DESIGN, DEVELOPMENT AND EVALUATION OF FRUIT BAGGING MACHINE FOR COMMERCIAL GUAVA CULTIVATION IN SRI LANKA

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Fruit bagging is a pest management strategy used abundantly in fruit cultivation. Pest damages in Guava (*Psidium guajava*) fruits are quite frequent leading to qualitative and quantitative yield losses. Newspaper bags were traditionally used for covering guava fruits. However, it is a labour-intensive method and causes degradation of fruit quality. Therefore, the research objectives were to design an appropriate Guava fruit bagging machine and to investigate a suitable bag. The bagging machine was comprised with a bag holding frame, wire winding bobbin and binding wire cutter which was used to hold the bags until it was applied to the fruits binding of bags and a cutter to cut the binding wire after applied to the bag. Furthermore, a pole was used to apply the bags to the fruits which were far from the operator. The bags were produced using white polythene (15 micron) with holes in the underneath which were covered with mosquito nets. The material cost for the production was only 2500.00 LKR. Evaluation of the machine was performed at two different height levels (up to 1.5 m and above 1.5 m) for both news paper bags and designed bagging machine. Actual capacity and efficiency of mechanical method were 28 $bagsh^{-1}$ and 65% up to 1.5 m and 46 $bagsh^{-1}$ and 57.7% above 1.5 m, respectively. Actual bagging capacity of news paper bag method was 56 $bagsh^{-1}$ up to 1.5 m and 28 $bagsh^{-1}$ above 1.5 m. Fruit falling ratio, plant damages and number of low-quality fruits were significantly lower in mechanical method ($p < 0.05$). It can be concluded that the newly developed bagging machine is more efficient for bagging Guava fruits above 1.5 m height and the selected bags are suitable for protecting guava fruits from pests and adverse weather conditions prevail in the field.

Keywords: Guava fruit bagging machine, Newspaper bags, Quantitative yield losses of Guava fruit