Flavour and aroma release packaging

**Identification**

<table>
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<tr>
<th>Key words</th>
<th>food aroma, flavour, food packaging, aromatic packaging, aroma release</th>
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**How does it work?**

**Primary objective**

The incorporation of food aromas into polymer material can be used to improve food aroma to attract consumers when the package is opened, and also to balance any detrimental effects of aroma loss. Fragrance additives, either synthetic or natural essential oils, can be used to impart an aroma to a product or to mask undesirable plastic odours. The technology involves a controlled, prolonged release of a volatile flavour after the initial opening of the package and upon successive re-openings.

**Working principle**

The technology involves a controlled, prolonged release of a volatile flavour after the initial opening of the package and upon successive re-openings. Plastics are in an equilibrium between aroma absorption and release that depends on several factors regarding both plastic and aroma characteristics. This must be carefully examined during active package design. Commonly used polymers for the release of aromas are PE, PP, ethylene vinyl acetate (EVA), ionomer, nylon, polyester and polyvinyl chloride. Different manufacturing methods are used for the preparation of these active polymers such as injection moulding, film blowing and casting, sheet extrusion, foaming, hot-melt adhesives and hot-melt coating. Encapsulated, food grade flavours can be added directly into packaging materials during manufacturing. During processing, the flavours and associated aromas result in the packaging becoming aromatized.

**Images**

**Additional effects**

The packaging containing encapsulated flavour compounds have been successfully produced and the release rate has been found to be suitable for extended shelf life food packaging. The system can retain and release volatile flavour oils and other active compounds.

**Important process parameters**

**Important product parameters**

The rate of fragrance release from the package is dependent upon the thickness of the plastic, its surface area-to-volume ratio, the composition, and the amount of active compound included in the plastic.
What can it be used for?

**Products**
Flexible packaging materials for controlled release containing flavour volatiles (d-limonene, alpha-pinene and 2-methoxy-3-methylpyrazine) included within beta-cyclodextrin.

Refillable water bottle and fruit caps, flavoured with natural lemon, peach, or berry, may increase consumer enjoyment of water without the addition of calories, sweeteners, or preservatives (Aquaescents™). Ultramid® nylon

**Operations**
Packaging: The product can be protected from processing-induced dilution and/or its shelf life extended by the gradual release of encapsulated flavours over time. The polymer may release aroma on the store shelf to accent a product is opened or cooked, or released into a product gradually to compensate for gradual product, inside a package to add aroma when a release aroma on the store shelf to accent a product, inside a package to add aroma when a product is opened or cooked, or released into a product gradually to compensate for gradual flavor loss during its shelf life.

Solutions for short comings

What can it NOT be used for?

**Products**

**Operations**

**Other limitations**
Flavours may interact with plastics: based on a function of aroma compound’s chemical compatibility or solubility with the plastic package material; diffusion into or permeation through the plastic package material by components of flavours.

**Risks or hazards**
Chemical solubility decreases the plastic functionalities and the aroma chemicals become more dissimilar.

Implementation

**Maturity**
Several types of flavouring and aroma emitting plastics exist in current markets, but controlled release active packaging is not currently in wide commercial use.

**Modularity/Implementation**
The system is compatible with commercial methods for filling and sealing containers holding a product.

As technological packaging innovations progress and material costs decrease, food and beverage manufacturers will begin to implement controlled release technology into their packaging.

**Consumer aspects**
More use of natural extracts is expected because of consumer preference when compared to the chemical antimicrobial agents.

This technology is a multifunctional process, enticing consumers with aroma brand association outside the package, releasing flavours and fragrances inside, and improving taste by releasing aroma on the outside.

**Legal aspects**
(EC) No 450/2009 Commission Regulation of 29 May 2009 on active and intelligent materials and articles intended to come into contact with food.

**Environmental aspects**
Not known
Facilities that might be interesting for you

Further Information

Institutes
Clemson University, University Helsinki

Companies
BASF, Kraft Foods, ScentSational Technologies, NutriSystem

References

Source: