Title Enzyme catalyzed degradation of rutin in asparagus juice

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Abstract

In examining several commercial pectolytic enzyme preparations for their ability to cleave the phenolic glycoside rutin, we found that a pectolytic enzyme preparation from *Aspergillus niger* (pectinase AN), degraded rutin and reduced the antioxidant activity of asparagus juice. Our objective was to explore the cause of the degradation of rutin by the *Aspergillus niger* pectolytic preparation. The presence of oxidative enzyme activity was examined by testing for the presence of peroxidase and polyphenoloxidase activities colorimetrically using guaiacol/ hydrogen peroxide and catechol as substrates, respectively, pH, temperature and enzyme concentration variables were evaluated. The effect of pH was determined by adjusting the pH of asparagus juice to 3.2, 4.5 or 5.8 and treating with enzyme at 37 °C. Juice was also treated with 0.1%, 0.5% and 1% enzyme at pH 5.8 at 37 °C. Temperature effects was evaluated at 25, 37 and 50 °C at pH 5.8. Reverse phase HPLC was used to measure the loss of rutin from the asparagus juice. The pectinase AN preparation had peroxidase activity of 240$\pm$67 unit/ml while no polyphenoloxidase activity was observed. The rate of rutin degradation of rutin was greatest at 25 °C. Increasing of enzyme from 0.5% to 1% did not result in a significant increase in rutin degradation. A small amount of quercetin was observed with enzyme treatment at pH 3.2, indicating the presence of rutinase activity. These results suggest that contaminating enzyme activities, such as peroxidase, exist in some pectinases from *Aspergillus niger* resulting in the loss of rutin in asparagus juice. The greatest loss of rutin occurred at pH 5.8 and 25 °C. Care must be taken in selection of pectolytic enzyme to avoid those with oxidative enzyme activities to avoid loss of antioxidant phenolics.