

**SOILS:
WHERE FOOD
BEGINS**

The effect of different doses of organic and mineral fertilizers on the availability of trace elements in soils through the transformation of their organic matter

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The **aim of research** was to determine changes in the mobility of trace elements in soils depending on the transformation of soil organic matter under the influence of different levels of fertilization.

Research methodology

Content of humic and fulvic acids in soils was determined by extraction with alkaline solution of sodium diphosphate with subsequent separation by adding sulfuric acid.

Determination of the content of available trace elements in topsoil samples from long-term field experiments in different soil/climatic zones of Ukraine was carried out by extraction with 1N ammonia-acetate buffer solution at pH 4.8.

Determination of the trace elements content in plants and preparations of humus acids was performed by dry ashing at 550 ° C with subsequent dissolution of ash in 10% HCl.

The instrumental completion was atomic absorption with flame atomization of a mixture of acetylene/air. Statistical processing of the results was performed using the program Statistica 10.

Research objects

Verkhnyatskaya Research Field (VRF): 1) Control; 2) N120P100K140.

Uladovo-Lyulinetska Research Fields (ULRF): 1) Control; 2) N32P50K42 + 7.5 t/ha manure.

Ivankivska Research Fields (IRF): 1) Control; 2) N32P50K42 + 7.5 t/ha manure.

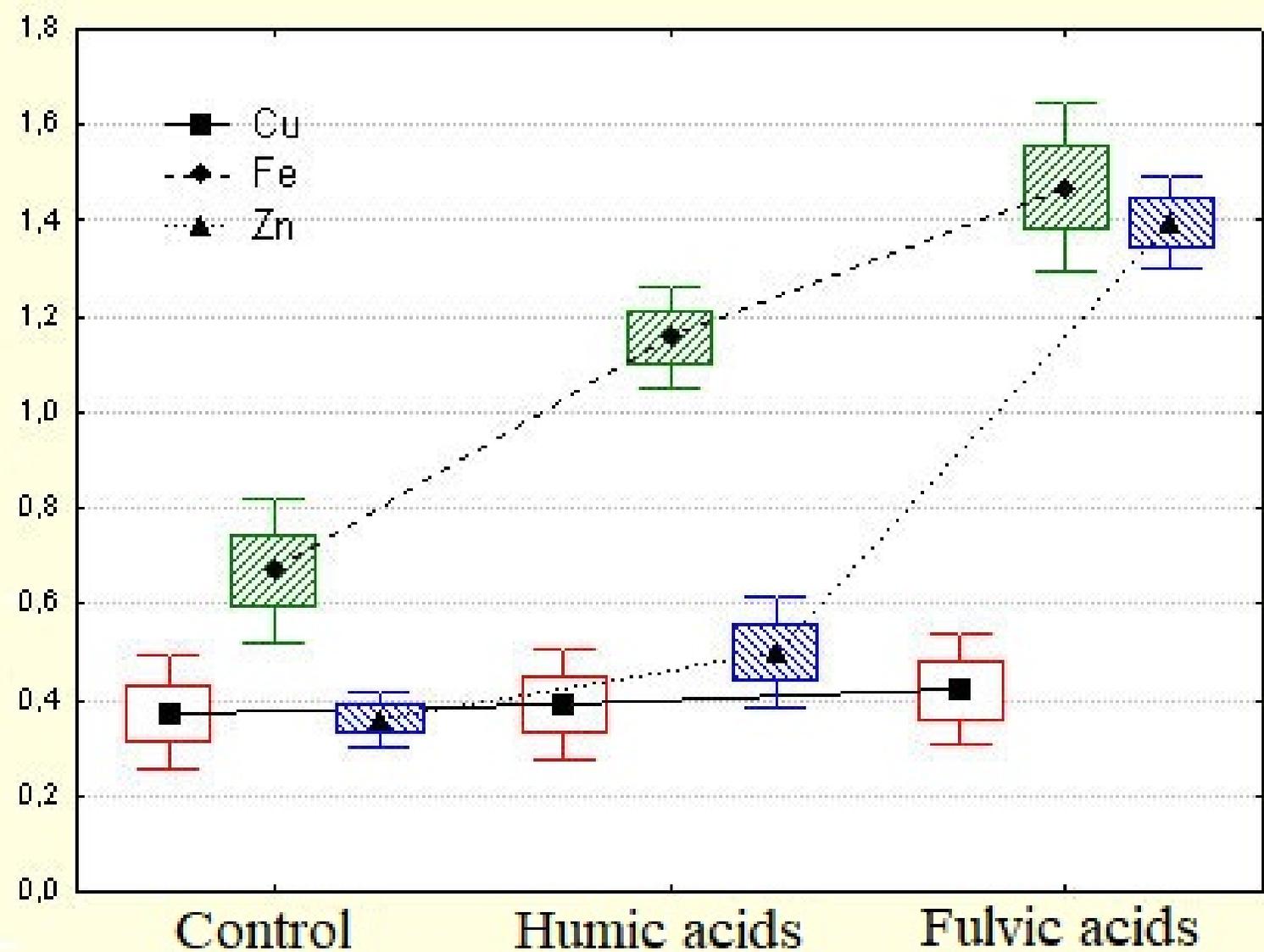
Myronivka Institute of Wheat (MIW): 1) Control; 2) N60P60K40; 3) N60P60K40 + 30 t/ha manure.

Vinnytsia Research Field (VinRF): 1) Control; 2) N60P60K45.

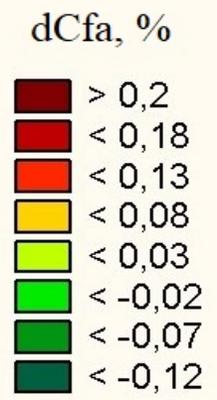
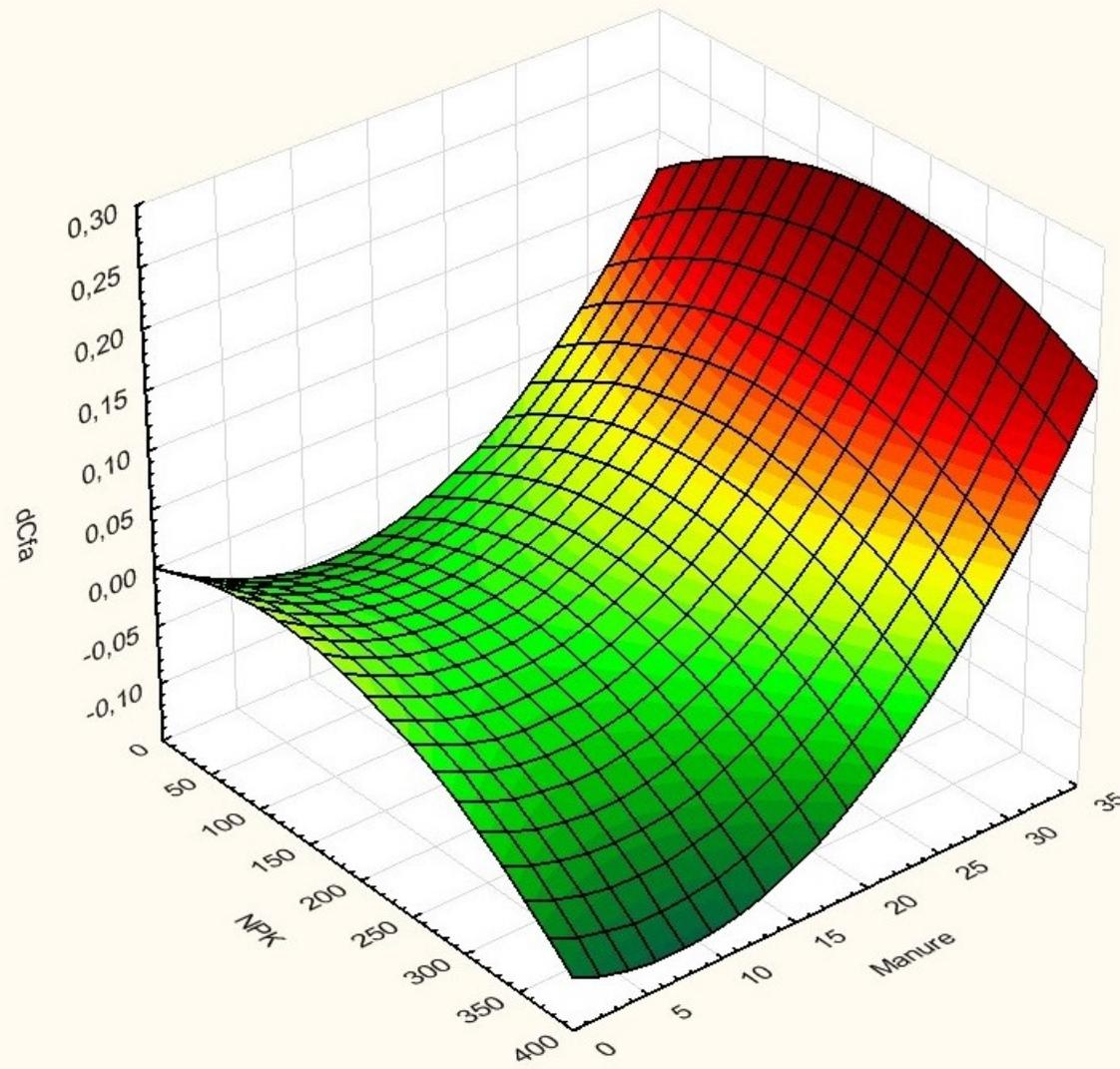
Bast Crops Research Field (BCRF): 1) Control; 2) N60P45K45; 3) N60P45K45 + 20 t/ha manure.

Preparations	Content of trace elements in preparations of humus acids, mg/kg								
	Fe	Mn	Cu	Zn	Co	Ni	Cr	Cd	Pb
Humic acids	3773,9	44,4	130,5	33,5	9,6	11,4	16,4	0,69	32,5
Fulvic acids	1077,5	31,1	177,5	206,8	12,9	10,0	29,4	2,41	51,3

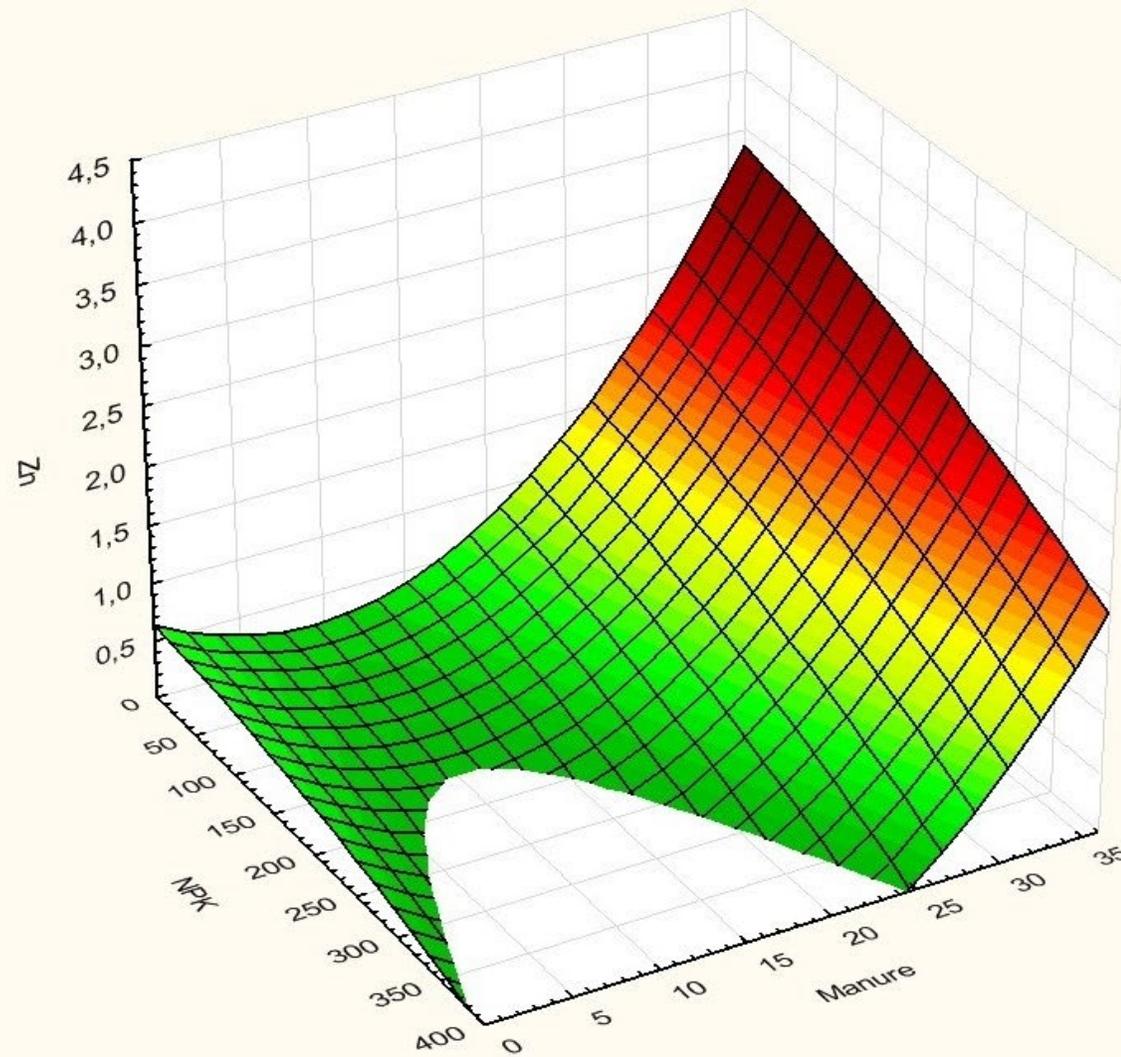
Release of trace elements from preparations of humus acid to the growth medium (0,4 % by mass)



The impact of different levels of fertilization on changes in the content of fulvic acids in the soils of long-term field experiments



The impact of different levels of fertilization on changes in the content of available Zn the soils of long-term field experiments. Correlation between available Zn and changes of the fulvic acids content (dCfa) is $r = 0,59$, $p < 0,05$



Conclusions

The analysis of long-term field experiments' data allows us to conclude that the application of organic and mineral fertilizers leads to significant changes in the mobility of trace elements, especially Zn.

This influence is well consistent with changes in the qualitative composition of soil organic matter, primarily due to the dynamics of the content of fulvic acids.

Thus, the transformation of soil organic matter should be taken into account both from the standpoint of determining the impact of mineral and organic fertilizers on the environment and in the context of soil micronutrients management as well.



Thank you !

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