

## **Fighting Shelfflation: Reduction of Food Loss at Consumer Level by Chemometric Characterization and Predictive Modelling of Organoleptic Quality Loss Throughout the Food Distribution System.**

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Almost 40% of all the food produced in Canada become food lost and waste (FLW). 60% of this is attributed to the consumer. Almost half of FLW by consumers is fruit and vegetables. Recently, a decrease of the shelf life of produces is being reported by consumers, to the point of being coined "shelfflation" in the media.

The quality of fruits and vegetables is never better than at the previous stage of its journey: the actions upstream have consequences on all the stages downstream. In this context, it is important to study the "propagation" of this degradation rather than putting the blame of the end user.

The journey of food through the value chain and the local, national and international distribution network is complex. It includes multiple interrelated stakeholders, covers great distances to reach remote and indigenous communities, suffer from large temperature differences (-30 °C to +35 °C for ground transport in Canada alone). Fruits and vegetables are greatly affected by those conditions. Several solutions aimed at limiting FLW are implemented throughout the value chain, but they have limited effect of the end-user shelf life as they are primarily aimed at increasing profitability for the actor implementing them. We therefore propose a global approach, aiming to quantify the impacts of the various actions throughout the food system in order to reduce FLW.

Numerous research articles on a number of fruits and vegetables report how hyperspectral imaging (HSI) technology can predict organoleptic quality through the use of chemometrics algorithms. This allows the development of methods aimed at the food industry. Using HIS and statistical algorithm (AI), we are able to describe, diagnose, predict the quality of the produces and prescribe appropriate actions. Representative examples of such approach are presented.