Whole-cluster Bagging Reduces Skin Freckles on ‘Tainung No. 2’ Papaya

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Introduction

Freckle-like blemishes affecting the appearance on papaya fruits caused lower marketable prices have much attention worldwide. The occurrence of skin freckles on papaya fruits happens throughout the year especially in cold season in Taiwan. We investigated the effects of 2 kinds of bagging materials, Tyvek and non-woven materials, as a whole-cluster bagging to reduce the incidence of skin freckles and improve the fruit appearance on papaya fruits in southern Taiwan.

Material and Methods

Nine-month-old 'Tainung No. 2' papaya trees in a commercial orchard in the southern Taiwan were conducted to examine the effects on blemish by bagging through January to May 2006. The plants’ whole-cluster fruits were bagged with Tyvek or 100g.cm^{-2} base weights of non-woven materials. Plants treated without bagging were kept as a control. Two fruits with 5-10% skin yellowing were harvested per tree every 2 weeks. Freckle index (FI) was scored fruit surface area with freckles every 20% for 1 scale. There were 3 replications per treatment in a CRD design. The data expressed as FI were analyzed using SAS ANOVA.

Results

The incidence of skin freckle was occurred and gradual decreased in all assessment periods. Bagging fruits more than 2 month with Tyvek and non-woven-material decreased FI but it couldn’t completely inhibit the incidence of freckle (Fig. 1). Fruit bagging with Tyvek and non-woven-material appeared to have significantly higher *L* and chroma in fruit color 2 month after bagging, both accounted for the good visual quality (Fig. 2). Fruit weight, total soluble solids content and Hue angle of fruit color were not affected by bagging with Tyvek, but total soluble solid content in assessment date of 61 and 105 with non-woven-material. We infer that higher average temperature around the non-woven-material might raise the respiration rate of fruits. It appears to cause the lower total soluble solid, but the effects warrants further investigation.

Conclusion

Bagging whole-cluster fruit by Tyvek significantly reduced the skin freckles, improving appearance on papaya fruits. The duration of bagging was needed 61 days before harvesting especially during cold season in southern Taiwan. Furthermore, the comparison with the method of bagging every single fruit, the whole cluster bagging offered more feasible practices to produce less blemish fruits in papaya industry (Fig. 3).

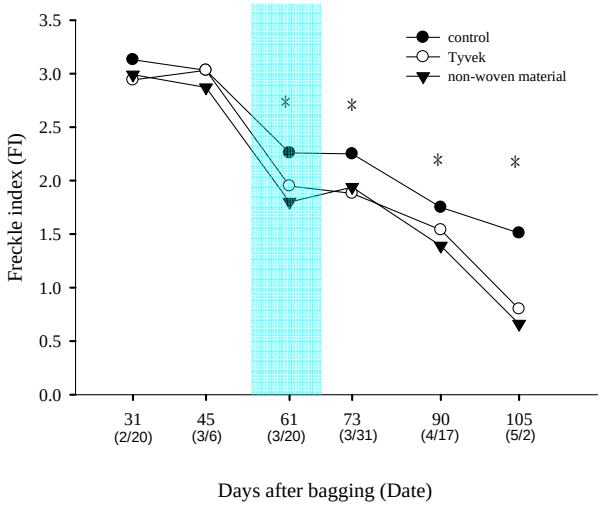

Fig. 1. Effects of bagging whole-cluster with Tyvek or non-woven material bags on freckle index (FI) on papaya fruits ‘Tainung No. 2’ in cold season. Each value represents the mean of 18 replicates. The asterisk indicates statistical significance ($P \leqq 0.05$). Initiating treatment day on 6 Jan. 2006.

Fig. 2. Effects of non-bagging (CK-left), enclosing whole-cluster with Tyvek (middle) or non-woven material (right) on skin freckle on abaxial portion of papaya fruits of ‘Tainung No. 2’ in winter (73 days after bagging).

Fig. 3. Whole-cluster bagging with tyvek in the commercial field.

Literature Cited

Eloisa, M., Q. Reyes, and R. E. Paull. 1994. Skin freckles on solo papaya fruit. Scientia Horticulturae. 58:31-39.

Y. J., Lin and Lin H.L. 2007. Seasonal fluctuation of fruit quality, mineral nutrient, and skin freckle of ‘Tainung No.2’ papaya fruits (*Carica papay.* L.). Master thesis, Univ. of Chung-Hsing Taichung.