**ACOSIC**

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# Absorbing oxygen Indicating Leakages Enhancing the quality of packed food Extending shelf life

# ACOSIC


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# Why ACOSIC ?

A substantial cause for food losses is product decay caused by oxygen inside the packaging, leading either to consumer complaints at the retailer or, much more often, to direct disposal by the consumer. Even low concentrations of oxygen, namely 1-200 mg/kg, can adversely affect flavour and colour of a wide range of foods. The residual levels of oxygen found in most packaging systems are much higher than this. For that reason, not only has the access of oxygen to the packed goods to be avoided but also oxygen levels in the headspace of the packaging have to be reduced as part of the packing process. The industry needs effective packaging to pack the foods safely for transport and storage while maintaining the food quality, along with increasing demands of the consumer for fresher, minimally processed, more convenient and safer foods. The consumers expect to be informed about the origin, treatment and quality/safety of the food. It would even be desirable to expand the current possibilities to track and trace food products from the point of sale to the point os consumption.

# The Aims

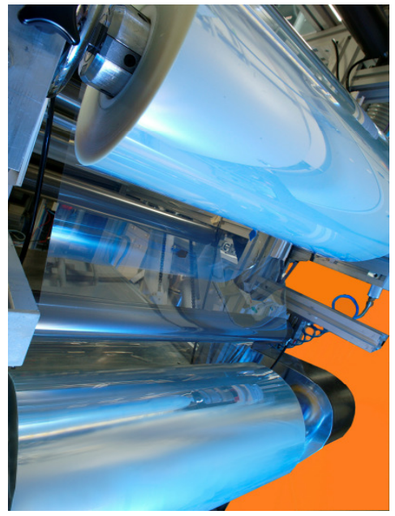
In the EC funded project ACOSIC eight partners (research institutes, industrial companies and consumer alliance) joined together in order to develop combined oxygen indicator/ - scavenger systems (OIS) for incorporation into packaging films. These new combined systems should remove oxygen by means of the oxygen scavenger component and, simultaneously, monitor the functionality of the oxygen absorber and the integrity of the packaging by the oxygen indicator dye. All these characteristics enhance the product quality and the shelf life of the packed foods. At the end of the project the first prototypes of novel active packagings could be produced. The product range addressed by the project are flexible packagings with medium of high oxygen sensitive goods, covering about ½ of all food products

# The Results

Resulting from the ACOSIC project three novel oxygen scavenger systems and two oxygen indicator systems were developed and tested with respect to their applicability in multilayer films for flexible packaging:

- one gallic acid based oxygen scavenger system,
- two hybrid-polymer based oxygen scavenger systems,
- two oxygen indicators, one based on gallic acid and the second based on methylene blue.


These systems are suitable for roll-to-roll application and show very good functionalities, even when they are incorporated into multilayered structures.
In addition food regulatory assessments were done in order to establish the migration behaviour of the new type of active packaging. The tested multilayer films which incorporated OSI-systems fulfilled the requirements of the foodstuff regulation regarding global and specific migration.
To characterise the functional properties of the new packaging test methods had been developed and evaluated within the ACOSIC project.
The carried out food packer and consumer surveys have borne the acceptance of the concept of packaging with incorporated oxygen indicator.
The food experiments with the manufactured prototype packaging films containing the new developed OIS-systems have clearly shown how important it is to know the characteristic of the $O_2$-consumption of the food before and appropriate active film can be selected and tested.
The $O_2$- scavenger/indicator characteristic has to be adapted to the oxygen consumption characteristic of the food to make sure, that the scavenger system incorporated in specific film structures is faster in chemically scavenging the residual oxygen than the food to be packed. ACOSIC had generated quantitative data for the selected foods.



Lamination plant

Ready-to-eat meals in containers with film samples containing and OSI-combination (green dots)

# The Benefits

The developed multilayer films have shown their capability for shelf-life extension of oxygen sensitive foods by keeping its quality for longer and by monitoring the safe shelf-life of the food.
The knowledge generated in the ACOSIC project on correlation between the functional effectiveness of the active components and the structure of the multilayer film or the kind of plastic material selected for film production provides a good basis for tailor made development of specific flexible packaging films for a specific food and logistic application. It should be used in order to implement this kind of packaging in the European food market and to enable the safe application of these systems throughout Europe.
ACOSIC provides the scientific bases for further developments and for the application of active and intelligent systems with a broad European acceptance among the food and packaging industries.
First prototype multilayer films containing the developed oxygen scavenger/indicator systems are available and offer a promising potential for exploitation.