Integration of transparency into packaging design

More and more industrials are turning to transparent packaging. This is a way to show to the consumers what they are buying from the beginning, without having unpleasant surprise when opening at home. It brings naturality and trustworthiness.

To reach transparency, varied materials exist, such as glass, PET, PP or HDPE. They all have different levels of transparency, PET and glass being the most transparent and HDPE the less one. But they also present different gas barriers. Therefore, changing from one material to another can bring much more complexity on product's evolution and protection than only light impact.

Dairy products can be particularly impacted by light and oxygen. Photo-oxidation is a mechanism that often occurs in sensitive products when they are exposed to the light. This can trigger undesired off-notes, such as farm, old cheese taste and smell in dairy products. Pigments can also change of configuration and bring a change in colour, mostly when fruit and vegetable preparations are added. These changes need to be carefully studied before launching a product in a transparent packaging on the market, to be sure the product will stay acceptable, from an organoleptic point of view, as well as nutritional and microbiological ones.

Oxygen permeability of the packaging material plays a key role in photooxidation: one can think that adding an oxygen barrier, such as EVOH, to the packaging will protect the product from organoleptic changes when exposed to the light. But oxygen plays an even more crucial role in alive products such as fermented ones. Most of micro-organisms are anaerobic, and therefore grow better in absence of oxygen. Having an oxygen barrier will protect ferments until the end of shelf-life. However, a too high barrier can enhance their activity and provoke a post-acidification of the product, and even prevent some aroma from developing. Indeed, ferments produce precursors which require oxygen to give aroma. Moreover, some ferments, called heterofermentative, can produce CO_2 as a co-product. Once again, a too high gas barrier will prevent CO_2 from escaping out of the packaging and may trigger many changes in the product such as postacidification, fizziness or change in colour.

Changing packaging material to reach transparency can thus impact a lot the product evolution, regarding direct light impact and photo-oxidation mechanisms, but also regarding gas permeability of the new packaging material which is chosen.

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