Evaluation of Growth, Yield, Storage and Processing Characteristics of Selected Tomato (*Lycopersicon esculenta* Mill) Varieties

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A Thesis submitted in partial fulfilment for the Degree of Master of Science Degree in Horticulture in the Jomo Kenyatta University of Agriculture and Technology

2010

ABSTRACT

The study was carried out in order to determine growth and development, yield and storage characteristics of selected processing tomato varieties under similar growth and storage conditions and to determine the processing characteristics of the selected varieties with regard to product yield and quality. Seedlings of Roma VF, M82-1-8-VF and Cal-J tomato varieties were planted in pots laid out in a Completely Randomized Design (CRD), under external environment. Each treatment was replicated four times. The study was carried out between September 2008 and June 2009.

Data on plant height, number of main branches, number of leaves, number of fruits and average fruit weight was collected from each plant. Fresh fruits from each treatment were selected and stored at average room temperature of 25^{o}C and relative humidity 85 to 90% for a period of 31 days. The fruits were weighed at 5 day interval in order to assess the rate of deterioration of fresh fruits and pictures showing the physical condition of the fruits were taken on 16 and 31days of storage. The other fruits were processed into tomato paste, sauce and ketchup and data on pulp to fruit weight ratio, proportion of product to pulp weight, degrees Brix, pH, vitamin C content and protein content were collected. All data was subjected to Analysis of Variance (ANOVA) to determine whether the treatment effects were significant at 5%, 1% or 0.1%. Means were separated using Duncan‘s Multiple Range Test (DMRT). Correlation analysis among growth parameters and yield was also done to determine their relationships.

Six weeks after planting, Roma VF had significantly higher leaf area and leaf area index compared to Cal J and M82-1-8-VF. Roma VF also had significantly higher number of

leaves per plant and plant height than Cal J but had no significant differences with M82-1-8-VF. In number of main branches per plant, Roma VF was significantly higher than M82-1-8-VF but not significantly different from Cal J. Roma VF was significantly higher in all yield parameters than Cal J and M82-1-8-VF but was significantly lower in fruit weight than the other two varieties. M82-1-8-VF had significantly lower fruit weight loss compared to Cal J and Roma VF. There were no significant differences among all the varieties in the proportion of pulp to fruit weight, proportion of product to pulp volume (%) and degrees Brix (^{0}Brix) in all the three products. Cal J had significantly higher protein content in tomato sauce and tomato paste compared to the other two varieties while in tomato ketchup, it was Roma VF that had significantly higher protein content than the other two varieties. There were no significant differences in product pH and Vitamin C content among all the varieties.

Based on the results, it is concluded that Roma VF was a better variety in plant growth and fresh fruit yield compared to the other two varieties. Fresh fruits of M82-1-8-VF had better storage characteristics at 25^{0}C and relative humidity of 85 to 90 %. No variety was significantly better than the other in processing characteristics while in product quality characteristics, Cal J was a significantly better variety in protein content in tomato sauce and tomato paste than the other two varieties while Roma VF was a significantly better variety with regard to protein content in tomato ketchup. No variety was better than the other in product pH and Vitamin C content.

Roma VF is recommended as the best processing variety for farmers to cultivate due to its good growth characteristics as well as high fresh fruit yield. However, due to its poor fruit storage characteristics it is recommended that the fruits should be processed as soon as

they are ripe and not be kept for long periods. On the other hand, M82-1-8-VF is recommended as a dual purpose variety both for processing and for fresh market. This is because of its good storage characteristics that could allow farmers to keep it for a longer period before marketing as well as where processing capacity is very low.