The two-year research in 2013 and 2014 was conducted in fields situated in Ujkowice village, near Przemysl (49.85° N, 22.72° E). The experiments covered three factors i.e., 4 levels of biomass ash fertilization (0; 4.28; 8.57;12.85 t ·ha^{-1}), 2 levels of sewage sludge fertilization (0; 30.3 t ·ha^{-1}) as well as 2 varieties of Jerusalem artichoke (*Helianthus tuberosus* L) Gigant and Albik. The experimental pattern of split plot-split block with three replications was applied. Plants yield, biometric features and physiological parameters were determined. The calorific value, carbon, ash and nitrogen contents of the plant material was also determined. The macro- and micro-nutrient content of the soil and plants were also determined. The findings were statistically analysed using analysis of variance, while multiple comparison of averages was performed applying the Turkey's test. The Pearson's straight correlation coefficient and simple regression equation were also calculated.

The application of 30.3 t ha^{-1} of sewage sludge in comparison with the controlled plot (sludge free) had varied effect on the yields of Jerusalem artichoke (topinambour) in the subsequent years of the study. The yield in the first year of application was lower by about 0.8 t, while in the second year the reaction to fertilization was positive. Changing yields of Jerusalem artichoke under varied conditions of fertilization with sludge depended on the length of the shoot and LAI and SPAD indicators. Biomass ash fertilization systematically led to increased yields of aboveground (vegetative) material in 2013. The differences were negligible in the next harvest although an incremental trend of values of the feature was observed. Increased yields of Jerusalem artichoke having been fertilized with ash from coniferous trees was associated with increased length of shoots and increased values of LAI and SPAD indicators. No variations in calorific value, carbon, ash and nitrogen content under sewage as well as biomass ash fertilizations were confirmed. There were no significant interactions between organic (sludge) and mineral (ash) fertilizations, which indicates that yield variation under ash fertilization was the same irrespective of the sludge variant being applied. Of the two varieties (Polish Albik and Dutch Giant) covered by the experiment, Albik was characterized by higher yields. If, however, the average yields obtained in the second year with option of sludge application were taken into consideration, the differences turned out much smaller. Giant appears to be a variety with much higher fertilizer demands than Albik. In comparing the properties studied, it can be confirmed that the Polish Albik variety is characterized by longer shoots, smaller diameter of shoots, higher LAI indicator, much higher SPAD values (variety specific feature), whilst the Fv/Fm ratio was similar for both varieties. As a result of the 20% calcium content obtained from coniferous ash being retained throughout the experimentation, the calcium content as well as the alkalinity was

increased in the soil on which ash fertilization was applied. Of the three factors analyzed in the experiment only coniferous ash fertilization resulted in significant increase in soil quantity of available phosphorous and potassium, which in turn led to increased potassium content of aboveground (vegetative) parts of Jerusalem artichoke. The stability of the plants chemical composition, which turned out to be a stable value, was expressed by the virtual lack of impact of the analysed factors on the varying micronutrient content in the vegetative parts of the Jerusalem artichoke grown.

It can be confirmed that the Jerusalem artichoke cultivated in the foothill conditions of Podkarpacie province gave yields at levels similar to those obtained in other regions of Poland. The findings are indications of the possibility of applying both sewage sludge and biomass (conifer) ash in the fertilization of Jerusalem artichoke. In comparing the data from the two-year period regarding the phosphorous, potassium, calcium, magnesium and sulphur content in soils, there is need to emphasize their less abundance in the second year, which indicates the huge absorption of these elements by the cultivated Jerusalem artichoke.