UDC

**Nikolić, V.**[1], Ph.D. of technological engineering, senior research associate
**Simić, M.**[1], Ph.D. of food technology, senior research associate
**Žilić, S.**[1], Ph.D. of food technology, principal research fellow
**Sarić, B.**[1], M.Sc. of chemistry, research trainee
**Milovanović, D.**[1], Spec. Dr. of veterinary medicine, research trainee
**Kandić, V.**[2], PhD of agronomy and plant breeding, senior research associate
**Perić, V.**[2], PhD of agronomy and plant breeding, senior research associate
[1]Department of Food Technology and Biochemistry,
[2] Department of Plant Breeding,
[1,2]Maize Research Institute, Zemun Polje, 11185 Belgrade, Serbia
e-mail: valentinas@mrizp.rs

# OAT GENOTYPES WITH DIFFERENT HULL COLORS AS A VALUABLE SOURCE OF NUTRIENTS AND ANTIOXIDANTS

Due to their health-promoting abilities whole grain cereals are regarded as indispensable elements of nutrition. Oats (‘*Avena sativa* L.’) are a crop that thrives in unfavorable environmental conditions and inadequate soil. A worldwide trend towards «sustainable diets» is being widely encouraged, driven by the need for sustainable, nutrient-dense food sources to support the expanding global population. In this situation, people are turning increasingly to plant-based foods as an alternative. The trend is based on several variables, including a shift in consumer lifestyle, increased consumer knowledge of sustainably produced food, and interest in alternative diets. Additionally, they offer consumers with allergies to things like almonds, cow’s milk, and gluten an alternative. Oats are naturally gluten-free and suitable for celiac disease patients and others who are gluten intolerant. Oats naturally contain numerous essential nutrients, including soluble fibers, proteins, unsaturated fatty acids, vitamins, minerals, and antioxidants, giving them a higher nutritional value than other cereals.

Oats are considered an important raw material for industrial uses due to the high contents of compounds like ß-glucans, oil, and protein. In the food industry, oats are most often used to produce flour or rolled oats. Oat groats or flakes are ground into flour, which is widely used as whole-grain flour. During harvest and processing, the oat grain’s inedible outer shell is routinely removed. In hulled oats, the hull typically accounts for 25–30% of the kernel weight, with some genotype-to-genotype variation. Dietary fiber, especially ß-glucans, which have been found to offer health advantages like lowering cholesterol, delaying the absorption of glucose, and reducing plasma insulin levels are a valuable component of oats.

The plant material used in this study were three oat genotypes with varying hull colors–yellow, brown, and black. The objective of the research was to assess the nutritional and antioxidant potential of whole-grain oat flour and differently colored hulls, as well as their *in vitro* digestibility. The amounts of total phenolic compounds, phenolic acids, ß-glucans, antioxidant capacity, and *in vitro* digestibility in ground oat grains and oat hulls were examined. The prospective digestibility of the oat samples for human consumption was assessed as a function of processing variables using an *in vitro* multi-step digestion approach.

Comparing parameter values obtained in the hulls to those found in the whole-grain flour revealed significant differences between the analyzed samples. Oat hulls contained more total phenolic compounds (11320.11–24352.48 µg GAE/g d.m.) than flour (841.89–982.08 µg GAE/g d.m.), as well as the phenolic acids *p*-coumaric, ferulic, isoferulic, vanillic, and syringic acid. Ferulic acid predominated in both the hulls (4987.02–13794.82 µg/g d.m.) and the whole grain flour (395.88–589.14 µg/g d.m.). The antioxidant capacity was higher in oat hulls, which ranged from 22.61 mmol Trolox/kg d.m. in black grain to 25.06 mmol Trolox/kg d.m. in brown whole-grain flour (from yellow hulls to brown hulls, 42.31 mmol Trolox/kg d.m. to 53.16 mmol Trolox/kg d.m.). However, just 0.03–0.06% of the ß-glucan concentration was discovered in the hulls, compared to a range of 4.07% to 5.33% in the samples of whole-grain oat flour. The oat genotypes color is not derived from these colored bioactive components, according to the absence of anthocyanins and proanthocyanidins. Brown whole-grain flour had the best *in vitro* digestibility (48.24%), followed by black (44.72%) and yellow oat flour (44.54%). Considering that the *in vitro* digestibility ranged from 12.02% in the black genotype to 16.69% in the brown genotype, the degradability of the ground oat hulls was much lower.

The results of the present study indicate that the investigated oat genotypes manifested a great potential for utilization as high-quality food and feed ingredients with potentially beneficial effects on nutrition and health.