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# The investigation total content of catechins in the blackberry (Rubus plicatus) leaves

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**Introduction.** Blackberry (*Rubus fruticosus* L.) is a perennial shrub belonging to the rose family (*Rosaceae*). It is well known for its fruits, which possess significant medicinal, nutritional, and cosmetic value. The genus *Rubus* represents the largest genus within the *Rosaceae* family, comprising approximately 700 species. It includes 12 subgenera, many of which contain domesticated as well as wild species. *Rubus fruticosus* is widely distributed across Europe, Oceania, North and South America, and Asia. Considerable variability is observed among species in terms of morphology, flower color, growth habit, and chemical composition. Within this large and diverse genus, numerous wild species and natural hybrids exist, many of which are self-infertile or dioecious, requiring cross-pollination for fruit production. The chemical composition of blackberry leaves is complex and characterized by a broad range of biologically active compounds, including catechins (mainly catechin), organic acids (such as citric and malic acids), hydroxycinnamic acids (such as caffeic and ferulic acids), flavonoids, and ellagitannins. These phytochemicals contribute to the plant's notable antioxidant, antimicrobial, and anti-inflammatory properties. Given this background, the present study aimed to determine the total catechin content in blackberry leaves using spectrophotometric methods, in order to evaluate their potential contribution to the overall antioxidant capacity of the plant.

**Materials and methods.** The object of the study was leaves of blackberry (*Rubus plicatus*), collected from cultivation sites. The material was gathered in 2021 during the fruiting period in the vicinity of the village of Ternova, Kharkiv region (50°19′31″ N, 36°66′93″ E). The determination the total content of catechins in leaves was determined according to following assay: a 5 g (an exact amount sample) was taken of the crushed raw material and placed in a 250 mL flask with ground glass joints, poured 100 mL of 70% ethanol and kept for 1 hours in a boiling water bath. The extraction was repeated one more time. After cooling, the solution was quantitatively transferred into a 250 mL volumetric flask and make up to the mark by the 70% ethanol (solution A). A 1 mL of prepared solution A was mixed with 7.5 mL of 1% vanillin solution in 96% ethanol in a 25 mL volumetric flask. Than the solution was made up by the addition 0.5 mol/L HCl in 96% ethanol solution. The mixture was analyzed at 505 nm after standing for 30 min as compensation liquid was 70% ethanol. The total content of catechins was determined using the standard substance (epigallocatechin-3-O-gallate). The calibration curve was plotted with interval concentrations 100 – 400 × $10^{-6}$ g/mL. The quantitative content of the sum of catechins, expressed as epigallocatechin-3-O-gallate, (X, %) was calculated according to the formula:

$$X(\%) = \frac{C_x \times K_{dil} \times 100 \times 100}{m \times (100 - W)},$$

where, $C_x$ – concentration of epigallocatechin-3-O-gallate according to calibration curve, C×$10^{-6}$ g/mL; $K_{dil}$ – coefficient of dilution; W – weight loss during drying, %; $m_n$ is mass of sample, g.

**Results and discussion.** The total content of catechin was 2.42±0.10% expressed as epigallocatechin-3-O-gallate in blackberry leaves.

**Conclusion.** The obtained research results can be used in the development of herbal remedies, dietary supplements, and medicinal products.