

possible errors. It would therefore be desirable if the problem could be tackled using yet another procedure, for example cytospectrophotometry¹².

Zusammenfassung. (1) Bei den Seeigelarten *Paracentrotus* (PP) und *Arbacia* (AA) sowie dem Hybriden PA wurde die DNS-Synthese für die Stadien der Mesenchymbblastula und Gastrulation bestimmt. Als Grundlagen dienten: die an den Ganzkeimen gefundenen Werte der Inkorporation von H³-Thymidin, die Gesamtzahl der Kerne und, an Schnitten bestimmt, der Prozentsatz der replizierenden Kernstadien. Es ergab sich, dass die DNS-Synthese *pro Kern* in den genannten Stadien (18 h und 26–29 h) bei PP rund doppelt so gross ist wie bei AA. Einzelheiten siehe Tabelle. (2) Es werden DNS-Synthese

und Chromosomengrösse der beiden Arten verglichen und wird auf den Gegensatz zu den Befunden von FICQ und BRACHET¹¹ hingewiesen.

F. BALTZER, P. TARDENT and P. S. CHEN

Zoologisches Institut der Universität Bern and
Zoologisches Institut der Universität Zürich
(Switzerland), 5th June 1967.

¹² These investigations were generously supported by the Schweizerische Nationalfonds zur Förderung der wissenschaftlichen Forschung and the Stiftung Dr. J. de Giacomini der SNG. We are grateful to Miss AUBERLE for reading the manuscript.

Ripening Tomatoes: C¹⁴O₂ Uptake by Green Tomato Fruit

The tomato fruit receives sugars and phosphates from the leaves of the plant (McCOLLUM¹). Data reported by DALAL² showed that the tomato fruit contains sufficient chlorophyll to synthesize much of its carbohydrate supply. Studies conducted by these investigators showed that when tomatoes were treated with light, the CO₂ given off by the green fruit was less than from dark treated fruit.

To test the hypothesis that the tomato fruit were using CO₂ a set of samples was prepared and treated with C¹⁴O₂. Uniformly mature green tomato fruits were placed in a quart size ripening chamber fitted with surgical tubing to facilitate the injection of the radioactive gas with a hypodermic needle. The C¹⁴O₂ was generated from barium carbonate by reaction with lactic acid in a mercury filled U-tube. Two ml of the C¹⁴O₂ was injected into each of the sealed ripening chambers. Twelve of these chambers were prepared. Half of them were covered with aluminum foil for the dark treatment and the other half placed under a light source of 100 foot candles. After 8 h of exposure the ripening chambers were attached to respirometers and air passed over the fruit. Samples were preserved in ethyl alcohol after 8 h, 2 days, 5 days, 10 days, and 14 days of ripening. The samples were separated on ion ex-

change columns into a neutral, anion, and cation fractions. The radioactivity of the fractions was determined on a liquid scintillation counter.

The Figure shows the counts/min of radiation given off by the 3 fractions separated from tomato fruit treated 8 h with C¹⁴O₂ in light and dark. All 3 fractions contained considerable radioactive label. However, only the neutral fraction showed significant differences between treatments. In this case those fruit treated in the light showed a much higher label.

The uptake of carbon-14 dioxide into the cation and anion fractions of the fruit was equal in light and dark. The amount of label in the cation fraction essentially remained constant, whereas, the carbon 14 label in the anion fraction increased somewhat.

This information lends itself to speculative interpretation on the basis of the mechanisms of photosynthesis, metabolism, and fruit ripening. First it makes the fruit much more of an independent unit, and the possibility that a detached tomato fruit could be kept alive and growing seems apparent. The green tomato fruit, at least in the first 8 h of ripening, is capable of photosynthesis.

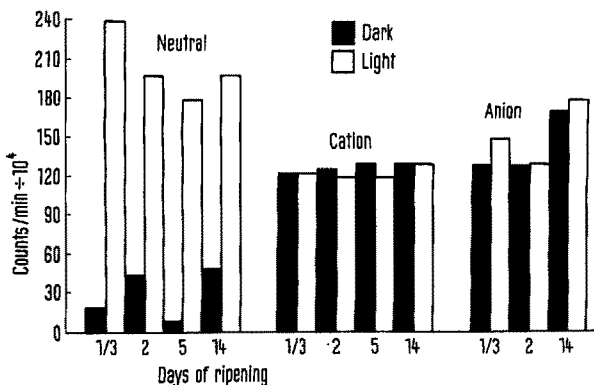
Further, this study shows that the tomato is actively incorporating carbon dioxide into its components by dark fixation. The active synthesis of amino acids occurs after the tomato is detached from the plant.

The results of this experiment also show that information received from respiration studies that measure either carbon dioxide evolved or oxygen uptake of green tomato fruit could be misleading depending on the experimental conditions.

Zusammenfassung. Die neutrale Fraktion grüner Tomatenfrüchte zeigt nach Fütterung mit C¹⁴O₂ im Licht eine höhere Radioaktivität als nach der Fütterung im Dunkeln. Die grüne Tomatenfrucht ist zur Photosynthese befähigt.

A. A. BOE and D. K. SALUNKHE

Utah State University, Logan (Utah USA),
20th March 1967.



Radioactivity of the neutral, cation and anion fractions of tomato fruit treated with C¹⁴O₂ for 1/3 day prior to ripening.

¹ J. P. McCOLLUM, Proc. Am. Soc. hort. Sci 75, 611 (1960).

² K. B. DALAL, D. K. SALUNKHE, A. A. BOE and L. E. OLSON, Fd Res. 30, 504 (1965).