

Effect of the homeopathic solution *Sulphur* on the growth and productivity of radish

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ABSTRACT. The aim of this work was to analyze the effect of the homeopathic solution *Sulphur* on some radish growth variables. Five dinamizations of *Sulphur* were used (5 CH, 12 CH, 30 CH, 200 CH and 1 MCH) on a centesimal scale. Treatments were carried out in vases outdoors and the homeopathic solution was applied weekly. The fresh and dry matter mass of the shoot and the root system, the average length of the root system, the average plant length, the length of the largest leaf and the root diameter were analyzed. The application of *Sulphur* improved the general conditions of the plants in practically all the studied variables, when compared with a control. The dinamizations 5 CH, 12 CH, 30 CH and 1 MCH showed better responses. The control and the dinamization 200 CH were the treatments that presented the most negative results. The results suggest that the homeopathy *Sulphur* can be an alternative to improve the productivity and appearance of commercial agricultural products, with substantial reduction in agricultural input.

Key words: Dinamization, *Raphanus sativus* L.

RESUMO. Efeito da solução homeopática *Sulphur* no crescimento e na produtividade de rabanete. Este trabalho teve como objetivo analisar o efeito do medicamento homeopático *Sulphur* em algumas variáveis de crescimento de rabanete. Utilizaram-se 5 dinamizações de *Sulphur* (5 CH, 12 CH, 30 CH, 200 CH e 1 MCH) na escala centesimal. Os tratamentos foram realizados em vasos em condições de ambiente aberto, e a aplicação do medicamento homeopático aplicado semanalmente. Foram determinados: a massa da matéria fresca e seca da parte aérea e do sistema radicular, o comprimento médio das plantas, o comprimento da maior folha e o diâmetro da raiz. A aplicação de *Sulphur* melhorou as condições gerais das plantas em praticamente todas as variáveis estudadas quando se compara com um controle. As dinamizações 5 CH, 12 CH, 30 CH e 1 MCH foram as que apresentaram melhores respostas nas plantas. O controle e a dinamização 200 CH foram os tratamentos que apresentaram os resultados mais negativos. Os resultados sugerem que o *Sulphur* pode ser uma alternativa quando utilizado para aumentar a produtividade e para melhorar a aparência dos produtos agrícolas comerciais com redução substancial de insumos agrícolas.

Palavras-chave: Dinamização, *Raphanus sativus*.

Introduction

The basic principle of the homeopathy, according to Samuel Hahnemann (1755 to 1843), is the use of dinamized solutions prepared from animal, vegetable or mineral substances, or sick tissues. For homeopathy, the disease or the unbalance is seen as an energetic unbalance and not as the action of the virus, bacteria and others (Bonato, 2002). Homeopathic solution promotes the reestablishment of the plants through improvement of their natural defenses. The homeopathy use in agriculture was made official as input in 1999

(Brasil, 1999). Now the homeopathic science is being used efficiently in the control of plagues (Fazolin *et al.*, 2000), diseases (Verma *et al.*, 1969; Kumar, 1980; Khanna e Chandra, 1983), increase of active principles in medicinal plants (Carvalho 2001; Castro, 2002), plant detoxification for metals as aluminium (Rocha *et al.*, 2002; Moretti *et al.*, 2002) and copper (Almeida, 2002), increase plant growth rate and productivity (Castro, 2002). This suggested the interest of verifying the applicability of the homeopathic solution *sulphur* in some variables of the radish, for growth and productivity.

Material and methods

The experiment was conducted in the Didactic and Experimental Garden of *Departamento de Biologia da Universidade Estadual de Maringá*, from September 3 to October 25, 2002.

Obtaining the homeopathic solutions

The main *Sulphur* solutions were obtained on a centesimal scale from a suitable pharmaceutical laboratory (*Farmácia Homeopática João Vicente Martins - Maringá -PR*).

Application of the homeopathic solution

The treatments consisted of applications of 5 homeopathic dinamizations of *Sulphur* 5 CH, 12 CH, 30 CH, 200 CH and 1 MCH) and water used as control. The *Sulphur* was applied in the proportion of twenty drops (1.5mL) per water liter. Each vase received 100mL of the solution every seven days.

Performance of the experiment

Radish seeds were sown directly in 3-liter vases, receiving, as substratum, soil, decomposed bovine manure and sand in the proportion of 3:2:1, respectively. Ferralsols originating from the Didactic and Experimental Garden were used.

After one week, the plants were thinned, leaving just two plants per vase. Soluble fertilizers were not used during the experiment. The data were collected for 31 days. The experiment was carried out according to double-blind methodology, i.e. the experimenter and the applicator ignored the dinamization of the solution that was being applied.

Statistics

The experimental delineation was entirely in randomized blocks, with 4 repetitions. The treatments consisted of 5 *Sulphur* dinamizations on a hahnemannian centesimal scale, in addition to the control. In the qualitative tests, the averages were compared using the Scott-Knott test at 5% probability. As regards the quantitative variables, the models were chosen based on the significance of the regression coefficients using the "t" test at 5% probability.

Obtaining the data

Data collection was made every 7 days. Evaluations were always made in the same afternoon period.

Quantified variables

Length of the largest leaf

Evaluation of leaf length was made weekly. The measures were taken starting from the beginning of the petiole to the leaf apex.

Plant height

Determination of plant height in each phase was made measuring the distance between the base of the stem and maximum plant height.

Fresh matter of the shoot and the root system

The plants collected on the 31st day after being sown had their shoots and root system highlighted, with the aid of scissors, and immediately weighed on an analytic scale.

Dry matter of the shoot and the root system

After the fresh matter of the shoot and the root system was weighed, the material was placed in a kiln (70°C) at constant mass and then weighed on an analytic scale.

Results and discussion

Effect of *Sulphur* on leaf length

Average leaf length was influenced by the application of the homeopathic solution *Sulphur* (Figure 1). The dinamizations 5 CH, 12 CH, 30 CH and 1 MCH showed longer average leaf length in relation to dinamization 200 CH and to the control (water). It was observed that the plants responded differently when several dinamizations of the same solution were applied. In several situations, the homeopathic solution also inhibits leaf growth (Castro, 2002). It should be emphasized that, starting from the dinamization 12 CH, according to the "Avogadro's Number" (6.02×10^{23}), physical molecules of the solution do not exist, only energy (Schembri, 1992).

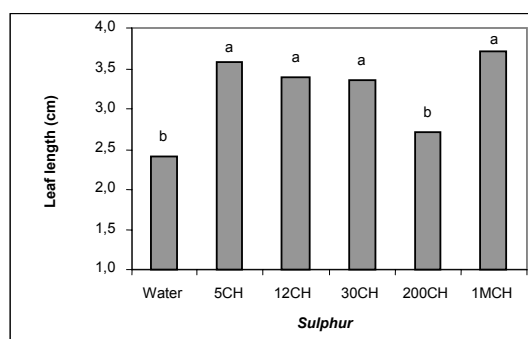


Figure 1. Average length of the largest leaf of radish plants submitted to different dinamizations of *Sulphur*. (Averages followed by the same capital letters on the bar do not differ statistically for the Scott-Knott test at 5% probability)

Effect of *Sulphur* on plant height

Plant height was influenced by different dinamizations of the homeopathic solution, except 7 and 14 days after sowing (Table 1).

Three weeks after sowing, it was verified that the treatments 5 CH, 12 CH, 30 CH and 1 MCH presented height significantly higher than the control

and the potency 200 CH. This behavior was practically identical to that observed for leaf length (Figure 1). The same tendency occurred for plant height at 21 and 28 days and in the general average (Table 1). It was observed that the growth alterations reflected the alternation of responses to the dinamizations. Alternation due to growing dinamizations has been verified in many experiments (Davenas *et al.*, 1988). In homeopathic science, it is common to observe the same solution causing very different effects in accordance with the dinamization, sometimes stimulating a lot, other times stimulating very little. This has been observed in clinical practice from the time of Hahnemann (Godoy, 1988; Castro, 2002). Fazolin *et al.* (2000), for example, verified this when carrying out an experiment seeking the control of *Cerotoma tingomarianus* in beans. The homeopathic solution *Ignatia* decreased the consumption of bean leaves by *Cerotoma tingomarianus* in the decimal dinamizations D5 and D15 and increased consumption in the dinamizations D9 and D29. The same phenomenon was observed using silver nitrate in the dinamizations D24 and D26, which increased the growth of wheat seedlings, while the intermediary dinamization D25 depressed the growth of the seedlings (Pongratz *et al.*, 1998). This behavior is still not explained by science, but it is believed to be related to existing rhythmic movements in nature, and also to the law of similitude that occurs between the applied homeopathic solution and the organism that receives it (Vithoulkas, 1980; Godoy, 1988).

Table 1. Average height (cm) of radish plants submitted to different dinamizations of *Sulphur*

Time (days)	Water	5CH	12CH	30CH	200CH	1MCH
7	0,55 A	1,00A	0,78 A	0,73 A	0,86 A	0,97 A
14	2,80 A	3,75 A	3,25 A	3,25 A	2,95 A	3,20 A
21	5,12 B	7,37 A	7,12 A	7,37 A	5,12 B	9,38 A
28	5,87 B	10,00 A	10,25 A	10,00 A	5,78 B	9,75 A
Averages	3,39 B	5,53 A	5,35 A	5,51 A	3,68 B	5,58 A

Averages followed by the same capital letters in the line do not differ statistically for the Scott-Knott test at 5% probability

According to the regression equations in Figure 2, the homeopathy *Sulphur* demonstrated much higher angular coefficient values for the dinamizations 5CH, 12 CH, 30 CH and 1 MCH than for the control and the dinamization 200 CH. This means that all the dinamizations (except for 200 CH) determined increase in the growth rate of the radish plants and suggests, in this case, that the homeopathy *Sulphur* interferes positively, accelerating plant metabolism. This fact was also observed by Castro (2002) in the application of *Phosphorus* in beets.

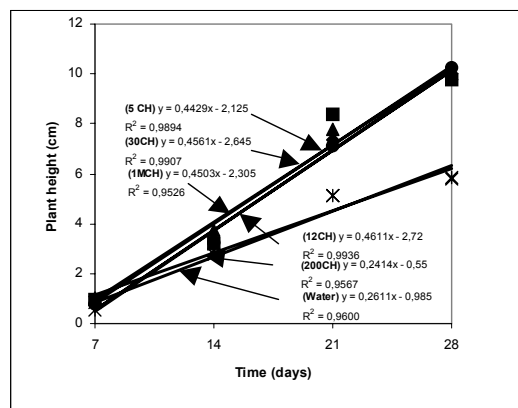


Figure 2. Regression of the height of radish plants submitted to different dinamizations of *Sulphur*

Effect of *Sulphur* on root diameter

The application of the homeopathy *Sulphur* in the dinamizations 12 CH, 30 CH and 1 MCH increased the average diameter of the radish roots significantly in relation to the control and the dinamizations 200 CH and 5 CH (Figure 3). The behaviour presented here was similar to that observed for the first described items. The average root diameter of the plants treated with 12 CH, 30 CH and 1 MCH was approximately 3 times greater than the control. This result is of great importance, because the applied homeopathy resulted in larger roots, leading to higher productivity and higher commercial value of the product. Again, it was observed that different dinamizations caused different results. When there is a similitude between the homeopathic solution and the organism, the vital energy responds, opposing the energy of the medication to a text of its own energy (Hamly, 1979). However, when there is no similitude between the homeopathy and the organism there can be disorder in the metabolic system of the plant, resulting in several negative growth and development aspects of the plant.

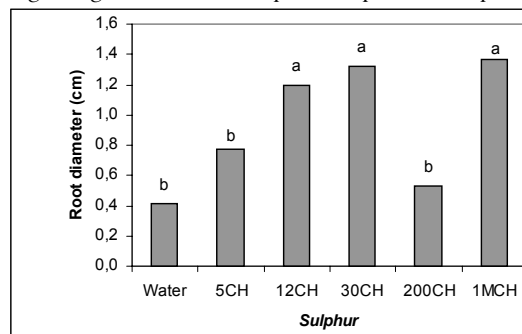


Figure 3. Root diameter of treated radish plants with different dinamizations of *Sulphur*. (Averages followed by the same capital letters on the bar do not differ statistically for the Scott-Knott test at 5% probability)

Effect of Sulphur on the mass of the fresh matter of the shoot and the root system

Both the mass of the fresh matter of the shoot and the root system were influenced significantly by the different dinamizations of Sulphur (Figures 4 and 5).

The application of Sulphur at potency 5 CH resulted in a large increase in the production of the shoot fresh matter, standing out among the other studied dinamizations and arriving at values approximately three times higher than the control and the dinamization 200 CH (Figure 4). The potencies 12 CH, 30 CH and 1 MCH also increased the mass of the shoot fresh matter and differed statistically from the control and the dinamization 200 CH.

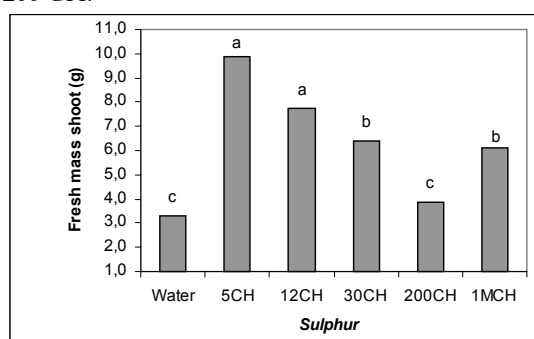


Figure 4. Fresh mass of the shoot of treated radish plants with different dinamizations of Sulphur. (Averages followed by the same capital letters on the bar do not differ statistically for the Scott-Knott test at 5% probability)

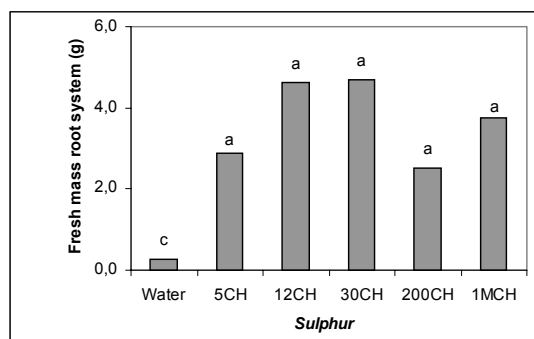


Figure 5. Fresh mass of the root system of treated radish plants with different dinamizations of Sulphur. (Averages followed by the same capital letters on the bar do not differ statistically for the Scott-Knott test at 5% probability)

The application of Sulphur, independent of the studied dinamization, resulted in a large increase in the fresh matter mass of the root system, when compared with the control (Figure 5). The difference was 10 to 20 times greater in relationship to the control. *Cymbopogon citratus* plants treated with Sulphur 30 CH presented a reduction in the mass of

the shoot fresh matter, differing statistically from the control (Castro, 2002).

Effect of Sulphur on the mass of the shoot dry matter and the root system

The radish plants that received Sulphur at potencies 5 CH and 12 CH presented a larger increment in the mass of the matter of the shoot (Figure 6), while the control and the other studied dinamizations did not differ statistically from each other. The plants treated with Sulphur 5 CH presented more than twice the mass of the dry matter of the shoot when compared to the control.

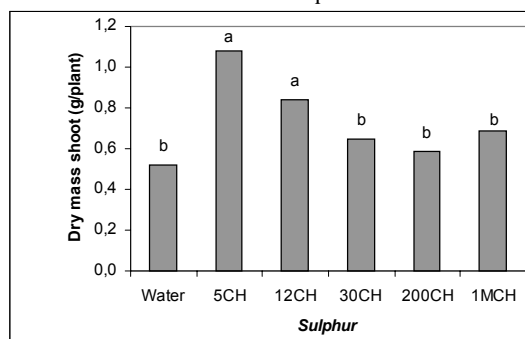


Figure 6. Dry mass of the shoot of treated radish plants with different dinamizations of Sulphur. (Averages followed by the same capital letters on the bar do not differ statistically for the Scott-Knott test at 5% probability)

The production of dry matter in the root system was identical to that observed for the mass of the fresh matter, i.e. all the dinamizations presented significantly higher dry mass values of the root system (approximately three times higher) in relationship to the control (Figure 7). The variable mass of the dry matter should be preferred to the mass of the fresh matter because it is less subject to environmental factor fluctuations.

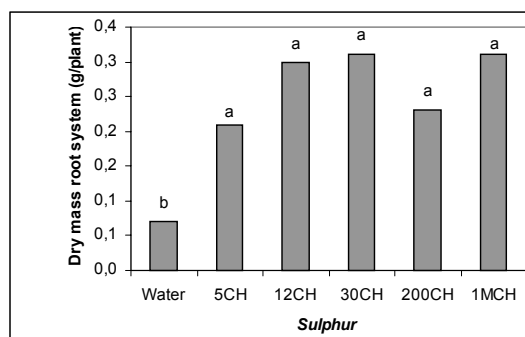


Figure 7. Dry mass of the root system of treated radish plants with different dinamizations of Sulphur. (Averages followed by the same capital letters on the bar do not differ statistically for the Scott-Knott test at 5% probability)

It is interesting to note that, even with the adversity of the abiotic and biotic factors (the plants grew outdoors), the homeopathy *Sulphur* was efficient and improved the general characteristics of the plants.

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