POLYETHYLENE BAGS HELP TO CONTROL BANANA RIPENING

By M.R. Baqar and J. Malai*

The Papua New Guinea University of Technology, Lae

INTRODUCTION

Bananas are grown all year round in Papua New Guinea and there is a heavy demand for them. Unfortunately, ripe bananas do not keep well and so quite a large proportion of the crop is lost each year during transport and marketing.

One way to avoid this is to ship and market the fruit while it is still green. This is made difficult by the fact that once a few bananas in a load start to ripen, the others quickly follow. This is because the ripening bananas give off a gas called ethylene which triggers off ripening in the others.

Ripening can be slowed down by storing bananas under refrigeration or in air containing more carbon dioxide and less oxygen than normal.

Refrigeration is expensive and difficult to use in Papua New Guinea where bananas are not grown on a commercial scale. The proportion of oxygen and carbon dioxide in the air around the bananas can easily be changed, however, by putting them in a polyethylene bag. As the fruit respires (breathes) it uses up the oxygen in the bag and produces carbon dioxide.

The useful effect of putting the fruit in these bags was shown in 1970 by K.J. Scott and other workers in Australia. They also showed that if a chemical such as potassium permanganate is used to absorb any ethylene produced in the bag, ripening is delayed even more. Later experiments showed that temperature also has an effect on the process. For example, a decrease in temperature from 30°C to 20°C (without absorbent) can extend the storage period in the bags from 12 days to more than 25 days.

This article reports on an experiment to find out whether the polyethylene bag method can be used successfully in Papua New Guinea.

MATERIALS AND METHODS

Bunches of full green bananas from the Food Marketing Corporation were divided into hands of about 15 fruits each and were then dipped in a fungicide solution (0.1 percent benomyl). They were allowed

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* *Present Address: N.G.I. Trading, P.O. Box 92, Lae.*

to drain before being divided between the following treatments:

1. Storage in ordinary air (control);

2. Storage in sealed polyethylene bags* 17 cm x 25 cm made from film 0.04 mm thick;

3. Storage as in Treatment 2 together with a round vermiculite block, approximately 2 cm thick and 16 cm in diameter, dipped in a concentrated solution of potassium permanganate. A piece of newspaper was placed in between the vermiculite block and the bananas to prevent the solution from staining the fruit.

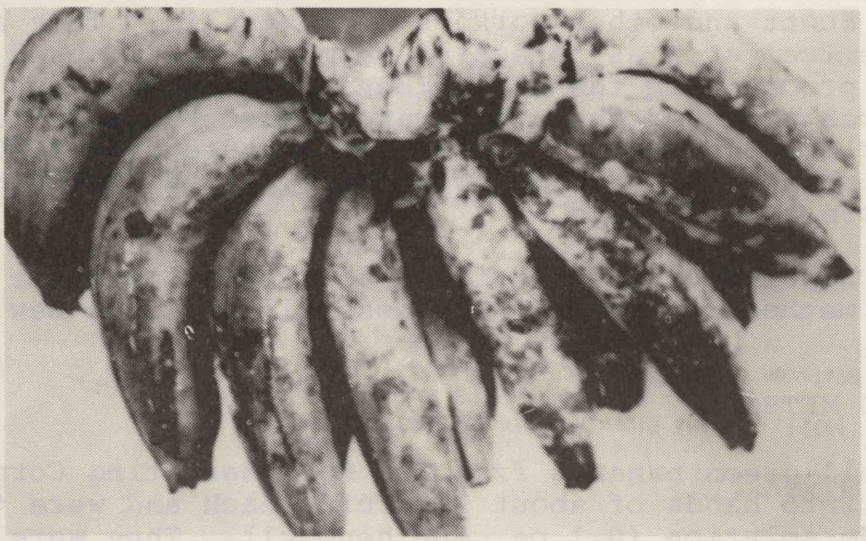
   After packing, the bags were sealed with tape and stored at room temperature for further observation.

RESULTS AND DISCUSSION

After eight to nine days at room temperature, the fruit stored in ordinary air had all ripened but the fruit in the sealed polyethylene bags was still hard and green. After 20 days storage, the fruit in Treatment 3 with the blocks of potassium permanganate was much firmer than that in Treatment 2 although neither sample had ripened. The difference between these two treatments was more obvious after 30 days when the fruits in ordinary air had become very rotten and their skins had turned black.

After the bags were opened, the fruit from the polyethylene bags ripened well and tasted quite normal.

This method of delaying the ripening of bananas has great potential for Papua New Guinea where the cost of refrigeration is too high. The technique also offers scope for delaying the ripening of other tropical fruits such as pineapples and pawpaws.



Mould growing on bananas which were put in the polyethylene bag without being first dipped in fungicide solution.

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* *Available from ICI New Guinea Pty. Ltd., Lae.*

The use of an effective fungicide, however, is essential for reducing mould growth which is encouraged by the high humidity which builds up inside the polyethylene bag. Bananas should be dipped in either a 0.1% solution of benomyl or a solution of thiobendazole (TBZ) at 0.15% w/v. It is important to get advice on making up these solutions correctly.

ACKNOWLEDGEMENT

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FURTHER READING

Burden, O.J. (1969). Control of ripe fruits rots of bananas. *Australian Journal of Experimental Agriculture and Animal Husbandry* 9:655-658.

Scott, K.J., McGlasson, W.B. and Roberts, E.A. (1970). Potassium permanganate as an ethylene absorbent in polyethylene bags to delay ripening of bananas during storage. *Australian Journal of Experimental Agriculture and Animal Husbandry* 10:237-240.

Scott, K.J. and Soertini Gandanegara (1972). Effect of temperature on the storage life of bananas held in polyethylene bags with ethylene absorbent. *Tropical Agriculture (Trinidad)* 51:23-26.

Smock, R.M. (1967). Methods of storing bananas. *Philippine Agriculturist* 51:501-517.

EDITOR'S NOTE

Mr Ken Newton, Chief Horticulturalist, D.P.I. has supplied the following additional information on this subject.

At a domestic level in Papua New Guinea, small polyethylene bags can be used successfully to prolong storage of hands of bananas cut from a bunch, or large bags can be used for whole bunches. In most cases in this country people will not be particularly interested in keeping the bananas green for very long periods of time. This is more suitable where the fruit is to be transported over a long distance as when it is exported to temperate countries. At present, this is not the case in Papua New Guinea.

However, it is important that anyone using this technique to keep bananas green takes the following simple precautions to ensure good quality fruit:

1. Only fully filled, mature, green bananas should be selected for storage (or for picking for that matter).

2. Picked bunches should be handled carefully to avoid bruising and should be stored at all times in the coolest conditions possible and in the shade.

3. If fruit fly attack is present the fungicide dipping should include an insecticide such as 0.05% fenthion (if available) or 0.05% dimethoate.

4. Storage after bagging the dry fruit should be at the coolest temperature available and bags should not be stacked deeply.

5. Fruit should be removed from the bags to allow yellowing as soon as it starts to soften.

No amount of post harvest treatment can correct damage which is done while the fruit is growing or that such as bruising during picking or transport. However, controlled storage and ripening can reduce losses and is to be recommended.