

ABSTRACT

THE EFFECT OF FOLIAR APPLIED METHANOL ON CARBON AND
NUTRIENT ASSIMILATION IN SELECTED VEGETABLE CROPS

Giselle L. Guevara

Two sets of experiments were conducted to evaluate; (1) effects of foliar application of methanol, nutrients and glycine on yield and nutrient uptake in Lettuce (*Lactuca sativa*), Sweet Pepper (*Capsicum annuum*) and Tomato (*Lycopersicon esculentum*), and (2) to measure the uptake of carbon from methanol, and its movement in the plant by applying carbon-13 labeled methanol and measuring the changes in the natural abundance of carbon-13 in response to methanol application.

Repeated methanol applications significantly ($p < 0.05$) increased the content of some nutrients even without the addition of nutrient supplements. In lettuce, uptake of magnesium, phosphorus and iron was enhanced, whereas for sweet pepper and tomato, the uptake of iron and magnesium was increased. Dry matter content however was not significantly increased by application of methanol plus nutrients. The methanol-nutrient formulations had a positive effect ($p < 0.05$) on the growth and development of Sweet Pepper and Tomato, while the addition of glycine to the methanol-nutrient treatments increased the dry matter content of Sweet Pepper, but not Tomato.

Results of the ^{13}C isotope studies indicated that the plant retains little carbon from methanol, since the recovery values were all $< 1\%$ in all three crops. The

natural abundance of ^{13}C however was increased by the application of methanol, suggesting that methanol may affect photosynthesis and cause increased carbon dioxide uptake, evidenced by increased delta ^{13}C values.

For methanol to be used as a yield enhancer in depth studies need to be performed on the mechanism of action and environmental conditions required for its assimilation. From these results and the findings of other researchers the effects of foliar application of methanol appears to be strongly influenced by environmental conditions.

Keywords: Giselle L. Guevara; Foliar application of Methanol; ^{13}C isotope; Natural abundance of carbon-13.