





THE FRUITS AND VEGETABLES INDUSTRY SERIES

23 May 2022

Session 3 – Technology innovations for fruit and vegetables quality control















Digitalization of the supply chain of fruit and vegetables

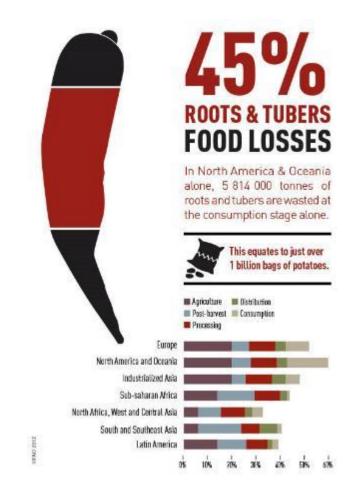


Ph. D. Alexandru Luca
Assistant professor
Department of Food Science
Aarhus University, Denmark
luca@food.au.dk



Food waste



















Source: FAO 2012

Shelf life monitoring: challenges

First in, first out (FIFO)

First expired, first out (FEFO)

Batch 1

Date of arrival: 13-Dec

Best before: 22-Dec

Batch 2

Date of arrival: 14-Dec

Best before: 20-Dec

Batch 3

Date of arrival: 15-Dec

Best before: 21-Dec

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Best before: **20-Dec**

Batch 3

Date of arrival: 15-Dec

Best before: 21-Dec

Batch 1

Date of arrival: 13-Dec

Best before: 22-Dec

How to determine shelf life of fresh fruit & vegetables?













Digital twins

- Other names: digital shadow/mirror, virtual avatar/phantom, or synchronized virtual prototype.
- Definition (according to Defraeye et al., 2021):
 - Digital representation of a real product
 - Contains information about properties and geometrical components
 - Simulates accurately all relevant processes and reactions throughout the life cycle of the product
 - Uses as an input real data from sensors (preferably continuous and in real-time).



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journal homepage: www.elsevier.com/locate/tills



Digital twins are coming: Will we need them in supply chains of fresh horticultural produce?

Thijs Defraeye⁴, Chandrima Shrivastava⁴, Tarl Berry⁴, Pieter Verboven⁴, Deniel Onwude⁴, Scraina Schudel⁴, Andreas Bühlmann⁴, Paul Cronje⁵, René M. Rossi⁴

⁴ Requ, 2 via Nabral takes storing in Materials School and Schoolings, takes story for Marchaels Street core and Scaling to chargibility care 3, CN 953/12. Only Remodered

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ABTICLTIME

Rijimah Padimenti Physical hand Visited Modeling ABSTRACT

Declayment Digital what have administed for its various industrie, but are test exceptly in perturnent copplychalles, A digital reds is a visual representation of a neutrin product, such as fields berticultural products. This traint insied to the real-world product by tensor repripting data of the conformational conditions can the target first or requisible. Startismal and dens-driven white quantity how quality how of their horizontamic products count by producing national to the arm. Newtochastics in their products are approached before their the extension, and physical products are described in the condition of the contraction.

upo and approach. We identify what the lawy advantages are of digital twizs and how the supply chain of the

Source: https://doi.org/10.1016/j.tifs.2021.01.025





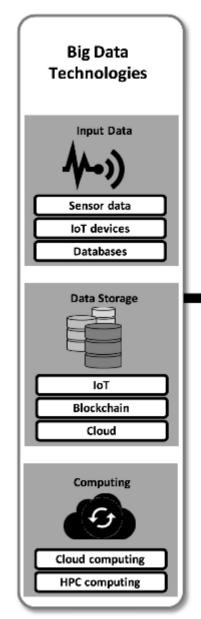


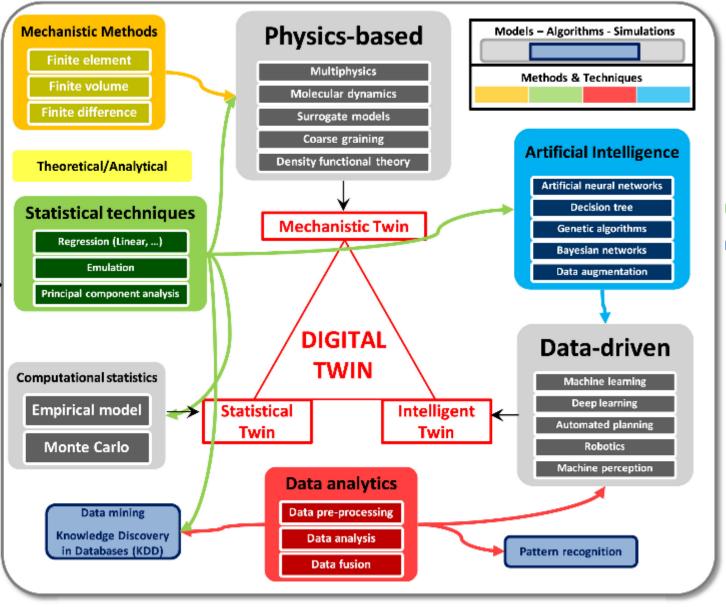






Digital twins





Sources:

https://doi.org/10.1016/j.tifs.2021.01.025













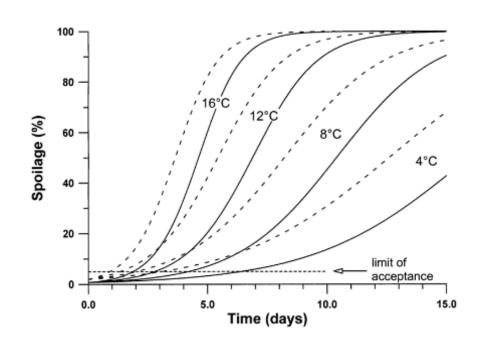
Generic shelf-life model

- Simple
- Generic
- Multiple Quality aspects
- Quality limits
- Multiple factors

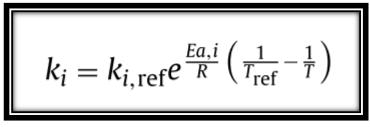




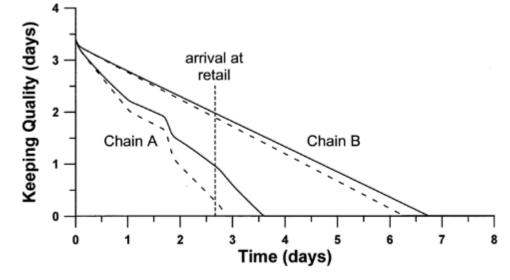








Hertog et al. 1999-2014















Co-funded by the European Union

Facts about the DigiFresh project

- EIT-FOOD innovation project
- Running 1. April 2021 31 December
 2022
- Four partners, AU coordinator
- Co-funded by EIT-FOOD/European Union
- Builds on competences from academia
 & industry on postharvest storage,
 quality assessment, shelf life modelling,
 digitalization, food waste reduction,
 communication and dissemination.







The DigiFresh ambition

"... integrating existing commercial sensor technology and real time monitoring (T/RH) with smart digital twins,

....

to **translate storage conditions** in the supply chain into **remaining shelf life**"













Outcomes of the DigiFresh project









predicted)

























THE FRUITS AND VEGETABLES INDUSTRY SERIES







The OECD-COLEACP Fruits and Vegetables Industry Series focuses on market access conditions and opportunities for the fruit and vegetable sector, especially for fruit and vegetables producers and exporters from ACP-countries. This activity is supported by the Fit For Market SPS programme, implemented by COLEACP within the Framework of Development Cooperation between the Organisation of African, Caribbean and Pacific States (OACPS) and the European Union.

Thank you



