# LIGNIFICATION OF Solanum gilo Raddi INDUCED BY CALCIUM NUTRITION

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## ABSTRACT

This communication turn on the use of Solanun gilo (Solanaceae) for lignification test on the nutritional point of view. This plant was chosen due its fast growth, high calcium mobility and low lignin content (15,51%). The experiment was carried out using calcium sulfate ($CaSO_4$) and calcium chloride ($CaCl_2$) for weekly and biweekly application. The treated plants with $CaSO_4/CaCl_2$ (biweekly application) showed 4% of additional lignin content. High syringyl unit concentration was also verified at Guaiacyl: Syringyl ratio (G: S) of 0.8:1 and 1.2:1, for weekly and biweekly application, respectively. The estimation of the lignin content and its composition were performed by Klason and infrared spectroscopy methods.

Key words: Solanum gilo, lignification, nutrition

### A proposal of calcium effect on lignification process in Solanum gilo

Plants which growth on different calcium nutrition condition could modify their physiologic process, due calcium contribution for the proteins phosphorylation, cell division, cell wall formation and membrane synthesis (Larcher, 1999). Moreover, calcium acts as a site-specific cofactor on peroxidase enzyme during the lignification process (Mac Laughlin & Wimmer, 1999).

Experimentation with S. gilo through $CaSO_4/CaCl_2$ application has been shown great result on the lignification process (Figure 1). The application of $CaSO_4$ only, provided a low effect on lignification process, while at binary system of $CaSO_4/CaCl_2$ for biweekly application, additional lignification rate of 4%, was observed. For $CaSO_4/CaCl_2$, weekly application, conduced a moderate lignification rate. In this case, probably $Ca^{++}$ concentration was at cytotoxicic level, hindering the normal flow from cytoplasm to cell wall (MacLaughlin & Wimmer 1999; Huber, 1981).

This experiment was conduced according to the completely randomized way and the variance analysis on the factorial model. The medium values of treatments were appraised by Tukey test at 5% level.

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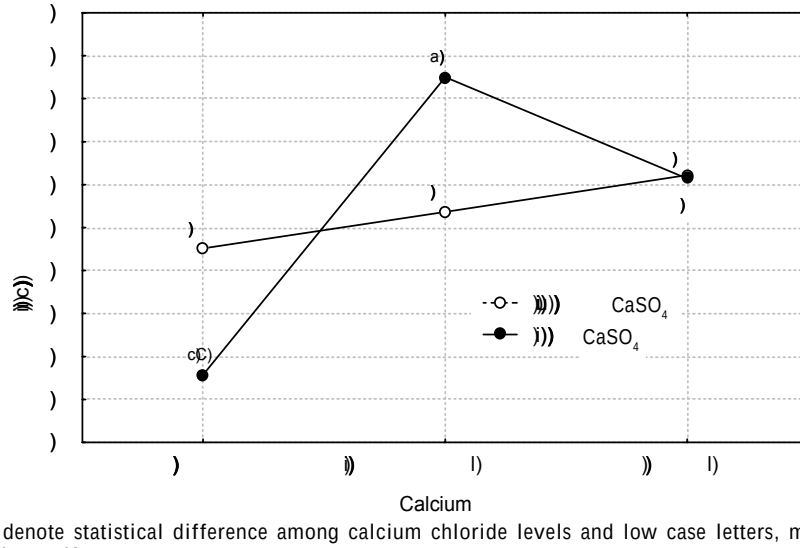


Capital letters denote statistical difference among calcium chloride levels and low case letters, mean presence and absence of calcium sulfate.

Figure 1. The relationship between the lignin and calcium nutrition in S. gilo.

Analysis by infrared spectroscopy using extractive-free sample showed that grown plants under calcium application present the lignin composition modified. The Guaiacyl: Syringyl ratios (G:S) for instance, were 0.8:1 and 1.2:1, for weekly and biweekly application, respectively. It suggests that the calcium supplement could regulate the lignin precursor formation in the cell as well. Moreover, the S. gilo species showed to be efficient for this purpose. A proposal of calcium behavior on phenylpropanoids and cell structural compound metabolism is shown in the figure 2.

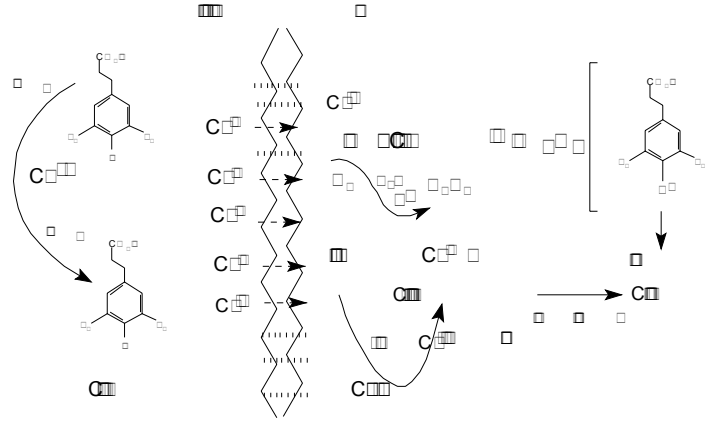

Figure 2. $Ca^{++}$ behavior in the cell wall formation.

## CONSIDERATIONS

The calcium application could be an interesting way for plant protection, through the extra-lignification process without environmental trouble. This lignification condition could determine the plant quality under this nutritional conditional during the growing.

This note makes part of Msc dissertation about lignification induction of S. gilo. Master Science Program/PPCAF/IF/UFRRJ/BRAZIL.

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