

Oxygen-sensitive indicators

In recent years, conventional glass and metal packaging materials are being substituted with plastic materials that offer many advantages such as reductions in weight and cost. But the barrier properties of plastics affect the shelf-life of the packaged product. It is therefore essential to quantify the amount of oxygen that is entering the package over time and to understand the relevant impact on the food product.

Guelph Food Technology Centre, Canada, has developed unique accelerated shelf-life testing procedures to test the package. The liquid oxygen sensitive indicator (LOSI) can assess both the rate and location of oxygen ingress into a food package. This system is based on a chemical redox reaction that takes place when the dye reacts with oxygen. The dye reacts proportionally with the amount of oxygen present, changing from colourless to blue, increasing in intensity with increased oxygen ingress. By measuring the blue colour development with a spectrophotometer over time, the rate at which oxygen is entering the package can be determined. Some benefits of LOSI include:

- Measurements are non-destructive;
- The system is a representative of food/beverage matrix in direct contact with the package;
- Measurements are representative of the entire packaging system, i.e. seals and closures;
- Results are in good correlation with other methods (gas flushing/coulometric, ascorbic acid degradation);
- Both rigid and flexible packages can be measured;
- Large sample sizes can be tested in a short period of time; and
- Environment (pH, temperature) is easily adjusted to stimulate actual transport/storage conditions.

The gelled oxygen sensitive indicator (GOSI) can be used to identify specific locations where oxygen enters the package preferentially. By immobilizing the LOSI in a gel system inside a package, the precise area where oxygen is entering preferentially into the package can be identified by monitoring the localized development of blue colour. *Contact: Guelph Food Technology Centre, 88, McGilvray Street, Guelph, Ontario N1G 2W1, Canada. Tel: +1 (519) 8211 246; Fax: +1 (519) 8361 281; E-mail: gftc@uo.guelph.ca; Internet: <http://www.gftc.ca>.*