

## Crop Yield and Determination of Kc Tomato Crop (*Lycopersicon esculentum* Mill.) in Passive and Heated Greenhouse on Northwest of Uruguay

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### Abstract

Northwest of Uruguay produces 68% of tomato in counter-season conditions using passive greenhouses. A two years trial evaluating ET<sub>0</sub>, K<sub>c</sub>, yield, quality and precocity of crop, in passive (TSC) and heated greenhouse (TCC) was carried out. Energy source for heated greenhouse was hot water from Guaraní Aquifer. Drip irrigation with fresh water was used. Hourly records of global solar radiation, wind speed, air temperature and humidity at 1.5m high, were obtained from automatic meteorological stations in both greenhouses and outdoor. Evapotranspiration was estimated by drainage lysimeters. Crop yield was weighted and calibrated at each harvest date. ET<sub>0</sub> was calculated using FAO-Penman-Monteith method. K<sub>c</sub> was calculated as the ratio between water consumption and ET<sub>0</sub>. ET<sub>0</sub> calculated within greenhouses was about 70% of the calculated outdoor. Although the temperatures in TCC were slightly above unheated greenhouse no significant differences were found. With regard to outdoor temperatures, minimum did not differ significantly from those recorded in the greenhouses; not the maximum, which were higher in the protected area in first crop cycles. In the second crop cycle minimum and maximum temperatures were consistently higher ( $P < 0.05$ ) in the TCC than in TSC. In the first crop cycle total yield was greater in TCC than in TSC ( $P < 0.05$ ) and showed precocity probably due to the lower number of hours below 10°C (critical level for flowering), early in the culture. Yield was greater in TCC in the first month of harvest. The evaluated period corresponds to flowering and fruiting, cultivar used is an indeterminate one. The K<sub>c</sub> obtained for the whole period were 1.06 for TSC and 1.25 for TCC varying between 0.4 and 1.2 for the first and between 0.8 and 1.5 for TCC.

**Keywords:** evapotranspiration, water requirements, protected crop