

INFLUENCE OF BENTONITE CLAY ON PROPERTIES OF ACID AND ALKALINE BUFFER ACTION OF PODSOLIC SOIL IN CONDITIONS OF NIZHNY NOVGOROD REGION

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In a three-year micro-field experiment the influence of bentonite clay on some indicators of the buffer action of the podsollic sandy loamy soil has been studied. Buffer characteristics of the bentonite clay have been measured in a laboratory. It was found that bentonite had high content of the exchangeable Ca^{++} and Mg^{++} and was showing buffer properties against alkalification (S_B 7,87 cm^2) and even more – against acidulation (S_B 20,74 cm^2). The degree of the bentonite clay natural buffer capacity is high and expressed in an acid interval (E_B of 79%), and the index of $[\text{H}^+]/[\text{OH}^-]$ -balance is strongly shifted to the alkaline side (2,63). These characteristics of the material have allowed to explain the obtained patterns of bentonite clay influence on the buffer properties of the soil. The intensity of the soil alkaline buffer actions significantly increases as a result of bentonite clay application depending on the ameliorant rate. Application of bentonite almost doubles the area of buffer action to acid. The maximum effect of I_B change depends on the clay application rate and is mainly observed only in the first year, but the prolonged effect on the other indicators persists until the third year. Due to the increase in the soil buffering ability to acidulation under the influence of the bentonite clay application, the degree of natural buffer capacity of the soil increases (from 19% to 37% in $[\text{H}^+]$ -interval and from 34% to 58% in $[\text{OH}^-]$ -interval). At the same time, the degree of soil buffering in the alkaline range changes from low to medium. The saturation of the soil with the alkaline cations is optimal at the lowest of the studied rates of bentonite clay, since the index of the acid-alkaline balance of soil in this case is the highest.

Keywords: bentonite clay, podsollic sandy loamy soil, properties of acid-alkaline buffer action and their stabilization.