

Water-soluble films

Sumeet Kumar of MonoSol explains the advantages of water-soluble film technology for packaging single-serve foods and food ingredients.



Although unit dose packaging has existed for more than 50 years, the introduction of water-soluble film technology has expanded considerably in the last three years. The proliferation of a variety of single-serve food and beverage products offers potential for formulations using tailored types of water-soluble film. Applications also exist in food manufacturing for ingredient delivery in-plant offering potential for increased efficiency and savings.

MonoSol, a specialist in water soluble delivery systems, has developed an odourless, tasteless water-soluble film, known as Vivos®, which is a proprietary, patent-pending, blend of food grade ingredients formulated for food and beverage applications. The film is tough enough to withstand handling and yet dissolves in a few seconds in hot or cold water. Single-serve consumer products already on the market, such as whey protein, workout drinks and meal replacement shakes, could all be candidates for packaging in this film. In food manufacturing lines involving multiple-ingredients, pouches can keep ingredients separate until the point of use.

The use of water soluble film for packaging food ingredients has a number of advantages in terms of production efficiency, waste reduction and safety of handling.

Production efficiency

The film protects the purity and preserves the potency of ingredients allowing a consistent product

delivery and avoiding cross contamination. In a typical food manufacturing line, routine clean-up required after ingredient changeovers and spills can be labour intensive and costly. The use of pouches to deliver ingredients, such as food colours and flavours, can provide more-precise dosing and help to increase productivity. Pre-measured and accurate sealed-pouch delivery can reduce the amount of some ingredients required, for example enzymes, because they are not in contact with other chemicals which can degrade them.

Waste reduction

The direct application of sealed packets of ingredients can also prevent product losses. With traditional dosing systems, valuable product can be lost from inaccurate dosing, pump priming, product changeovers and ingredient rotation. Losses can multiply when preparing small-run production batches for varied final products. Spills not only cause loss of product, but also result in labour costs for clean-up and lost productivity.

Water soluble ingredient delivery systems also have potential to reduce packaging waste by eliminating the need to dispose of solid packaging materials.

Safety

Water soluble film pouches also offer potential safety benefits to food handling workers in manufacturing plants. By sealing ingredients within pouches, workers are protected

The film protects the purity and preserves the potency of ingredients allowing a consistent product delivery and avoiding cross contamination.'

from potentially harmful exposure to ingredients with irritant properties. Although enzymes are generally non-toxic, workers may experience health-related issues, such as skin irritation and respiratory sensitisation upon prolonged exposure. Inhaling airborne particles is a more serious hazard, as it can develop into respiratory allergy.

Manufacturing

There are two main options for the production of food pouches using water-soluble film:

- *Vertical Form-Fill-Seal (VFFS)* employs a heat-seal method commonly used to make stick-pack powdered drink formulations. It is suitable for larger packs (40-200 grams).
- *Rotary Drum machines* are typically used for higher volume production (in the range of 1,000 units/min) to process smaller pouches carrying 20-50 grams of material.
- *Contract packers* offer another option for newcomers to water-soluble film technology.

No specific labelling for Vivos® is needed in the US because the film is used in very small amounts as a manufacturing aid to deliver food ingredients; it is not present to a significant degree and serves no functional purpose.

Film technology offers a number of potential advantages for portion control in single-serve foods and the delivery of ingredients in food manufacturing production-line systems. It is likely that applications in the food industry will follow the trajectory of uptake of the technology by other industrial sectors.



Article available online at:
www.fstjournal.org/features/29-3/water-soluble-films



Sumeet Kumar, MonoSol, Portage, Indiana, USA
Vivos® is Halal and Kosher certified and is available for sale in the U.S.
Email: skumar@monosol.com Web: www.monosol.com, www.vivosfilm.com