



Summary Article: **amylases**

From *Dictionary of Microbiology & Molecular Biology*

Image from: [Amylase.](#)

[The splitting of starch to form... in Collins Dictionary of Biology](#)

Enzymes which cleave glucosidic linkages in e.g. STARCH or GLYCOGEN.

$\alpha$ -Amylases ((1  $\rightarrow$  4)- $\alpha$ -D-glucan 4-glucanhydrolases, EC 3.2.1.1) are endoenzymes which have little action on terminal (1  $\rightarrow$  4)- $\alpha$ -bonds or on bonds adjacent to (1  $\rightarrow$  6)- $\alpha$  branch points. They act on amylopectin and glycogen to form glucose, maltose and branched  $\alpha$ -limit DEXTRINS, and on amylose to form first maltose and maltotriose, then slowly on maltotriose to form maltose and glucose.  $\alpha$ -Amylases are common among microorganisms. They are obtained commercially mainly from *Bacillus* spp (see also IMMOBILIZATION (sense 1)) and are used e.g. for processing starch to form glucose syrups: insoluble starch granules are dispersed in water by heating, and the starch is partially hydrolysed with thermostable  $\alpha$ -amylases from *B. amyloliquefaciens* and/or *B. licheniformis*. Further hydrolysis is achieved using e.g.  $\gamma$ -amylases (see below).

$\beta$ -Amylases ((1  $\rightarrow$  4)- $\alpha$ -D-glucan maltohydrolases, EC 3.2.1.2) are exoenzymes which cleave alternate bonds from the nonreducing end of a linear (1  $\rightarrow$  4)- $\alpha$ -D-glucan; thus, e.g. amylose is degraded to maltose.  $\beta$ -Amylase action is halted at (1  $\rightarrow$  6)- $\alpha$  branch points; thus maltose and  $\beta$ -limit dextrins are formed from glycogen and amylopectin.  $\beta$ -Amylases are common in plants and are produced e.g. by *Bacillus* and *Streptomyces* spp. They may be used, together with DEBRANCHING ENZYMES, in the manufacture of maltose syrups from starch.  $\beta$ -Amylases are inhibited by SCHARDINGER DEXTRINS.

$\gamma$ -Amylases (amyloglucosidases, glucoamylases, (1  $\rightarrow$  4)- $\alpha$ -D-glucan glucohydrolases, exo-(1  $\rightarrow$  4)- $\alpha$ -glucosidases, EC 3.2.1.3) are exoenzymes which cleave (1  $\rightarrow$  4)- $\alpha$ -bonds consecutively from the non-reducing end of a (1  $\rightarrow$  4)- $\alpha$ -D-glucan to yield  $\beta$ -D-glucose; they can also cleave (1  $\rightarrow$  6)- $\alpha$ - and (1  $\rightarrow$  3)- $\alpha$ -bonds, although at a much lower rate.  $\gamma$ -Amylases are found mainly in fungi and are obtained commercially e.g. from *Aspergillus niger* and *Rhizopus* spp. They are used to convert malto-oligosaccharides (e.g. limit dextrins) to D-glucose (see above).

(See also BREAD-MAKING and ENZYMES.)

**APA**

Chicago

Harvard

MLA

---

amylases. (2006). In P. Singleton, & D. Sainsbury, *Dictionary of microbiology & molecular biology* (3rd ed.). Hoboken, NJ: Wiley. Retrieved from <https://search.credoreference.com/content/topic/amylase>

---

 Copyright © 2006 John Wiley & Sons Ltd.



## APA

amylases. (2006). In P. Singleton, & D. Sainsbury, *Dictionary of microbiology & molecular biology* (3rd ed.). Hoboken, NJ: Wiley. Retrieved from <https://search.credoreference.com/content/topic/amylase>

## Chicago

"amylases." In *Dictionary of Microbiology & Molecular Biology*, by Paul Singleton, and Diana Sainsbury. 3rd ed. Wiley, 2006. <https://search.credoreference.com/content/topic/amylase>

## Harvard

amylases. (2006). In P. Singleton & D. Sainsbury, *Dictionary of microbiology & molecular biology*. (3rd ed.). [Online]. Hoboken: Wiley. Available from: <https://search.credoreference.com/content/topic/amylase> [Accessed 15 September 2019].

## MLA

"amylases." *Dictionary of Microbiology & Molecular Biology*, Paul Singleton, and Diana Sainsbury, Wiley, 3rd edition, 2006. *Credo Reference*, <https://search.credoreference.com/content/topic/amylase>. Accessed 15 Sep. 2019.