# NITROGEN AND SULFUR INDUCED DAMAGES ON THE PHOTOSYNTHESIS OF PHYSIC NUT DURING THE EARLY DEVELOPMENT

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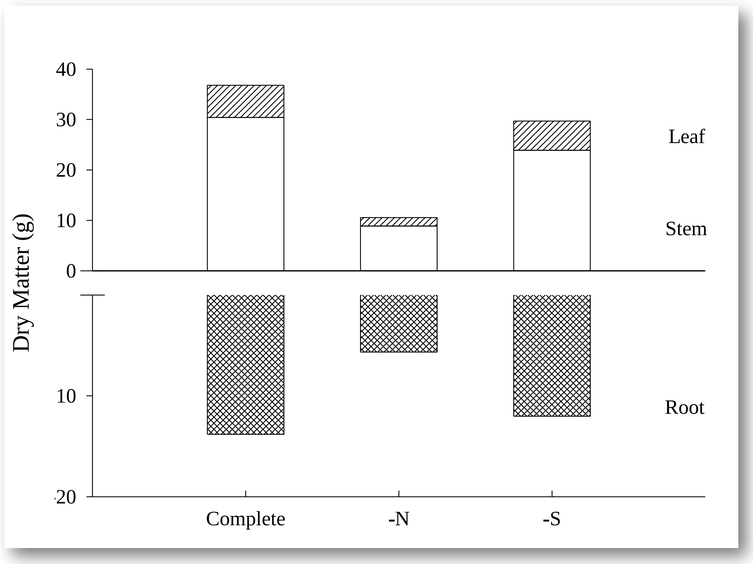
## Introduction

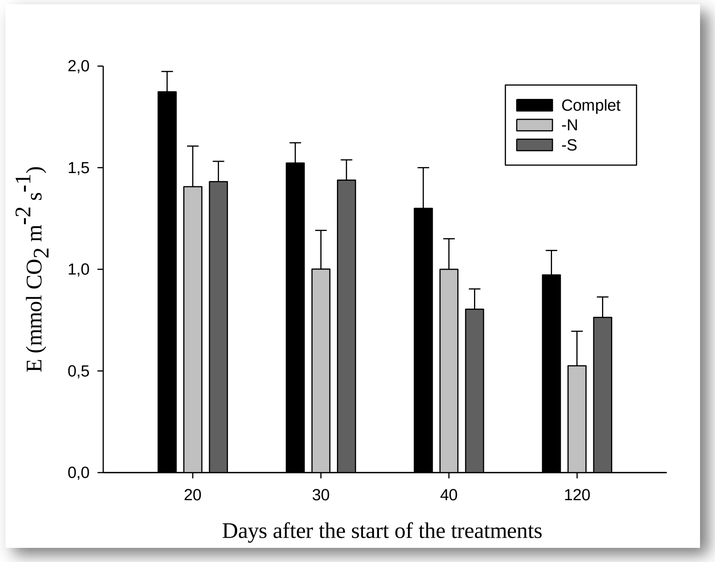
The use of physic nut oil as a source of biofuel has been well-explored. However there are few studies that address the nutritional assessment of nitrogen (N) and sulfur (S) in physic nut (*Jatropha curcas* L.) focusing on physiological responses, especially in terms of photosynthesis. Our hypothesis in this study was that the omission N and S would cause different responses in physic nut, promoting changes in the dry matter production and the photosynthesis rate. Therefore our objective was to evaluate the effects of N and S omission in *Jatropha curcas* (L.) grown in nutrient solution.

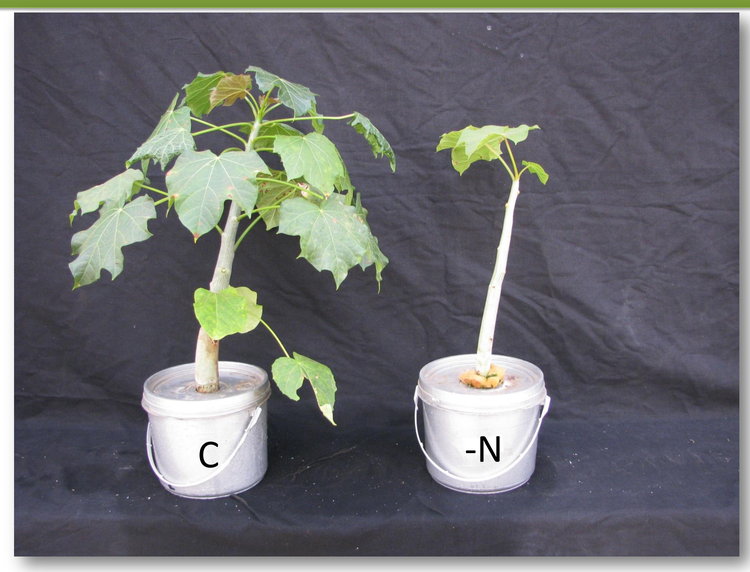
## Material and Methods

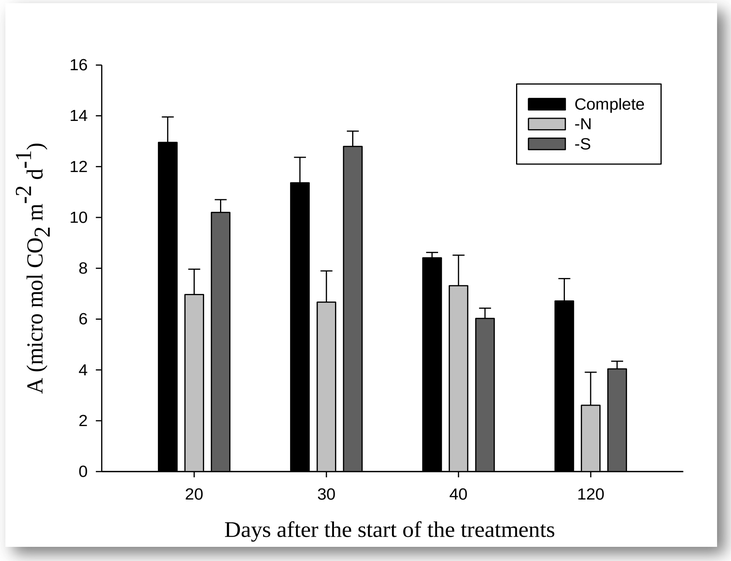
The plants were exposed to the following treatments: complete solution – control (16 mmol $L^{-1}$ N and 2 mmol $L^{-1}$ S); lack of N and lack of S. Four times of plant assessment were also considered: 20, 30, 40 and 120 days after the beginning ot the treatments. The leaf gas exchange parameters ($CO_2$ assimilation (A), transpiration (E) and stomatal conductance (Gs)) was measured , at 120 days after the start of the treatments, in the morning, between 9:00 and 11:00 a.m., with an LI 6400 portable infrared gas analyzer (IRGA, Li-Cor®, Inc., Lincoln, NE, USA). The $CO_2$ supply was approximately 400 µmol $mol^{-1}$ and the light intensity 1,200 µmol $m^{-2}$ $s^{-1}$, at a leaf temperature between 20 and 25 °C.

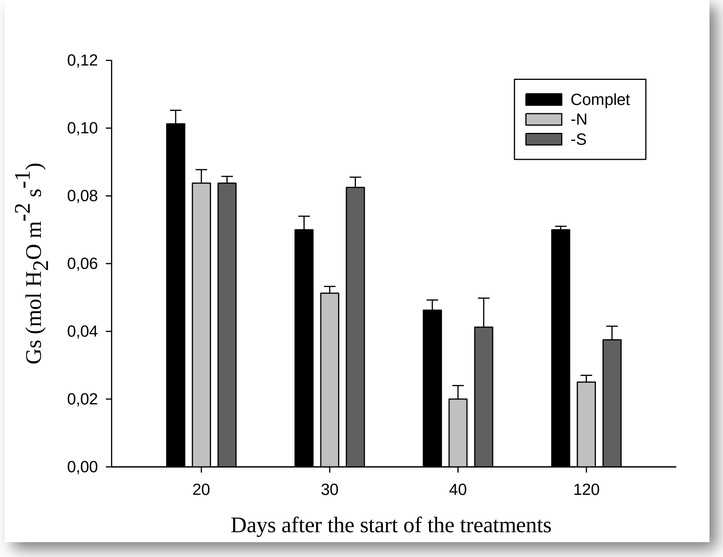
## Results



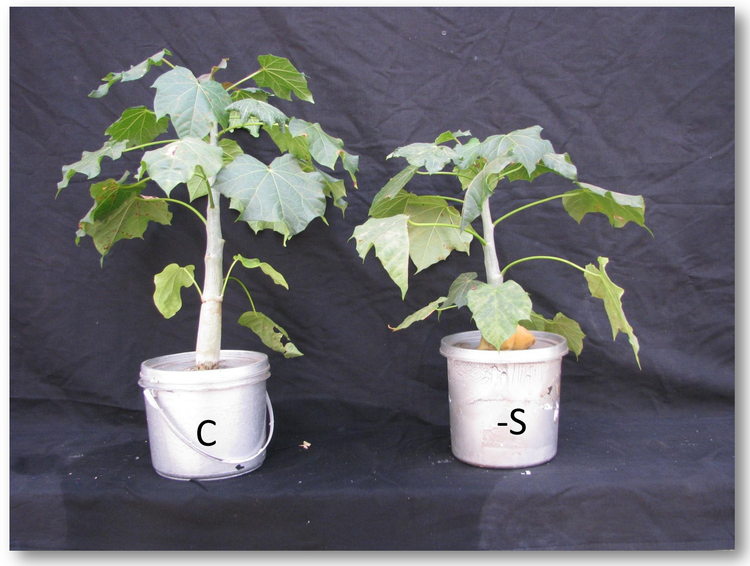




**Figure**. Dry matter yield of the plant parts of physic nut in complete nutrient solution and in lack of N and lack of S at 120 days after the start of the treatments [A]. Rate of $CO_2$ fixation [B] stomatal conductance [C] and transpiration [D] measured on the middle lobe of the third and fourth recently expanded leaves of physic nut grown in complete nutrient solution and lack of N and lack of S, at 120 days after the start of the treatments. Comparison between phisic nut plants grown in complete nutrient solution in solution lack of N [E] and lack of S [F].

## Conclusions

Maximum photosynthesis rates occurred in plants grown in complete solution, indicating that leaf gas exchange parameters might be a good indicator for the nutritional status to N and S, in physic nut. Physic nut in early development is sensitive to N and S nutritional imbalances.