

Change of the humus state of fallow soils

Albina Albertovna Valeeva*, **Kamil Gashikovich Giniyatullin**,
Elena Vasilyevna Smirnova

Kazan Federal University, Department of Soil Science, Kazan, Russia

The aim of the research was to study the humus state of the different-aged (2 years and 70-75 years) fallow soils (Luvisols) by IR spectroscopy and stepwise oxidation according to Chan. The feature of the studied different - aged fallow soils is the presence of a series of absorption bands characteristic of aliphatic esters. Probably they are the most stable and permanent structural units of soil organic matter (OM). In the fallow soil (70-75 years and 2 years) from the surface and up to a depth of 15 cm the increase in the absorption intensity in the region of about 3000 cm^{-1} is observed which correspond to the stretching vibrations of the CH_2 and CH_3 groups. The increase in their intensity with depth can be associated with the increase in the chain length of saturated hydrocarbons. In the upper 10 cm layer of fallow soils are detected absorption bands of the peroxide group which may be due to the auto-oxidation of organic and organometallic compounds with air oxygen. In the fallow soil of the age of 2 years were found series of bands of silicic oxygen stretching vibrations which is probably associated with the insignificant accumulation of secondary humus. The results of stepwise oxidation of fallow soils OM showed that in the upper layers (0-10 cm) of the old plow horizon there is the accumulation of easily-oxidized and medium-oxidized fractions of OM. In fallow soils of the age more than 70 years this process is significantly stronger. Thus, when old-arable soils are found in the fallow state for decades accumulated low-humified plant residues which will quickly mineralize when the fallow soils return to arable land.

Key words: Fallow soils, soil organic matter, humus.

***Corresponding author:** Albina Albertovna Valeeva, E-mail: valeyabc@mail.ru