ESTIMATION OF RATES OF UPTAKE OF TRACE ELEMENTS FROM THE SOIL TO SEEDS OF OILSEED FLAX


*U.S.A.M.V. Cluj-Napoca, Faculty of Agriculture, 3-5 Mănăstur street, România, e-mail: sorin_m75@yahoo.com
**E.S.I.T.P.A. Rouen, France

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SUMMARY

This research aims to model the migration of heavy metals from soil to Flax oilseeds at different development stages. Following a three-year study, we have developed a mathematical model which enables us to evaluate risk options in the management of urban wastes, taking into account agricultural practice, physico-chemical soil properties.

This study concerns two locations, each with different pedological characteristics and which had been previously treated with organic materials. At each location, two different varieties of oilseed flax were grown (A and B).

The first site, G in Normandy, received sewage sludge in agronomic doses until 1998. At the second site, H in the Paris region, the polluted area was irrigated with waste water via a sewage outfall from the early years of the 20th century until 1999, while in the unpolluted area of the H site (used as a control for this study) integrated management has been used.

Each site was divided into two areas for cultivation of the two varieties of Flax.

Soil samples were taken at three different depths (0-25 cm, 25-50 cm and 50-75 cm), during four stages of flax growth (seed, growth, flowering, ripening), and from the plants themselves.

The presence of five metals, Cd, Cu, Ni, Pb and Zn was measured.

The test sites were separated into two classes: ‘Polluted’ and ‘Integrated Management’. The results show that two varieties of Flax plants react in different ways to each three families of metals (Cu-Zn, Ni-Pb, and Cd). The results are similar, whatever the variety of Flax.

Finally, the quantities of heavy metals carried by Flax seeds and their effects on risk-levels are practically non-existent in the context of existing standards.

Studies are continuing in this area to explain the mobility of some metals such as Zinc, taking account of interactions between metals, soil texture, and physico-chemical factors.

BIBLIOGRAPHY
