

## Understanding Retail Benefits Trade-offs of Dynamic Expiration Dates (DED) Associated with Food Waste

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**Abstract :** Dynamic expiration dates (DEDs) play an essential role in reducing food waste in the context of the sustainable cold chain and food system. However, it is unknown for the trades-off in retail benefits when setting an expiration date on fresh food products. This study aims to develop a multi-dimensional decision-making model that integrates DEDs with food waste based on wireless sensor network technology. The model considers the initial quality of fresh food and the change rate of food quality with the storage temperature as cross-independent variables to identify the potential impacts of food waste in retail by applying a DEDs system. The results show that retail benefits from the DEDs system depend on each scenario despite its advanced technology. In the DEDs, the storage temperature of the retail shelf leads to the food waste rate, followed by the change rate of food quality and the initial quality of food products. We found that the DEDs system could reduce food waste when food products are stored at lower temperature areas. Besides, the potential of food savings in an extended replenishment cycle is significantly more advantageous than the fixed expiration dates (FEDs). On the other hand, the information-sharing approach of the DEDs system is relatively limited in improving sustainable assessment performance of food waste in retail and even misleads consumers' choices. The research provides a comprehensive understanding to support the techno-economic choice of the DEDs associated with food waste in retail.

**Keywords :** dynamic expiry dates (DEDs), food waste, retail benefits, fixed expiration dates (FEDs)

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