**Modifying digestion in a dense wheat gluten network through the addition of cellular legume flour**

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Pasta and noodles are staple foods and examples of food products that contain a dense gluten network, yet their nutritional protein quality may be limited by the amino acid profile of wheat.[[1]](#endnote-1) Specific demographic groups such as elderly require higher concentrations of complete proteins[[2]](#endnote-2). The addition of complementary amino acids to pasta and noodles, from for instance legumes, could improve health outcomes. In addition, maintaining a low glycaemic response can offer benefits to cardiometabolic health and support the prevention and management of type 2 diabetes.[[3]](#endnote-3) A potential strategy to achieve higher protein quality, increased protein quantity and reduced starch digestion rates is to enrich wheat pasta with legume flours which have been processed to retain the cell wall integrity of the legumes during the grinding process.

Pastas containing cellular flours from different sources were produced, and the impact this has on metabolic responses was quantified. The cellular flours were obtained through hydrothermal treatment followed by grinding, freeze-drying and sieving. The cellular flour was compared to a ‘broken flour’, which was produced in the same way but included cryo-milling and sieving steps. The legume pasta production, drying, and cooking times were optimized to enable comparison of pasta made with different legume flours to determine the influence of (1) cell wall integrity, (2) legume species, and (3) wheat-to-legume ratios on digestion. Starch and protein digestibility were assessed using the Englyst[[4]](#endnote-4) and the INFOGEST 2.0[[5]](#endnote-5) protocols respectively. Pasta matrix properties such as degree of starch gelatinization and cell wall integrity were measured using differential scanning calorimetry and microscopy. Our findings provide insights on the metabolic impact of intact cellular flours in a real food system, and provide guidance on ways to tailor pasta formulations to optimize starch and protein digestion using legume flour.

References:

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