

## Determination of Phenolic Compounds in Apples Grown in Different Geographical Regions

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**Abstract :** Apples are an important source of various biologically active compounds used for human health. Phenolic compounds detected in apples are natural antioxidants and have antimicrobial, anti-inflammatory, anticarcinogenic, and cardiovascular protective activity. The quantitative composition of phenolic compounds in apples may be affected by various factors. It is important to investigate it in order to provide the consumer with high-quality well-known composition apples and products made out of it. The objective of this study was to evaluate phenolic compounds quantitative composition in apple fruits grown in a different geographical region. In this study, biological replicates of apple cv. 'Ligol', grown in Lithuania, Latvia, Poland, and Estonia, were investigated. Three biological replicates were analyzed; one of each contained 10 apples. Samples of lyophilized apple fruits were extracted with 70% ethanol (v/v) for 20 min at 40°C temperature using the ultrasonic bath. The ethanol extracts of apple fruits were analyzed by the high-performance liquid chromatography method. The study found that the geographical location of apple-trees had an impact on the composition of phenolic compounds in apples. The number of quercetin glycosides varied from  $314.78 \pm 9.47 \mu\text{g/g}$  (Poland) to  $648.17 \pm 5.61 \mu\text{g/g}$  (Estonia). The same trend was also observed with flavan-3-ols (from  $829.56 \pm 47.17 \mu\text{g/g}$  to  $2300.85 \pm 35.49 \mu\text{g/g}$ ), phloridzin (from  $55.29 \pm 1.7 \mu\text{g/g}$  to  $208.78 \pm 0.35 \mu\text{g/g}$ ), and chlorogenic acid (from  $501.39 \pm 28.84 \mu\text{g/g}$  to  $1704.35 \pm 22.65 \mu\text{g/g}$ ). It was observed that the amount of investigated phenolic compounds tended to increase from apples grown in the southern location (Poland) ( $1701.02 \pm 75.38 \mu\text{g/g}$ ) to apples grown northern location (Estonia) ( $4862.15 \pm 56.37 \mu\text{g/g}$ ). Apples (cv. 'Ligol') grown in Estonia accumulated approx. 2.86 times higher amount of phenolic compounds than apples grown in Poland. Acknowledgment: This work was supported by a grant from the Research Council of Lithuania, project No. S-MIP-17-8.

**Keywords :** apples, cultivar 'Ligol', geographical regions, HPLC, phenolic compounds

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