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COLD CHAIN INVENTORY OPTIMIZATION MODEL OF THREE-LEVEL FRESH PRODUCTS BASED ON CARBON LABELING SYSTEM

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Abstract

Carbon labeling is a reasonable quantitative tool, which is an important thrust for enterprises to tap the potential of emission reduction. It can cultivate consumers' low-carbon consumption awareness and consumption habits, and also an important means to promote the green and low-carbon transformation of traditional high-carbon industrial chain. Based on the cold chain composed of upstream suppliers, distribution centers with logistics and product value-added services and downstream retailers, this paper considers the carbon emission reduction investment of distribution centers and implements carbon labeling system. The carbon footprint and sales price of fresh products are introduced to describe the demand of low-carbon preference consumer market, and the deterioration rate of fresh products is described by Weibull distribution function. The inventory optimization models of each participant in the cold chain of fresh products are constructed and simulated. Combined with the survey data, the genetic algorithm is used to search the optimal decision variables, and the sensitivity of the deterioration rate of fresh products and the carbon footprint sensitivity coefficient is analyzed. The research results show that the carbon label attached to the distribution center for carbon emission reduction can effectively reduce the carbon emission in the cold chain inventory link and optimize the inventory of each node in the supply chain. The established mathematical model and the research conclusions can provide a useful reference for the practice of energy conservation and emission reduction of the cold chain inventory optimization of fresh products.

Key words: carbon emission reduction, carbon label, fresh cold chain, inventory optimization

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