

Changes in Physicochemical Properties and Avenanthramides Content of Oat Varieties during Storage

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[Introduction]

Oats (*Avena sativa* L.) have received considerable attention for their high content of dietary fibers, phytochemicals and nutritional value. Avenanthramide (AVN), a polyphenolic compound that is found only in oats and known to have anti-oxidant, anti-inflammatory, and anti-cancer effects. In this study, we investigated the changes of physicochemical properties, antioxidant activity, and AVNs contents of oat cultivars (Daeyang; DY, Choyang; CY, and Jopung; JP) in accelerated age-condition for the use of functional food materials.

[Materials and Methods]

Oats were stored for 63 days at 45°C incubator (RH<20%). Crude protein content was determined by Micro-Kjeldahl method and Crude fat content was analyzed by AOAC method 920.85 (AOAC, 1990) using the Soxtherm automatic system (Gerhardt, Germany). Tocopherol and tocotrienol contents were analysed by Lee et al. 2012 using NPLC. For analysis of the AVNs content, Chu et al. 2013 method was modified using UPLC. Fatty acid content was analyzed using GC. Antioxidant activities were determined from the scavenging activity of stable DPPH free radicals and the radical cation ABTS⁺ using a modification of 96 well-based method. β -Glucan content was measured enzymatically using Megazyme kit (K-BGLU, Megazyme Int. Ireland).

[Results and Discussions]

In the accelerated age-conditioning study, physicochemical properties such as crude protein, crude fat and β -glucan contents of oat were moderately changed until 63 days without statically significance (Crude protein; DY 15.63 \pm 0.25%, CY 10.83 \pm 0.20%, and JP 13.31 \pm 0.18%. Crude fat; DY 7.93 \pm 0.40%, CY 10.99 \pm 0.89%, and JP 8.02 \pm 0.79%. β -Glucan; DY 4.83 \pm 0.20%, CY 2.93 \pm 0.64%, and JP 4.29 \pm 0.75%). In addition, the antioxidant activities which was confirmed by DPPH and ABTS radical scavenging assays remained relatively stable (DPPH; DY 40.89 \pm 4.05 mg TEAC/100 g, CY 44.87 \pm 1.86 mg TEAC/100 g, and JP 40.32 \pm 3.37 mg TEAC/100 g. ABTS; DY 77.04 \pm 7.13 mg TEAC/100 g, CY 76.41 \pm 4.00 mg TEAC/100 g, and JP 64.35 \pm 3.26 mg TEAC/100 g). The contents of tocopherols and tocotrienols decreased significantly during the storage (DY 1.20 to 0.85 mg/100 g, CY 1.84 to 1.33 mg/100 g, and JP 1.11 to 0.98 mg/100 g). However, the contents of AVNs was not different during the storage (DY 179.4 \pm 19.6 μ g/g, CY 9.1 \pm 2.9 μ g/g, and JP 8.1 \pm 0.6 μ g/g). As a result, physicochemical properties and ingredients of oat were maintained until the 63th day of storage without spoilage. These results could be used as basic data for post-harvest management and development of functional food materials for extending the use of oats.

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