

## Chondroitinase AC

## Research Grade

PN 50-013

### Synonyms

Chondroitin sulfate lyase; chondroitin sulfate eliminase

### Source

*Flavobacterium heparinum* (recombinant)

### EC Number

4.2.2.5

### CAS Number

9047-57-8

### Catalyzed Reaction

The enzyme cleaves, via an elimination mechanism, sulfated and non-sulfated polysaccharide chains containing 1-4 linkages between hexosamines and glucuronic acid residues. The reaction yields oligosaccharide products (mainly disaccharides) containing unsaturated uronic acids which can be detected by UV spectroscopy at 232 nm. The enzyme is active on chondroitin sulfates A and C, chondroitin and hyaluronic acid, but is not active on dermatan sulfate (chondroitin sulfate B).

### Substrate Specificity

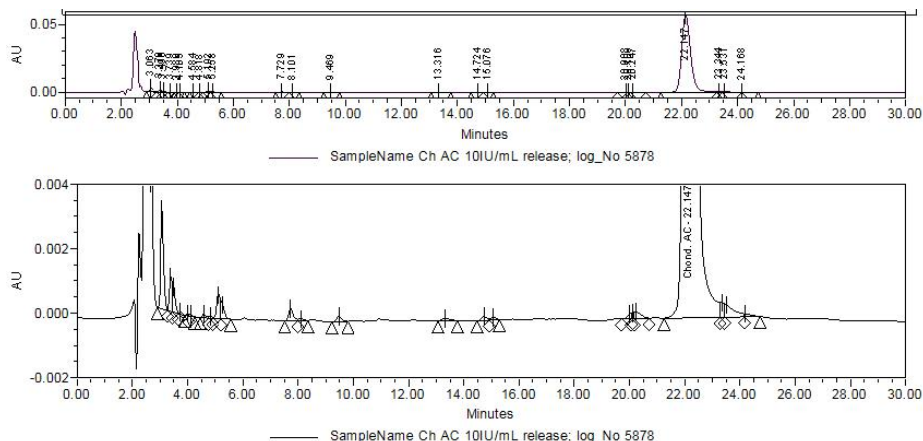
Chondroitin sulfates A and C, chondroitin, hyaluronic acid. (The specific activity with chondroitin sulfate A is approx. 1.5 times higher than the specific activity with chondroitin sulfate C).

### Properties

- Molecular weight: 79,557 Da
- Isoelectric point: 9.0 – 9.1
- pH optimum for activity: 4.5 – 6 with chondroitin sulfate A  
6 – 7 with chondroitin sulfate C
- pH range for activity: 3.5 – 9 with chondroitin sulfate A  
4.5 – 9 with chondroitin sulfate C
- Optimal temperature range: 20 °C – 37 °C
- Crystal structure has been determined and published (see references)

### Purity

≥90 % by reversed phase HPLC analysis.



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## Specific Activity

≥200 IU/mg (substrate: chondroitin sulfate A)

One international unit (IU) is defined as the amount of enzyme that will liberate 1.0 μmole unsaturated oligosaccharides from chondroitin sulfates A and C and hyaluronic acid per minute at 30 °C and pH 8.0.

## Stability

- PN 50-013 (vial of 0.5 IU): Expiration is 30 months from manufacturing date frozen at -70 °C in aqueous buffers containing Sodium Chloride, Sodium Phosphate and Sucrose 5%.

## Applications

- As research reagent (glycosaminoglycan degradation).
- For the preparation of di- and oligo- saccharides of chondroitin sulfates and the preparation of oligosaccharide libraries.
- Degradation of hyaluronic acid.

## Availability

A proprietary expression system for *F. heparinum* and the fermentation and isolation processes developed by IBEX Pharmaceuticals allow the production of large quantities of high purity product.

## References

- Review: "Enzymatic Degradation of Glycosaminoglycans". S. Ernst et al. in *Critical Reviews in Biochemistry and Molecular Biology* (1995), 30(5): 387-444.
- "Isolation and Expression in *Escherichia coli* of *csIA* and *csIB*, Genes Coding for the Chondroitin Sulfate-Degrading Enzymes Chondroitinase AC and Chondroitinase B, Respectively, from *Flavobacterium heparinum*". A.L. Tkalec, D. Fink, F. Blain, G. Zhang-Sun, M. Laliberté, D.C. Bennett, K. Gu, J.J.F. Zimmermann and H. Su, in *Applied and Environmental Microbiology* (2000) 66(1): 29-35.
- "Purification, Characterization and Specificity of Chondroitin Lyases and Glycuronidase from *Flavobacterium heparinum*". K. Gu, R.J. Linhardt, M. Laliberté, K. Gu and J. Zimmermann, in *Biochem. J.* (1995) 312: 569-577.
- "A comparative Study Between a Chondroitinase B and a Chondroitinase AC from *Flavobacterium heparinum*". M.Y.M. Michelacci and D.C.P. Dietrich, in *Biochemical Journal* (1975) 151: 121-129.
- "Crystal Structure of Chondroitin AC Lyase, a Representative of a Family of Glycosaminoglycan Degrading Enzymes". J. Féthière, B. Eggimann and M. Cygler, in *J. Mol. Biol.* (1999) 288: 635-647.

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