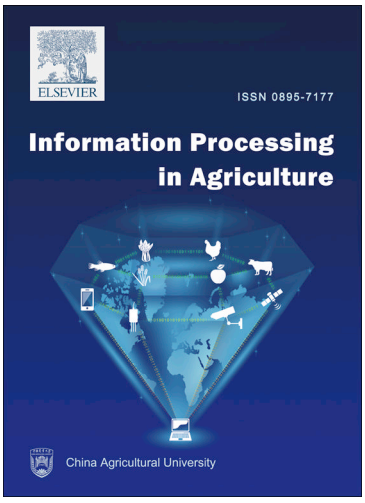

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The risk management of perishable supply chain based on coloured Petri Net modeling

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ABSTRACT

The supply chain of perishable products is a combination of information organization, sharing and integration. The information modeling of supply chain is constructed to abstract key quality information including environment information, processing procedures and product quality assessments based on principle of quality safety factors and property of decay rate. The coloured Petri Net is applied for integrated description of independent information classification, aiming at risk identification and risk management framework. Well, according to the quality deterioration tendency, risk grades management and decision-making system are established. Practically, the circulation system of aquatic products is studied in this paper for full processing description. The simulation experiments are manipulated on environmental information, processing information and product quality information by the coloured Petri Net. Eventually, the conclusion turns out precisely as such that the coloured Petri Net conclusive for information classification and information transmission while integrated information management is available of efficient risk identification and decision-making system in supply chain of perishable products. Meanwhile, the validity of evaluating management and shelf-life estimation of perishable products are technically feasible.

Keywords:

Petri nets; supply chain; risk management; simulation technique; perishable product

1. Introduction

Perishable products are easily affected by environmental factors and becomes decayed in the circulation and transmission process of supply chain [1]. Environment data collection is particularly significant for the quality safety assessments on the basis of relevant information interactions. Ultimately, a spatial network structure with time series is built up through correlation between internal information and external information, which is characterized by temporal and spatial variation of supply chain. Environmental data loss and data fragments are recognized as a common worldwide issue leading to catastrophic quality safety accidents and enormous economic losses [2–4]. Environmental attribute parameter collection, including information medium, time-temperature data and moisture, is not only a practical foundation for quality condition analysis, but also a crucial approach to effectiveness and safety in supply chain. The globalized circulation is a distinctive nature of the supply chain, in which effective conformity of supply