

# HYDRATION AND OIL BINDING PROPERTIES OF RAW AND GERMINATED ALFALFA SEEDS AND SPROUTS AS NOVEL GLUTEN-FREE INGREDIENTS

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## ABSTRACT

Arising incidence of coeliac disease made both consumers' and food industry aware of the close link between diet and health far beyond the well-known role of food in satisfying hunger. The emerging requirements for healthy gluten-free foods providing necessary nutrients has steadily prompted the research and development towards exploration and introduction of novel gluten-free raw materials as an alternative to refined flours and starches. However, finding the right balance between nutritive value and technological functionality of such gluten-free raw materials creates many challenges nowadays especially in production of gluten-free bread that will match the properties of its wheat counterparts.

As one of the extensively cultivated forage legume alfalfa or lucerne (*Medicago sativa L.*), and its seeds possessing high nutritional value (rich in proteins, dietary fibres, essential polyunsaturated fatty acids, vitamins and associated total phenols) have immense potential as a gluten-free food resource. In application of novel gluten-free flours as baking ingredients, knowing the water absorption properties of flour represents one of the essential prerequisites for reaching the final product with desired overall quality. Additionally, differences in novel gluten-free flours effect on the final product quality can be predicted to some extent by assessing its hydration properties. In this regard, presented study aims to investigate and compare the hydration (water binding capacity, water holding capacity, and swelling) and oil binding properties of grounded raw alfalfa seeds, grounded germinated alfalfa seeds, and alfalfa sprouts powder.

The highest water holding capacity and swelling was recorded for alfalfa sprouts 6.48 g/g and 7.13 cm<sup>3</sup>/g, respectively, whilst germinated alfalfa seeds had the highest water binding capacity (3.13 g/g). Oil binding capacity ranged from 0.90 to 1.41 g/g with the highest value reported for alfalfa sprouts followed by germinated and raw alfalfa seeds. The obtained results demonstrated that alfalfa sprouts, considering their hydration properties, can have a great impact on other gluten-free ingredients functionality, product yield and shelf stability, while in terms of oil binding can act as flavour retainer increasing the mouth feel of gluten-free bakery products. Additionally, germinated and raw alfalfa seeds also showed hydration and oil binding properties desirable for the gluten-free bread production. Further research should be conducted to establish the raw and germinated alfalfa seeds and sprouts influence on gluten-free bread technological, sensory and nutritional quality.

*Keywords: Alfalfa; Germination; Hydration properties; Oil binding; Gluten-free*