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MULTI-OBJECTIVE OPTIMIZATION MODEL TO SUPPORT FRESHLY CUT VEGETABLE PROCESSING DECISIONS

Thinendra Wijesuriya[1*], Subodha Dharmapriya[2], Asela Kulathunga[2], Priyadarshani Premarathne[3] and Sajeevika Daundasekara[4]

[1]Department of Mathematics, Faculty of Science, University of Peradeniya, Sri Lanka
[2]Department of Manufacturing and Industrial Engineering, Faculty of Engineering, University of Peradeniya, Sri Lanka
[3]Department of Sociology, Faculty of Arts, University of Peradeniya, Sri Lanka
[4]Department of Food Science and Technology, Faculty of Agriculture, University of Peradeniya, Sri Lanka
[*]thinendraw@sci.pdn.ac.lk

This study focused on optimizing fresh-cut vegetable processing decisions using a multi-objective optimization approach. It aimed to minimize processing times and costs by selecting alternative processes at different stages of production. Limited attention has been given to optimizing the fresh-cut vegetable process, particularly in applying multi-objective optimization approaches to support processing decisions. The fresh-cut vegetable process consists of several stages, including peeling, cutting, washing, and packing, with alternative methods in each stage, which are different in terms of their operations cost and times. The problem was formulated as an integer bi-objective combinatorial optimization model, optimizing total processing time and cost. Since the problem was NP-hard type, discrete non-dominating sorting genetic algorithm-II (NSGA-II) and discrete non-dominated sorting particle swarm algorithm (NPSO) have been employed to investigate their complementary algorithmic performance. Both primary and secondary data have been used in estimating the process parameters of each processing alternative. NPSO demonstrated a more robust convergence performance in terms of computational time compared to NSGA-II, while the latter algorithm produced a greater number of solutions on the Pareto front than the former. Future studies may focus on evaluating the performance of other alternative algorithms on comprehensive fresh-cut vegetable processing systems.

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