Creative Enzymes®

Native Thermomicrobia sp. Naringinase (Rhamnosidase A)

Cat. No. NATE-0653

Lot. No. (See product label)

Introduction

Description A thermostable Alpha-L-Rhamnosidase (Naringinase, RhamA) that catalyzes the cleavage of the bond between terminal L (+)-rhamnose and the aglycone of rhamnose-containing glycosides. The enzyme is very active on naringin but has also substantial activity with hesperidin as substrate.

Applications Naringin is a source of bitter flavor in fruit juice and rhamnosidases with naringinase activity are frequently used for debittering citrus juice. Other biotechnological applications include manufacture of prunin; manufacture of alpha-L-rhamnosidese fom natural glycosides; clarification of juices; enhancement of wine aromas by hydrolysis of terpenyl glycosides; conversion of chloropolysporin B to chloropolysporin C and production of pharmaceutically important compounds by removal of rhamnose residues from steriods such as diosgene, desglucoruscin and ginsenosides-Rg2 (Yadav et al. 2010). Beta-glucosidases may be used in combination with alpha-L-rhamnosidases for removal of glucose from the flavonoid skeleton. ThermoactiveTM Rhamnosidase A has been successfully demonstrated for use in production of rhamnose from narigin in a bioreactor containing immobilized E. coli cells expressing the gene for the enzyme (Birgisson et al 2007). L-Rhamnose or its derivatives are suitable chiral structural component and can be used for the synthesis of pharmaceutical products, plant protection agents and the preparation of fragrances in the foodstuffs and perfume industries.

Synonyms glycoside hydrolase; RhamA; naringinase; hesperidinase; α-L-rhamnosidase A; α-L-rhamnosidase N; α-L-rhamnoside rhamnohydrolase; EC 3.2.1.40

Product Information

Species Thermomicrobia sp.

Source Thermomicrobia strain PRI-1686

EC Number EC 3.2.1.40

CAS No. 37288-35-0

Optimum pH pH range is about 4.5-9 with optimum about pH 7.5

Optimum temperature The enzyme in relatively active in a rather broad temperature range (45-75°C)with optimum around 65°C

Structure The crystal structure of alpha-L-rhamnosidase from Bacillus sp. GL1, sharing 52% sequence identity with ThermoactiveTM Rhamnosidase A, has been determined to a resolution of 1.9 Å (Cui et al. 2007).-Protein Data Bank entry 2OKX

Specificity Alpha-L-rhamnosidasaes catalyse the release of terminal rhamnose residues from polysaccharides and glycosides. Of the many natural compounds that contain terminal alpha-L-rhamnose, the flavonoids naringin, hesperidin, rutin and quercitrin have been the main natural test-substrates for alpha-L-rhamnosidases. Of these compounds, ThermoactiveTM Rhamnosidase A was found to be most active on Naringin as shown in Figure 1 (Birgisson et al 2004). The structure of naringin (4′,5,7-trihydroxyflavanone-7-α-L-rhamnopyranoside-(1,2)-β-D-glucopyranoside) and the hydrolysis by rhamnosidase is shown in Figure 2.

Unit Definition One unit (U) of enzyme activity is the amount that leads to the release of 1 µmol of p-nitro-phenyl-α-L-rhamnopyranoside (pnpR) per minute