

Influence of sulfate containing potassium and magnesium fertilization on the yield amount and some content parameters of strawberry (*Fragaria ananassa*)

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Potassium plays a role in the plant's water management, promotes the cell elongation, it takes part in the synthesis of all kinds of carbohydrates: sugar, starch, and cellulose. That is why the proper potassium supply is important in strawberry production, too. Strawberry supplied with potassium well, synthesizes more sugar, so the yield will be sweeter, deliver more energy to human body, and more attractive for the consumers. Nowadays in plant production mostly potassium chloride is used as potassium fertilizer. Some plants, especially horticultural berries, strawberry in particular, react sensitive to chloride ions, because higher chloride concentration hinders the translocation of different assimilates. Therefore the application of chloride-free fertilizers such as potassium sulfate might be reasonable. Besides potassium, magnesium plays also a relevant role in plant life. It is important to watch out on magnesium supply on soils that are treated with a higher dosage of potassium, because of the antagonism between different ions, high potassium content can deteriorate the magnesium utilization. To avoid this negative effect, the potassium sulfate fertilization can be combined with magnesium sulfate application.

To study the potassium and magnesium supply of soils were set up the field experiments in the north eastern region of Hungary, near to Újfehértó, in an acidic soil (pH-KCl = 4.4) with sandy texture. The ammonium lactate – acetic acid soluble nutrient content is the following: 129.6 mg kg⁻¹ P₂O₅; 208.8 mg kg⁻¹ K₂O, 1243 mg Ca and 67.3 mg Mg kg⁻¹ soil. The net area of each plot was: 2.8 x 3.75 m = 10.5 m², the distance between rows was 0.75 m, and the plant to plant distance was 0.25 m, so these were 60 plants in each plot. We used the sort "Polana" in our experiment. To reach a higher statistical reliability we set up our experiment in 6 replications, in a randomized arrangement.

On the basis of the results and their statistical analysis it was stated that the most favorable conditions for the strawberry development were ensured by the treatment with Patentkali (Table 1), which is a fertilizer that contains a combination of potassium sulfate and magnesium sulfate (in the form of Kieserit, MgSO₄·H₂O). The positive effect was confirmed by the statistical analysis at P = 0.1% probability level. Nutrients applied in form of sulfate inhibited the uptake of chloride-ions. It is presumable, that the decrease in the chloride-ion concentration of plants contributed to the yield increment.

Table 1. The yield of strawberry and the vitamin-C-, fructose and chloride-ion-content of the berries

| Treatments | Parameters | | | |
|---|---|-------------------------------------|-----------------------------------|------------------------------------|
| | Total yield (kg plot ⁻¹) | Vitamin C (mg kg ⁻¹) | Fructose (g kg ⁻¹) | Chloride (mg kg ⁻¹) |
| Without K and Mg | 17.2 | 556 | 42.4 | 698 |
| 120 kg K ₂ O ha ⁻¹ (KCl) | 17.3 | 503 | 39.9 | 727 |
| 120 kg K ₂ O ha ⁻¹ K ₂ SO ₄) | 19.7 | 586 | 49.0 | 449 |
| 120 kg K ₂ O ha ⁻¹ (K ₂ SO ₄) + 40 kg MgO ha ⁻¹ (MgSO ₄) | 20.6 | 495 | 44.5 | 401 |
| SD _{5%} | 1.1 | 96 | 9.2 | 118 |
| F | 21.4*** | n.s. | n.s. | 16.4*** |

*** significant at P = 0.1% level; n.s. = not significant