Research Abstract

Parent topic: Protein life cycle: from structure to function

Topic: Protein folding, structure and function

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New strategies for addressing the bioactivity of Wheat Germ Agglutinin

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Rationale: Wheat Germ Agglutinin (WGA) is a highly stable, digestion-resistant lectin involved in plant defence. Its ability to bind epithelial surfaces may lead to antinutritional effects, potentially offsetting some benefits of wholegrain consumption. Yet, the molecular basis of these effects remains unclear, largely due to the lack of reliable methods to quantify WGA and evaluate its biological activity. Current assays are limited, time-consuming and affected by poor extraction efficiency, interference from co-extracted proteins, and the inability to distinguish active from inactive lectin.

Methods: This study aims to establish reliable, sensitive and high-throughput methods for WGA detection and assessment of its bioactivity in food matrices. WGA will be sequentially extracted from model and real foods using buffered ethylene glycol, a medium expected to disrupt interactions with insoluble grain proteins and improve recovery. Total WGA will be quantified through sandwich ELISA, while a carbohydrate-capture ELISA will be developed to assess biological activity on the same extracts, providing a more accurate alternative to hemagglutination.

Results: Sequential extraction in buffered ethylene glycol is expected to markedly enhance WGA recovery and reduce interference from co-extracted proteins. The sandwich ELISA should offer robust quantitation of total WGA, while the carbohydrate-capture ELISA is anticipated to outperform hemagglutination in accuracy, precision and throughput, enabling a reliable evaluation of active lectin.

Conclusions: Sequential extraction in buffered ethylene glycol is expected to markedly enhance WGA recovery and reduce interference from co-extracted proteins. The sandwich ELISA should offer robust quantitation of total WGA, while the carbohydrate-capture ELISA is anticipated to outperform hemagglutination in accuracy, precision and throughput, enabling a reliable evaluation of active lectin.

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