Optimizing Production for Better Materials

Most companies strive to optimize production, making it faster and cheaper — that's common sense. Adjusting production speed and materials use can both improve the bottom line and protect the environment. With those goals in mind, global packaging solutions company Tetra Pak wanted to understand exactly how the plastic layer in its cartons behaved when quickly folded by machines.

Tetra Pak specializes in packaging such as milk and juice cartons. These consist of multiple layers of paperboard and plastic folded together, and the plastic layer must harden quickly. The company hoped to get better insight into the plastic's building blocks in order to understand its behavior better — enhanced knowledge of the plastic's limitations would surely translate to an improved carton.

A High-Tech Route to Better Product Development

To help Tetra Pak gauge its plastic layers' folding capacity, the LINX Association put the company in touch with the University of Copenhagen (KU), home to experts in a technique called small-angle X-ray scattering (SAXS). SAXS is non-invasive, allowing researchers to look deep inside microscopic structures and components.

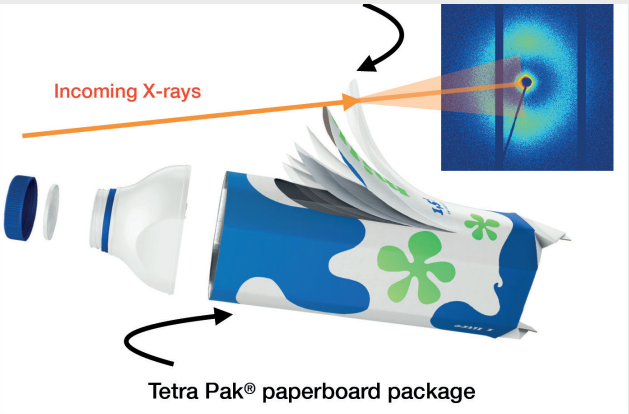
Together they tested plastic layers measuring as thin as 20 micrometers (microns) or 0.00002 meters (0.002 cm). The testing provided Tetra Pak with data regarding the plastic layers' molecular structure, a determiner of how strong the plastic layer is once it hardens.

To understand just how liquid plastic hardens into a thin layer of plastic film, the research team developed a completely new method of microscopic analysis.

Tetra Pak's collaboration with KU proved successful, producing results that will have a positive effect on the production process and, ultimately, the bottom line. Companies that work with plastics, paperboard and liquids can all benefit from X-ray technology, as it enables researchers to peer below surfaces and inside objects, seeing through to their hidden characteristics without opening them up.

Under the right circumstances, researchers can even monitor the behavior of a product while it is in use, assessing how it withstands various stresses imposed upon it.

High-tech X-Ray tools can assist in developing better packaging in the future.



Polyethylene layers act as a barrier and adhesive for Tetra Pak® paperboard packages.

Plastic layers inside e.g. milk cartons both protect its contents and help bind thin layers of paperboard.

By focusing on optimization, we can increase machine production efficiency over time. Imagine, for instance, that we would like the plastic layer on a food container to harden quicker when it is applied to the packaging. Using 3D X-ray images can show us how much the material can withstand before it is damaged. Having access to this knowledge earlier in the design process will help us find the ideal production speed, and the overall result will be optimized production quality.

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