

## Abstract

# Avenanthramides, Avenacosides, and $\beta$ -Glucans in Oat-Based Milk Alternatives—How Oat's Nutritional Compounds Are Being Affected by Various Stages of Processing<sup>†</sup>

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**Abstract:** Background: Oat-based Milk Alternatives (OMAs) provide multiple health benefits arising from oat's unique compounds: avenanthramides, avenacosides, and dietary fibre  $\beta$ -glucan. Avenanthramides–polyphenols, unique to oats, provide anti-inflammatory and antioxidant effects, whilst avenacosides are saponins with anti-bacterial and anti-fungal properties.  $\beta$ -Glucans assist in lowering blood cholesterol and lead to the prevention of diabetes and cardiovascular diseases. However, oats undergo many stages of processing to ensure a sensory appealing and safe OMA product, including enzymatic treatment, heating, high shear, decanting of larger solids, and homogenisation. It is possible that throughout these stages, compounds may be affected by degradation or lost entirely. Objective: The concentration of avenanthramides, avenacosides, and  $\beta$ -glucans in the OMA samples was measured at each of the 12 stages of an OMA production, with a comparison of short ultra-heat treatment (UHT) and prolonged high heat treatment, to assess how they may be affected. Design: OMA samples were produced from basic ingredients within the pilot plant. Liquid chromatography–mass spectrometry was used to measure the concentration of avenanthramides and avenacosides.  $\beta$ -Glucan was determined spectrophotometrically using the Megazymes assay. Results: Avenanthramides and avenacosides were found to significantly increase in concentration after initial enzymatic treatment with alpha-amylase, whilst avenanthramides also increased post 90 °C treatment, and decanting – suggesting that these compounds are not being lost in the removed solids. However, avenanthramides decreased after UHT and prolonged heat treatment, suggesting they may be susceptible to degradation from prolonged heat and temperatures above 120 °C.  $\beta$ -Glucans concentrations decreased post glucoamylase treatment, and decanting – suggesting that  $\beta$ -glucans are lost within the decanted slurry, and increased after treatment with alpha-amylase, 90 °C and high shear mixing. Conclusion: With this information, future products may be optimised to preserve these components to improve the health benefits of oat-based milk alternatives.

**Keywords:** Oats; avenanthramide;  $\beta$ -glucan; Avenacosides; processing



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