk to the desired renneting temperature. Guidelines for dosage are given in the table below. It is recommended to dilute 1 part of coagulant in 5-15 parts of water prior to use. Dilution water must have a pH <6.4 and be free of chlorine. If pH and chlorine are not under control, we recommend to mix 80% of cold water with 20% of cold milk, and use this solution for dilution. The diluted coagulant should be added immediately to the milk while stirring for 2-3 minutes to distribute the coagulant properly in the cheesemilk.

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Dosage

Guidelines for the dosage of rennets are given in the table below.

Product Name	Dosage IMCU/l milk
NATUREN®	30-60

The correct dosage of rennets depends on the following factors:

- * Cheese type
- * Temperature of the cheesemilk
- * pH of the cheesemilk when adding the rennet
- * The characteristics of the cultures
- * Dosage of CaCl₂ and NaCl

Some of these factors vary from country to country, from dairy to dairy and sometimes from day to day. Therefore the exact dosage should be adjusted individually.

**Handling
precautions**

The product is non-flammable, completely miscible with water and safe when used according to directions. Proteolytic enzymes may irritate skin and eyes, and enzyme aerosol may cause sensitization when inhaled. In case of accidental spillage and contact to eyes or skin, rinse promptly with water. For additional information, please ask for Safety Data Sheet.

Technical service

Chr. Hansen's worldwide facilities and the personnel of our applied technological departments are at your disposal with assistance and instruction.