Development and Evaluation of a Grader for Round Fruits and Vegetables

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ABSTRACT

Grading of agricultural produce especially the fruits and vegetables has become a perquisite of trading across borders. In India mostly fruit growers grade the fruits manually. Human operations may be inconsistent, less efficient and time consuming and costly during shortage of labour in peak seasons. Hence, a low cost grader suitable for round fruits and vegetables based on the principle of centrifugal force and gravitational force was developed. The grader was evaluated for lemon, sweet orange and onion. Average sphericity of lemon, sweet orange and onion were 0.99, 0.97 and 0.86 respectively. The developed grader was tested and evaluated at different feed rates. The grader was also evaluated at different speeds of the rotary disc like 10, 30, 50 and 70 rpm. Efficiency and capacity of the grader was optimized with respect to feed rate and disc speed. Optimum speed of the rotary disc during highest separation efficiencies was 30 rpm for all fruits and vegetables tested. Overall efficiency of grader for lemon, sweet orange and onion were 86%, 75% and 70% respectively. Maximum grading efficiency was obtained for lemon because of its more sphericity.

Key words*: Feed rate,Geometric mean diameter, Grading efficiency, Rotary disc, Sphericity, Separation efficiency.*