

**FEATURES OF THE INFLUENCE OF NANOPOWDERS OF IRON, COBALT AND  
THEIR MIXTURE ON YIELD AND BIOCHEMICAL PARAMETERS OF  
SUNFLOWER «DONSKOY 22»**

**A. A. Nazarova**

*Ryazan State Agrotechnological University, 2/4 – 15 Engels str., Ryazan, 390042, Russia*

*E-mail: Nanocentr-APK@yandex.ru*

The paper presents the results of a study where the impact of nanopreparations based on metals-trace elements in optimum concentrations for the growth and development of sunflower hybrid «Donskoy 22» was studied. Three nanopreparations were studied: iron nanopowder (NP Fe), cobalt nanopowder (NP Co) and the mixture of the powders (NP Fe+Co). The size of nanopowder particles was 20–40 nm, purity - 99.98%, the metals' suspension was subjected to ultrasonic treatment. Field studies were conducted in 2010–2012 on the demonstration grounds of the Ministry of agriculture of Russia in OOO «Agrotechnology» Pronsky district of the Ryazan region. The experimental site was established on loam leached Chernozems. NPs used in the seed treatment (concentration 0.1 g per hectare). Germination, leaf area, plant height, diameter of sunflower baskets, yield, chemical composition of seeds (dry matter, ash, protein, oil content, acid number) and fatty acid composition of sunflower seed oil were studied during the experiment. At the end of the experiment the comparative evaluation of the three NPs was conducted. The best result was shown by the NP Co which has contributed to the increase in leaf area by 14.3%, plant height by 6%, diameter of the sunflower baskets by 10.9 %, yield of sunflower seeds by 3.4 t ha<sup>-1</sup> (or 19.2% compared to the control), seed oil content by 3.4 mg kg<sup>-1</sup> (or 9.7% compared to the control). The use of NP Fe or NP Fe+Co had a smaller effect but in most cases was insignificant.

**Key words:** nanopowders, iron, cobalt, sunflower, yield, chemical composition, fatty acids.