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# The effect of sewage urban and industrial sludge on the development of wheat and colza

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The main objective of this study is to evaluate the effect of two types of sludge from sewage treatment urban and industrial plants on the wheat and colza. These sludge is made at different doses (5, 25, 50 and 100 t / ha). We are therefore interested in the growth and absorption of heavy metals by plants and follow the fate of the latter in the ground to prevent pollution events and toxicity.
The soil is characterized by an alkaline pH; conductivity ranging from 1.06 to 1.52mmho/cm resulting low salinity and soil saturation is between 30.4 and 31.8ml/100g. The sand is the most representative size fraction in this soil which is a sandy loam soil texture. The percentages of limestone in the different horizons are less than 5% so it is a non-calcareous soil, with organic matter content very low.
Contents of total nitrogen are relatively low. The C/N ratio is about 7 at the first horizon (0-10cm) indicates that organic matter will be quickly mineralized. The mean levels of heavy metals found in the soil are organized in the following order: Fe » Mn> Zn> Pb> Cu> Ni> Co> Cd mean concentrations of heavy metals introduced by the sludge.
With the addition of sludge, there is a parallel increase in the number of ears and an increased number of grains per $m^2$. The ears and grains also increases with increasing dose of sludge, whatever the type of sludge made. The increase in the number of grains with the addition of sludge has the consequence of decrease in PMG this can be explained by the decrease in weight and grain quality response to stress.
The numbers of feet of wheat increases dice the contribution of 5t/ha sludge, this increase is more pronounced with the addition of urban sludge.
The leaf area increases with the contribution of sludge as well as for urban or industrial sludge's. The leaf surface of this crop varies between 15.77cm2 of the oldest leaf to 3.78cm2 for the youngest leaf in the control soil. The leaf surface increases by $10cm^2$ for 5BI and $11cm^2$ 5BU. We noted that the young leaf appears to 5BI and 25BI, but it is not yet developed with input from 50t/ha to 100t/ha. This developmental delay may be due to toxicity effect more pronounced with industrial sludge.
The effects of the contribution of sludge are manifested by a significant increase in the weight gains of the whole plant, these results in a variation of the ratio of the aerial part and root (PA / R) which tends to increase with the increase the dose sludge made. In all cases, the increase in leaf weight gain following a contribution of mud is still perceptible from the low inputs applied with a more significant effect with the provision of urban sludge. The important contribution of sludge rich in heavy metals causes stress in plants. We found a high content of Ni, Pb and Zn in these plants.