

*A STUDY ON DESIGN FACTORS OF A TREE
SHAKER FOR FRUIT HARVESTING*

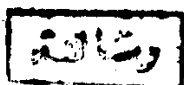
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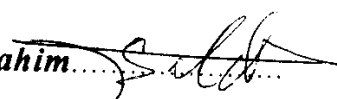
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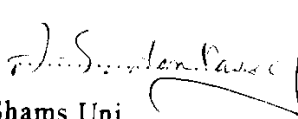
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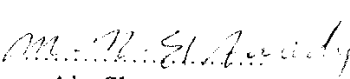
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ABSTRACT

Al Salloum Wael Selim. A study on design factors of a tree shaker for fruit harvesting. Unpublished Master of Science, University of Ain Shams, Faculty of Agriculture, Department of Agricultural Mechanization, 1996.

This investigation is a study on design factors of a tree shaker for fruit harvesting, including:

1. Determination of some physical properties of olive branches (Young' modulus and damping factor). These basic informations were utilized to forecast shaker operating parameters.
2. Detachment force was 6-7 N without abscission spraying. Minimum values of detachment force varied between 4 and 0 N with increasing ethrel concentration from 500 to 2000 ppm, 4.5 and 3N with increasing ascorbic acid concentration from 500 to 2000 ppm, and varied between 5 and 4 N with increasing salicylic acid concentration from 0.25 to 0.75%.
3. The treatment for easiest fruit-removal with low leaves dropping was spraying the olive trees with ethrel concentration of 500 ppm.
4. A tree shaker was designed to be driven by pedal to benefit from human energy. Parameters investigated to evaluate the machine performance according to harvesting efficiency included:
 - a) Shaking frequency (200 to 400 r.p.m).
 - b) Shaking stroke (6 to 15 cm).
 - c) Shaking duration time (45 to 75 sec).
 - d) Clamp position.
5. The energy required to give 90% harvesting efficiency was 0.62 kW, at 400 r.p.m frequency, 15 cm stroke, and 75 sec shaking duration without chemical abscission.
6. Economical study indicated that the mechanical harvesting cost by utilizing of pedal power is 44% of manual harvesting cost.

Key words

Abcission-promoting substances - Detachment force - Mechanical harvesting - Olive tree harvesting - Removal force - Shaking frequency- Shaking stroke - Tree shaker .

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