



The wettability of selected organic soils in Poland

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The wettability was measured in the laboratory by means of two methods: Water Drop Penetration Time (WDPT) test and Thin Column Wicking (TCW) method. WDPT is fast and simple method and was used to investigate potential water repellency of analyzed samples. TCW is an indirect method and was used to determine contact angles and surface free energy components. The measurement was performed in horizontal teflon chambers for thin-layer chromatography, adapted for tubes 10 cm long.

The experiment was carried out on muck soils (samples were taken from two levels of soil profile: 0-20 cm and 20-40 cm) and peat soils. There were two types of peats: low-moor peats and high moor peats. Samples of low-moor peats were taken from level 25-75 cm (alder peat) and 75-125cm (sedge peat) and 25-75 cm (peloid peat). Samples of high moor peats from level 25-175 cm (sphagnum peat) and 175-225 cm (sphagnum peat with Eriophorum).

There was found no variability in persistence of potential water repellency but there were differences in values of contact angles of individual soil samples. Both muck and peat samples are extremely water repellent soils. Water droplets persisted on the surface of soils for more than 24 hours. Contact angles and surface free energy components for all samples were differentiated. Ranges of water contact angles for organic soils are from $27,54^\circ$ to $96,50^\circ$. The highest values of contact angles were for sphagnum peats, and the lowest for muck soil from 20-40 cm level. It means, that there are differences in wettability between these samples. Muck soil is the best wettable and sphagnum peats is the worst wettable soil. If the content of organic compounds in the soil exceeds 40% (like in peats), the tested material displays only dispersion-type interactions. Therefore for peat soils, the technique of thin column wicking could only be used to determine the dispersive component γ_i^{LW} . For muck soils it was also determined electron-acceptor (Lewis acid) γ^+ and electron-donor (Lewis base) γ^- surface free energy components.

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