

Benefit of modified atmosphere packaging on the overall environmental impact of packed strawberries

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Abstract

Life cycle assessment (LCA) was used to address the environmental benefit of using Equilibrium Modified Atmosphere Packaging (EMAP) at ambient temperature as an alternative to the use of conventional macro perforated packaging (MPP) and refrigeration in the strawberries' farm to fork system. In this purpose, the environmental impact of strawberries' storage conditions at household in macro perforated packaging put in ambient or cold condition were compared with that of EMAP used at ambient temperature. LCA was applied from production till consumer level taking into account food losses at each step as well as packaging production, disposal and usage benefit, if any, i.e. food losses reduction. Our findings confirmed that for highly perishable product, the production step is the main driver of environmental impacts. As such, the technology of preservation that permits to minimize losses leads to the lowest environmental impact in spite of its direct impacts. For short storage at household, well optimized EMAP system is a valuable alternative to MPP for both low and ambient temperatures while for long storage duration (3d), EMAP at ambient temperature could not substitute for MPP at refrigeration temperature. Finally, sensitivity analysis of results to the food losses parameters at both supermarket and household has revealed that conclusions regarding the best packaging strategy are highly sensitive to these parameters. The main conclusions of this study are that (i) EMAP could be, in several conditions, a valuable option compared to standard packaging strategies, (ii) it is needed to inform consumers on packaging functions in order to preserve EMAP benefit until consumption and (iii) better knowledge of food losses among the supply chain is needed to assess environmental impacts more precisely.