

YIELD RESPONSE AND MINERAL CONTENT OF POTATOES
UNDER SALINE CONDITIONS

*(Response du rendement et de la Composition minérale
de la Pomme de Terre a des conditions salines)*

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SUMMARY

Aim of the experiments was to determine ion specific and complex effects of different salts on the development of the canopy, tuber formation yield and mineral content of potatoes. Yield formation was taken as an important parameter of salt tolerance.

During two vegetation periods NaCl and Na₂SO₄ were applied in 4 concentrations. The experiment was carried out under semi-controlled conditions in pots.

To get detailed informations about the development phases of the plants during the vegetation period, samples were harvested 39, 53, 74 and 95 days after planting.

Increasing salt concentration reduced the total yield and changed significantly the number of tubers, tuber size and tuber weight. The mineral content showed also differences in the reaction to both salts and salt concentrations as measured in the yield formation.

A significant shifting of the content of cations was observed especially in the canopy. The shifting of the cation content was not so distinct in the tubers. The starch content of the tubers was significantly reduced by increasing concentrations.

RESUME

Durant deux périodes de végétation, différentes concentration de chlorure de sodium et de sulfate de sodium ont été appliquées. Ces expérimentations ont été conduites en pots, en conditions semi-contrôlées.

Selon le niveau de concentration saline et la nature des ions, la surface foliaire a été significativement réduite et l'élaboration du rendement retardée.

L'augmentation de la concentration saline a réduit le rendement final et changé significativement le nombre, la taille et le poids des tubercules. La composition minérale a aussi montré des différences dans la réaction aux deux sels et à leurs concentrations.

Des changements significatifs de composition cationique ont été observés surtout dans les parties aériennes.

Le contenu en amidon et en azote total a été significativement influencé par des concentrations croissantes.

INTRODUCTION

Hitherto, only few investigations are reportedly made on salt tolerance of the potato crop. But with a remarkable increase in the production of this crop in semiarid regions in the last ten years, it seems imperative that a considerable attention should be given to this specific problem area.

BERNSTEIN et al. (1951) reported that at higher irrigation frequencies, an ECs of 6.2 mS/cm reduced the yield of the potato variety "White Rose" by 50 per cent, whereby size and number of tubers played an important role. BOUAZIZ (1980) found a 30 per cent yield loss in variety "Spunta" at 8 mS/cm, which he said was attributed to a reduced single tuber weight. It was also observed that high salt concentrations lead to different cation and anion contents in various plant organs. ABDULLAH and AHMAD (1982) said that in varieties "Multa" and "Atom" salt concentrations ranging from 8-10 000 ppm cause a decrease in chlorophyll and protein content whereas lower concentrations favor their production.

In connection with fertilization, BUCHNER (1951), LATZKO (1955), LEMPITZKAJA (1960), and HAEDER (1975) observed a shift in the profile of carbohydrates, disturbance and inhibition of translocation of assimilates from leaves and stems which was caused by accompanying elements.

It is also known that different plants and varieties within a plant react differently to salinity depending on their stages of development (GREENWAY 1962, EL-GIBALY and GOUMAH 1969, RUSITZKA 1982, DORING 1985). The objective of this study was therefore to determine the effect of salt treatments at different phases of potato development.