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Reducing process packaging

Overpackaging and effective design of packaging system

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Packaging has been blamed for representing one of the highest environmental impacts in food productions. Although it cannot bedenied that packages, with special regards for production materials, processing and disposal, carry some impact, other aspects should be considered for an objective assessment of packaging environmental role.

Plastics are the most used materials for packaging; thus, it is highly consumed, leading to a **huge waste generation**. The end of life of plastics is controversial, because the majority of them are not biodegradable and they are quite difficult to recycle *[Sorrentino, Gorrassi & Vittoria, 2007]*.
The good news is that sustainable packaging represents a viable path to reduce overpackaging and the fight against it already offers several cues for improvement. The crucial aspect to keep an eye on is the importance of **shelf life assessment** while investigating packaging reduction: indeed, the alternative systems need to be tested to check if they provide the same shelf life standards as conventional ones *[Licciardello et al., 2014; 2017]*.

Overpackaging is the unnecessary use of packaging materials. It represents an environmental and economic issue, and it tends to be underestimated. Packaging systems are often oversized, even though studies have already shown that thickness reduction is often possible.
Source: F. Licciardello "Packaging, blessing in disguise".

Packaging reduction is still an underestimated issue for many food products, but it actually represents the best way to improve sustainability of packaging for many food products.

It is important to remark that **packaging** contributes to the sustainability of food chains, as it represents the ultimate defense of food products, and this aspect should be considered for specific food cases. A valid indicator to assess the role of packaging in the sustainability of a specific product is PREI, the **"Packaging Relative Environmental Impact"**.

PREI depends on food impact, as well as on the packaging solution for the specific product.

This indicator is usually higher for products containing **high amounts of water** or for those originating from lower-carbon footprint ingredients. PREI can assist in packaging design and optimization and it does not require to perform full Life Cycle Assessment studies.

Based on literature data, it is possible to classify food products into:

- very low-PREI (cheese, meat, coffee, bread)
- low-PREI (milk)
- moderate-PREI
(extra-virgin olive oil, ketchup, tomato puree)
- high-PREI
(beer, wine, carbonated soft drinks in PET bottles and canned tuna)
- very high-PREI
(carbonated soft drinks packed in aluminum cans and glass bottles)

According to the above-mentioned classification, low-PREI systems can improve overall **sustainability** by adopting packaging systems able to reduce food waste.

TRENDS AND CONCLUSIONS

Packaging *is considered as a serious waste of resources and an environmental issue, however a correct approach should focus on the* ***packaging-product system*** *overall, instead of packaging only. Studies on the* ***optimization*** *of packaging systems, aimed at reducing packaging thickness and weight, also show wide margins for improvement especially for food SMEs.*

Technical vocabulary: LIGHTWEIGHTING

"Though it shares a common goal with practices like source reduction and waste consciousness, lightweighting specifically refers to the ability to create lighter, more efficient versions of a particular package, whereby the end result is a lighter version of the original – rather than an entirely new form of packaging."

REINWASTE ACTIONS

Packaging material reduction, alternative packaging materials and **techniques** should be investigated for the high-PREI products, while keeping the same shelf-life standards. In the same view, when packaging represents a relatively small issue, environmental improvements should focus on process optimization, shelf life extension and waste reduction.

Packaging lightweighting remains an underestimated strategy for many food products. Lightweighting could be achieved by reducing thicknesses for the same material and/or adopting composite structures with higher performances: however, sustainability-driven packaging reduction should be addressed under an end-of-life perspective, preferring mono-materials instead of composite multilayer materials (whenever possible), which bring higher performances even though they are less recyclable. Solutions addressing packaging lightweighting have been proposed among the pilot actions of REINWASTE. This strategy has been especially addressed to small dairy industries, whose packaging choices are commonly demanded to providers and do not guarantee optimization.

Moreover, this strategy represents the easiest, fastest and most affordable measure for sustainability improvement of food packaging. Indeed, recyclability could be the downside of lightweighting when alternative multilayer/ composite materials are considered.

REDUCE PACKAGING WASTE FROM THE PACKAGING

The final products are generally packaged in plastic container and operculum. Depending on packaging design, a skeleton can be generated corresponding to the cutting cutes. These technologies cause a lot of polluted waste when the station is started up and/or resumed.
The alternative is to switch to skeleton-free technologies where the transition time between two trays is reduced to a minimum, favoring mono materials for recyclability and reducing operculum edges to the minimum acceptable.

Links to articles in relation with the subject:

- "Packaging, blessing in disguise" – Trends in Food Science & Technology: *http://www.journals.elsevier.com/trends-in-food-scienceand- Technology*
- Stop toxic packaging: *https://yuka.io/emballages-sante/*

Interreg MED Green Growth Community / REINWASTE Project

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Interreg Mediterranean REINWASTE

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