types of fragments, will permit a better characterization of the process of leaf determination.

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Mechanism of the 'Climacteric' Rise in Respiration in Banana Fruits

DURING the past 40 years various theories have been advanced to explain the large rise in rate of respiration, that is, the 'climacteric' rise, which accompanies ripening in certain fruits[1–8]; but no hypothesis has yet been accepted as proved.

We have used specific enzymatic methods[9–11] to determine the changes during the ripening of bananas (variety Lacatan) in the contents of fructose-6-phosphate, glucose-6-phosphate, fructose-1,6-diphosphate, phosphoenolpyruvate and malate. The changes in citrate and α-keto-acids (pyruvate, α-ketoglutarate and oxaloacetate) were estimated by conventional chemical methods. Associated with the 4- to 5-fold increase in rate of output of carbon dioxide during ripening, there was a 20-fold increase in the content of fructose diphosphate (Figs. 1 and 2) and increases of some 3- to 6-fold in the amounts of the α-keto-acids and of malate.

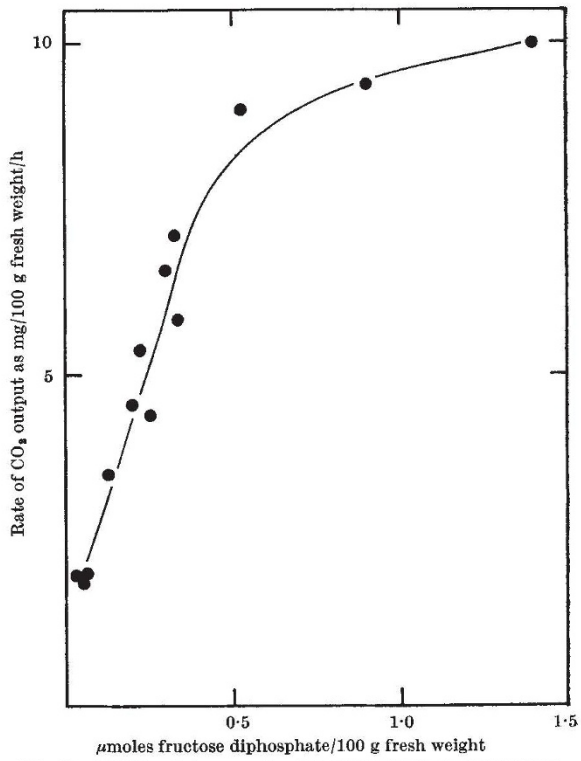

Fig. 2. Relation between rate of output of carbon dioxide and content of fructose diphosphate

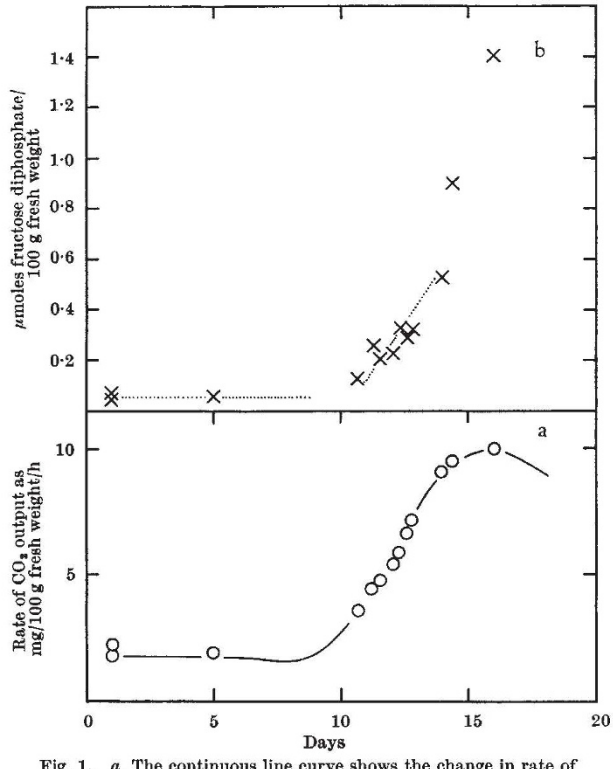

Fig. 1. *a*, The continuous line curve shows the change in rate of output of carbon dioxide of a single finger ripened at 18° C. The circles show the rates of respiration of other single fingers taken for analysis at different stages of ripeness. The circles are plotted with their respective rates on the continuous line so that the time scale for them is arbitrary. *b*, Changes in content of fructose diphosphate of the single bananas of which the rates of output of carbon dioxide are shown in Fig. 1*a*. The time-scale is that of Fig. 1*a*

The results support the view that the increase in rate of respiration during the 'climacteric' rise is due to the increase in the concentration of fructose diphosphate. Since the contents of glucose-6-phosphate and of fructose-6-phosphate were increased by only 2- to 3-fold, the rise in fructose diphosphate may be related to an activation of phosphofructokinase as suggested for animal muscle[12].

Treating bananas with ethylene induced changes of the same pattern as those mentioned here.

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