

Papain CLEA

- **Protease from *Carica papaya***
- **Extreme thermal stability as CLEA**
- **Immobilized as Cross-Linked Enzyme Aggregate**



Papain is a cysteine protease from *Carica papaya*. It is used in the pharmaceutical, nutraceutical and cosmetic industry, since it is able to hydrolyse peptide bonds of collagen and keratin in the stratum corneum of the skin. The proprietary CLEA methodology has been applied to immobilize and stabilise this enzyme, yielding a highly thermostable formulation of papain.

CLEA Methodology

Our proprietary methodology to immobilize enzymes as Cross-Linked Enzyme Aggregates (CLEAs) consists of covalent cross linking of precipitated enzymes. This efficient and economically attractive method yields immobilized biocatalysts that do not include support material and therefore have a very high activity per unit volume.

Product Properties

Product Type:	Immobilized form of papain from <i>Carica papaya</i> as a Cross-Linked Enzyme Aggregate (CLEA)
Formulation:	Suspension in buffer
Enzyme Type:	Cysteine protease, EC 3.4.22.2
Natural Reaction:	peptide synthesis and breakdown
Substrate Specificity:	accepts collagen, keratin
Typical activity:	100 units/ml*

* 1 unit will catalyse the hydrolysis of 1µmol N-benzoyl-arginine ethyl ester at 40°C and pH 6.5

CLEA® is a registered trademark of CLEA Technologies BV.

Specific Product Specification

Papain CLEA

Applications

Papain can hydrolyse peptide bonds in of collagen and keratin in the stratum corneum of the skin. This controlled skin damage can trigger renewal resulting in a smoother, softer skin.

In organic synthesis papain is used in peptide synthesis and for the production of enantiopure alcohols, amines or acids via ester hydrolysis.

Storage and Stability

The Papain CLEA® is best stored in a cool and dry environment. Storage at 4 °C is recommended. It is recommended to keep the CLEA in suspension upon storage. The papain CLEA shows a dramatic improvement in thermal stability compared to the free enzyme that loses all activity within 5 h at 50 °C.

Thermal stability:

Residual activity during incubation at 50 °C

Time	Free enzyme	CLEA
5 h	0 %	100 %
65 h	0 %	100 %

Formulations

Papain CLEA is available as a suspension in buffer.

Pricing and Availability

Papain CLEA is available in the formulations that are described before. The available quantities range from 10 kU to giga unit scale. Please inquire for availability, lead times and prices.

References

1. Sheldon, Roger A; Sorgedragger, Menno; Janssen, Michiel H. A. **Use of Cross-linked Enzyme aggregates (CLEAs) for performing biotransformations**. *Chimica oggi, Chemistry Today* 2007, 25(1), 48-52.
2. Sheldon, R. A; Schoevaart, R; Van Langen, L.M. **Cross-linked enzyme aggregates (CLEAs): A novel and versatile method for enzyme immobilization (a review)**. *Biocatalysis and Biotransformation* 2005, 23(3/4), 141-147.
3. Sheldon, Roger A; Schoevaart, R; van Langen, Luuk M. **CLEAs: An effective technique for enzyme immobilization**. *Specialty Chem.* 2003, July/August, 40-42.
4. Cao, Linqiu; van Langen, Luuk; Sheldon, Roger A. **Immobilised enzymes: carrier-bound or carrier-free?** *Curr. Opin. Biotechnol.* 2003, 14, 387-394.