## GERMINATED GRAINS: NUTRITIONAL POTENTIAL IN CEREALS

#### INTRODUCTION

- Germination increases the bioavailability of essential nutrients such as iron, zinc, and magnesium by reducing anti-nutritional factors like phytic acid.
- Sprouting enhances the levels of bioactive compounds, including antioxidants, vitamins (especially B vitamins), and amino acids, improving the overall nutritional profile.
- Germinated cereals exhibit improved digestibility and glycemic control, as enzymatic activity during sprouting breaks down complex carbohydrates and proteins into more easily absorbable forms.

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#### **QUESTIONS ADDRESSED**

Does the nutritional composition of a cereal grain change during germination
Does germination time affect selected nutritional parameters of grain?
How can sprouted grains be used in the food industry?

#### **MATERIAL & METHODS**

- The Inovec variety (Avena sativa L.) and the Dagmar variety (Triticum aestivum L.) were conventionally grown in 2022 in Vígľaš-Pstruša (oat) and Báhoň (wheat), Slovak Republic. Oats and wheat were analyzed statistically separately.
- •Healthy, undamaged seeds were washed five times with distilled water and then soaked in distilled water for 24 hours at 20°C in the dark. The seeds were transferred in a single layer onto filter paper in Petri dishes and placed in an incubator to germinate at 20°C, 75% relative humidity, and in continuous darkness for various durations (O h = control, and 24, 48, 72, 96, and 12O h). After germination, whole grains were dried at 50°C for 24 hours, ground to a particle size of 0.5 mm, and subsequently analyzed.

 Starch content (STN EN ISO 10520); Total dietary fibre content, soluble, and insoluble (Total Dietary Fiber Assay Kit, Megazyme); β-D-glucan content (β-Glucan Assay Kit (Mixed Linkage), Megazyme); proteins (Dumas method); lipids (n-hexane); α- and β-amylase (α-Amylase Assay Kit (Ceralpha Method), β-Amylase Assay Kit (Betamyl-3), Megazyme); sucrose (spectrophotometrically); lipase (by titration). The results were converted to dry matter (dwb).

















#### **OCONCLUSIONS**

• Grain germination caused a decrease in some parameters (β-D-glucan and starch content). Enzyme activities increased with germination time.

• Germination time affects the nutritional quality of the grain. Optimal sprouting time balances the peak nutritional enhancement without compromising processing or sensory qualities-often around 48 to 72 hours, depending on the grain and desired outcome.

• Due to the nutritional value of oat grains, their health benefits, and the economical and simple germination method, sprouted grains have the potential to be used in the bakery industry to produce bread, biscuits, cereal bars, and oatmeal, or in the form of fermentable beverages. They can become an alternative to diastatic malt flour in the food industry.



### **3 RECOMMENDATIONS FOR THE FOOD INDUSTRY**

• Enhanced Nutritional Profile: Sprouting increases levels of vitamins (especially B-complex and E), essential amino acids, and antioxidants, making products more appealing to health-conscious consumers.

• Improved Digestibility: Enzymatic activity during sprouting breaks down starches and proteins, resulting in products that are easier to digest and potentially less allergenic.

• Better Functional Properties: Sprouted grains can improve dough rheology, water absorption, and texture in baked goods, contributing to softer, more palatable end products.

• Natural Sweetness and Flavor: The conversion of starches into simpler sugars during germination enhances the natural sweetness and flavor of foods, reducing the need for added sugars.

• **Clean Label Appeal:** Sprouted grains support clean-label trends by offering a natural way to enhance nutritional value and functionality

# without synthetic additives or fortification.

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