Role of Ethylene in Transition Stages During Tomato Fruit Growth and Development

By

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B.Sc. Agric. (Horticulture) Ain Shams Univ.,1991

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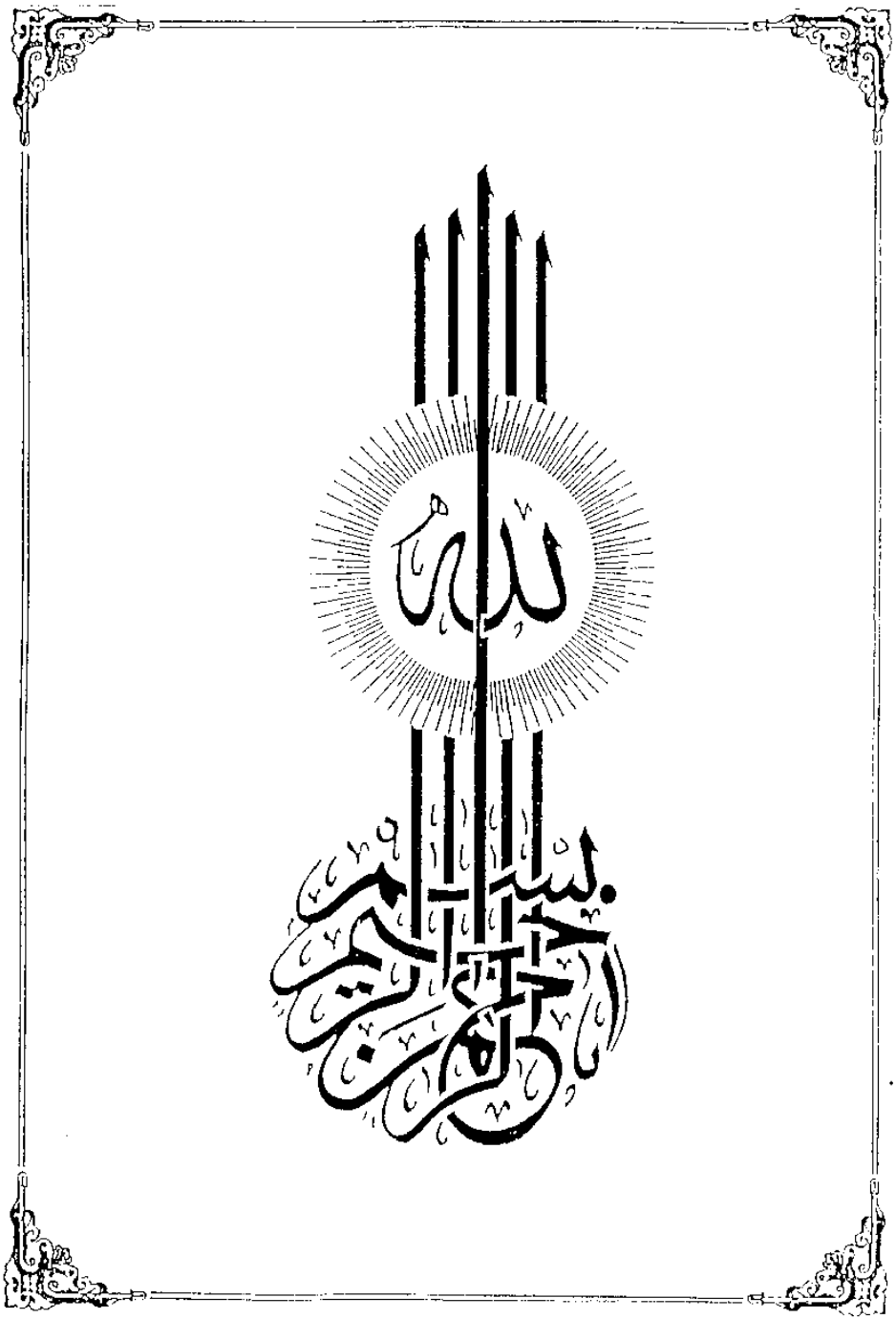

APPROVAL SHEET

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ABSTRACT

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This study was carried out in Shalakan experimental farm and Department of Horticulture, Faculty of Agriculture, Ain Shams University, during the two seasons of 1994 and 1995.

This work was designed to study the impact of ethylene on tomato fruit transition from cell division to cell enlargement using ethrel, as an ethylene releaser, and AOA (Aminooxy-acetic acid), as an inhibitor of ethylene biosynthesis, applied at fruit set. The subsequent impact of such treatments on fruit size, ripening acceleration or delay was monitored as well. On the other hand, the effect of inhibiting ethylene biosynthesis and action in detached mature-green tomato fruit on the transition from maturity to ripening was studied with determining the subsequent postharvest quality of such fruits. This was achieved by exposing tomato fruits to ethanol vapor (an inhibitor of ethylene biosynthesis and action) supplemented to fruit ambient through newly designed air-flow system. Ethrel was applied to the fruit to test fruit response to ethylene after ethanol exposure.

Data presented in this work indicated that treating attached tomato fruit with ethrel, at the stage of fruit set, prolonged the period of cell division and delayed fruit transition to cell

enlargement. In subsequent, fruit fresh weight and diameter were strongly increased with a pronounced delay in ripening. An opposite trend however, was obtained with AOA application. On the other hand, exposing detached mature-green tomato fruit to ethanol vapor remarkably delayed or blocked ripening based on the concentrations of used ethanol vapor. Such ripening inhibition or block was diminished when fruits moved to ethanol-free air. The subsequent, ethrel application enhanced fruit ripening and partially overcomed the inhibition caused previously by ethanol vapor application. This indicated that ethanol inhibition in terms of tomato fruit ripening is reversible. This work, therefore suggested that ethanol vapor application can be used instead of refrigeration to delay the ripening of chilling sensitive fruits such as tomato during exportation.

Key words : Tomato Fruit, Cell Division, Cell Enlargement, Ethrel, AOA, ACC, Maturity, Ripening, Ethanol.

C_2H_4 : Ethylene.
ACC : 1-Aminocyclopropane-1-carboxylic acid.
AOA : Aminooxy-acetic acid.
AVG : Aminoethoxyvinylglycine.
LAA : L-Ascorbic Acid (LAA).
TA : Titratable Acidity (% TA).
TSS : Total Soluble Solids (TSS).

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