

Pectinesterase-catalyzed firming effects during precooking of vegetables

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Abstract

Many vegetables exhibit a firming effect after precooking at a temperature between 50 and 70C. This effect has generally been attributed to the action of endogenous pectinesterase which hydrolyzes the methyl ester linkages in pectin molecules. The resulting free carboxyl groups then form Ca-bridges between pectin molecules. We have shown, by using the pectinesterases of pea sprouts, that the enzymes catalyzed not only the hydrolysis of the methoxyl groups of pectin molecules, but also a transacylation reaction of the galacturonic acyl groups from methanol to other hydroxyl groups of pectin. The latter reaction results in the formation of new ester linkages between pectin molecules, which also contributes to the firming of the tissue. The pectinesterases have been separated into four isozymes, PE1, PE2, PE3, and PE5. The isozymes exhibited similar transacylation activity, with the exception of PE5 that did not catalyze transacylation.