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A matrix effect in pectin-rich fruits hampers digestion of allergen by pepsin in vivo and in vitro.

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Abstract

BACKGROUND: It is a general belief that a food allergen should be stable to gastric digestion. Various acidic plant polysaccharides, including pectin, are ubiquitous in fruit matrixes and can form hydrogels under low-pH conditions.

OBJECTIVE: The purpose of this study was to investigate the effect of hydrogel forming polysaccharide-rich fruit matrixes on in vivo gastric and in vitro pepsic digestion of fruit allergens.

METHODS: Fruit extract proteins (kiwi, banana, apple and cherry) and a purified major kiwi allergen Act c 2 were digested with simulated gastric fluid in accordance with the US Pharmacopeia. In vivo experiments on kiwi fruit digestion were performed on four healthy non-atopic volunteers by examining the gastric content 1 h after ingestion of kiwi fruit. The Act c 2 and kiwi proteins were detected in immunoblots using monoclonal anti-Act c 2 antibodies and rabbit polyclonal antisera.

RESULTS: Crude fruit extracts were resistant to digestion by pepsin when compared with commonly prepared extracts. In the gastric content of all volunteers, following kiwi fruit ingestion and immunoblotting, intact Act c 2 was detected with anti-Act c 2 monoclonal antibodies, while kiwi proteins of higher molecular weights were detected using rabbit polyclonal antisera. Addition of apple fruit pectin (1.5% and 3%) to the purified kiwi allergen was able to protect it from pepsin digestion in vitro.

CONCLUSION: The matrix effect in pectin-rich fruits can influence the digestibility of food proteins and thereby the process of allergic sensitization in atopic individuals.

Publication Types, MeSH Terms, Substances

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