



## **Chemical properties of humic substances from soils under shelterbelts and adjoining cultivated fields**

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The investigations carried out in soils under two shelterbelts located in the Agroecological Landscape Park in Turew (40 kilometers south of Poznań, West Polish Lowland). Shelterbelts are the most advantageous components of the landscape (rows or clumps of trees), which were planted in Turew due to initiative of Dezydery Chlapowski in the 1820s. Shelterbelts and afforestation cover 14% of entire area. The shelterbelt, the first one of 140 years old (old) and the second one 11-year old (young) were introduced on Hapludalfs soils, which constituted soils of adjoining, cultivated fields and are light ones with favorable infiltrations conditions. The old shelterbelts consist mainly of *Robinia pseudoaccacia* with admixture of *Quercus pen-trea* and *Quercus robur*. Humic substances from air-dried soil samples were extracted separately with 0.1 M NaOH and 0.1 M Na<sub>4</sub>P<sub>2</sub>O<sub>7</sub> at pH 7 using an extractant-soil ratio of 5:1 under N<sub>2</sub> atmosphere at room temperature. HA extracted with 0.1 M NaOH from the soils under the young shelterbelt and adjoining cultivated field were found to have little differences in their chemical structure and molecular parameters. HA from the soil under the old shelterbelt was characterized by a higher degree of humification, or chemical maturity compared to the reference one. HA extracted with 0.1 M Na<sub>4</sub>P<sub>2</sub>O<sub>7</sub> at pH 7 from the soil under the young shelterbelt was found to be less chemically mature and younger comparing with the reference HA and the HA from the soil under the old shelterbelt. FA extracted from the soils under both shelterbelts with 0.1 M NaOH were shown to have a higher degree of humification compared to the reference FA, while the reverse was true for those extracted with 0.1 M Na<sub>4</sub>P<sub>2</sub>O<sub>7</sub> at pH 7. The young shelterbelt can be regarded as a more effective biogeochemical barrier, be-

cause the accumulation of soil organic matter with the withdrawal of various elements from recycling in the agroecosystem during humification in the soil under the young shelterbelt is more intensive compared to the soil under the old one