SITE SPECIFIC FERTILIZATION AFFECTS YIELD, FRUIT SIZE, QUALITY, AND SHELF-LIFE OF 'KENT' MANGO

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INTRODUCTION

Site specific fertilization (SSF) defines the type and rate of fertilizer needed for individual orchards (Salazar-García, 2002). This study presents preliminary results (2010-2011) of a medium term project to quantify the effects of SSF on yield, fruit size, quality, and shelf-life of 'Kent' mango in the state of Nayarit, México.

MATERIALS AND METHODS

Two orchards located in Acaponeta (irrigated) and San Blas (rainfed) counties were used. Planting distance in both orchards is 10 x 10 m. At each orchard, three fertilization treatments were evaluated: 1) Normal rate, which considers the demand of the trees to produce 20 ton ha^{-1}; 2) High rate (normal rate + 50 %); 3) Control (no fertilization). The nutrients supplied in the fertilizer mixture were N, P, K, Ca, Mg, Fe, Mn, Zn, and B, and were equally split in July and September, 2010. A factorial design with 20 tree-replications per treatment was used. At full bloom 20 panicles per tree were tagged. Fruit were harvested when they reached 1,800 thermal units (Base temperature = 10 °C; Osuna *et al*., 2007). At harvest, yield (kg/tree), fruit size (length, diameter, weight, and caliber), initial quality (external appearance, skin color, pulp firmness, pulp color, and total soluble solids content) were recorded. Another set of fruit was stored at ambient conditions (22 ± 2 ºC; 75 ± 10 % RH) until reaching the full ripeness stage. Shelf-life was evaluated periodically and quality was assessed again at full ripeness.

Length

Weight

External color

Firmness

Pulp color

Total soluble solids

RESULTS AND DISCUSSION

Yield and fruit size were affected by fertilization treatments (Table 1 and Figure 1). The normal dose resulted in bigger fruit when compared to high and control treatments.

Table 1. Effect of fertilization treatments on yield and fruit characteristics.

Treatment	Lenght (mm)	Diameter (mm)	Weight (g)	Caliber	Yield (Kg/Tree)
Normal Dose	103.8 a	75.2 a	373.7 a	12.6 c	155.2 a
High Dose	102.5 ab	75.1 a	358.0 b	13.3 b	139.9 b
Control	101.3 b	73.8 b	344.0 c	14.0 a	114.4 c

Means with different letter within columns are statistically different (Duncan P ≤ 0.05)

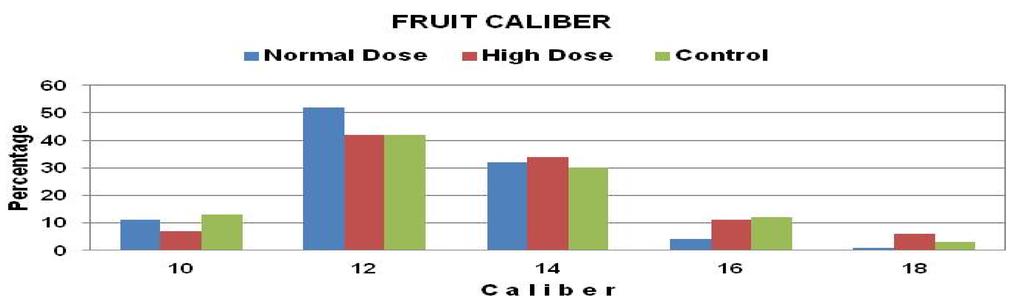
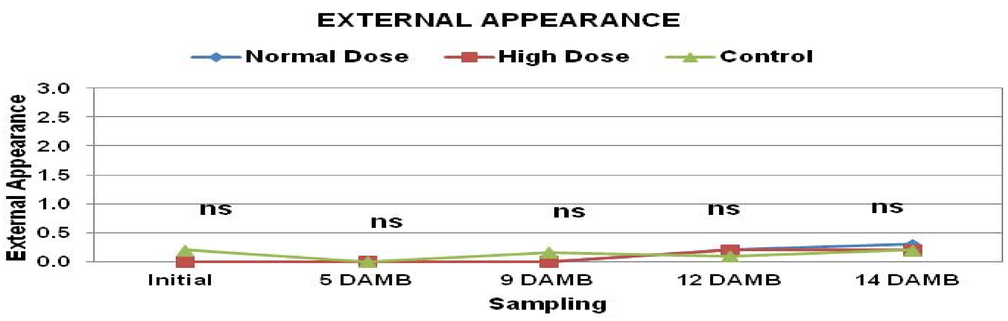


Figure 1. Effect of fertilization treatments on fruit caliber.

For initial quality, significant differences were detected for pulp firmness and total soluble solids content, while at full ripeness differences were detected for pulp color and total soluble solids content, all of them in favor of the normal dose. Fertilization treatments did not affect shelf-life (Figures 2, 3, 4, 5, and 6).



DAMB = Days at ambient (22 ± 2 ºC; 70 ± 10 % HR) ; ns = No significant * (P ≤ 0.05)

Figure 2. Effect of fertilization treatments on external appearance at harvest, during shelf life, and at full ripeness.

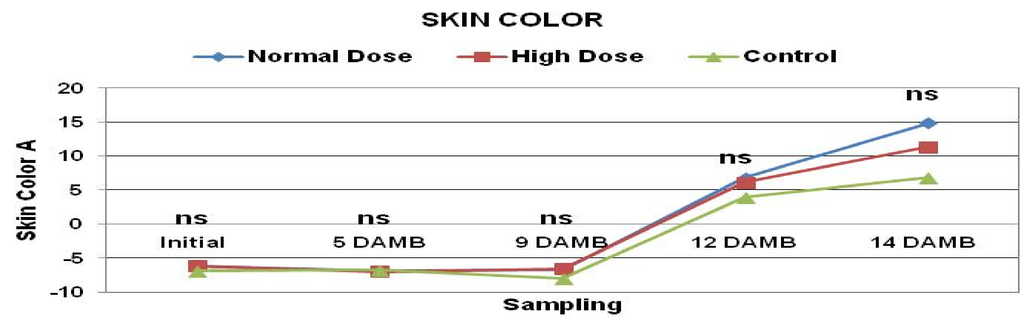


Figure 3. Effect of fertilization treatments on skin color at harvest, during shelf life, and at full ripeness.

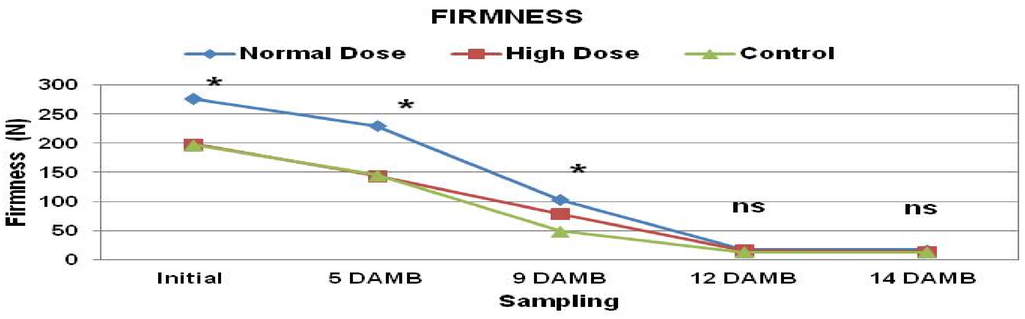


Figure 4. Effect of fertilization treatments on firmness at harvest, during shelf life, and at full ripeness.

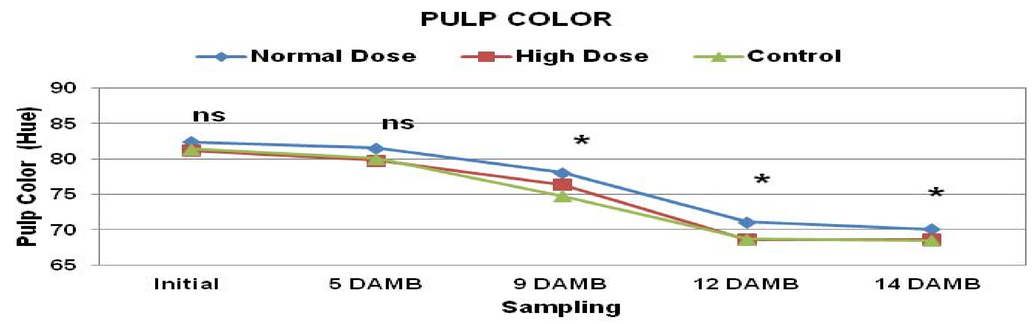


Figure 5. Effect of fertilization treatments on pulp color at harvest, during shelf life, and at full ripeness.

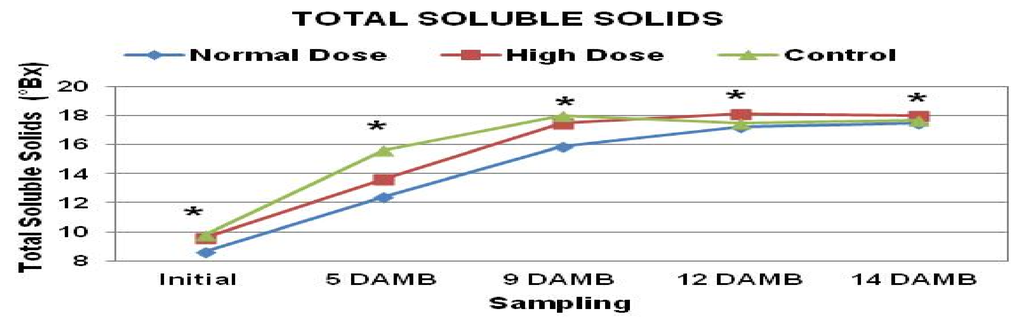


Figure 6. Effect of fertilization treatments on total soluble solids at harvest, during shelf life, and at full ripeness.

CONCLUSIONS

- Fertilization treatments affected yield and fruit size. The normal dose resulted in bigger fruit when compared to high dose and control treatments.
- For initial quality only firmness and total soluble solids were affected.
- At full ripeness, fertilization treatments affected pulp color, and total soluble solids.
- Fertilization treatments did not affect shelf-life.

REFERENCES

Osuna-García J.A., Ortega Z., D.A., Cabrera M., H. y Vázquez V., V. 2007. El uso de Unidades Calor como una tecnología viable para determinar momento óptimo de cosecha en el mango Ataulfo. Revista Ecotech Agosto/Septiembre p. 12-13.

Salazar-García, S. 2002. Nutrición de aguacate, principios y aplicaciones. Instituto Nacional de Investigaciones Forestales, Agrícolas y Pecuarias (INIFAP) en asociación con el Instituto de la Potasa y el Fósforo (INPOFOS). Querétaro, México. 1ra Impresión. 165 p.

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