

## Accepted Manuscript

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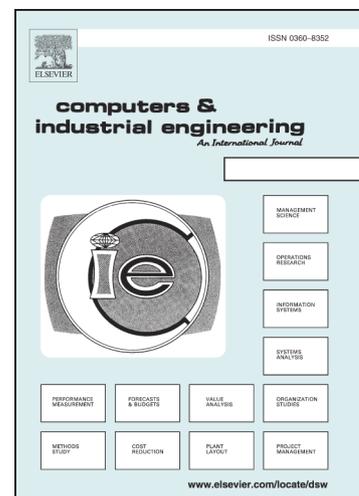
PII: S0360-8352(17)30290-5  
DOI: <http://dx.doi.org/10.1016/j.cie.2017.06.038>  
Reference: CAIE 4807

To appear in: *Computers & Industrial Engineering*

Received Date: 16 June 2016  
Accepted Date: 30 June 2017

Please cite this article as: Hou, X., Haijema, R., Liu, D., Display, disposal, and order policies for fresh produce with a back storage at a wholesale market, *Computers & Industrial Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.cie.2017.06.038>

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# Display, disposal, and order policies for fresh produce with a back storage at a wholesale market.

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## Abstract

Traditional wholesalers of fresh produce in China display and sell all the products that they have brought to the wholesale market every day. Products left by the end of the day are deteriorated due to high temperatures at which products are displayed, and are thus sold at a low price or disposed. Modern wholesalers can preserve product quality and carry over unsold products to the next day, by using a back storage with cooling facilities at or close to the market site. Modern wholesalers thus face a multi-period decisions problem, with decision related to amongst other the number of products to keep behind in the cooled back storage, and the number of products to display in the open air from each quality class. During a market day these decision can be revised. Hence the decision problem is not only a multi-stage problem because of carrying over products from one day to the next, but also because of intra-day periods at which the display decision is updated. The price decreases over the day. So does the demand, and the demand depends on the quality of the displayed products. Products that are of (too) low quality are sold/disposed to a secondary market. We modeled the inventory control problem as a Markov decision process model that maximizes the profit of the wholesaler. Based on the model and numerical result for a realistic setting, we analyze the structure of the optimal policies and derive heuristics for practical use. The heuristic methods perform close to the optimal policy, resulting in managerial insights to practitioners.

*Keywords:* inventory management, deterioration, back storage, display policy, wholesale market, Markov decision problem

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