

FRAGRANCE ENCAPSULATIONS IN CONSUMER PRODUCTS

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- IFRA is the International Fragrance Association.
- Created in 1973, its members consist of:
 - Direct members: 8 fragrance companies
 - Worldwide network of national associations and associated members.
- IFRA members are fragrance compounders (i.e. business to business) and represent 90% of global market of fragrance mixtures.
- IFRA manages a voluntary initiative to set Standards to restrict and prohibit materials
- IFRA Europe is the regional branch of IFRA in Europe and includes fragrance companies and national associations members.



1. **Share** of fragrance encapsulations used in consumer products
2. **Technical function** of fragrance encapsulations in consumer products
3. **Characteristics** of fragrance encapsulations used in consumer products
4. **Potential for release to the environment** during use
5. **Potential alternatives** of current fragrance encapsulations
6. **Impact of the fragrance industry** through the value chain
7. **Impact on the value chain** due to an eventual restriction on fragrance encapsulations
8. **Conclusions**

1. Share of fragrance encapsulations in consumer products

Product type	Percentage (by volume) of the product type using fragrance encapsulations
Laundry detergents	10-20%
Fabric softeners and scent boosters	~60%
Other cleaning products	<1%
Deodorants	<1%
Other cosmetic and personal care products	<1%



2. Technical function of encapsulations in consumer products

Deliver long-lasting fragrance experiences to the users of laundry and personal care products, allowing to:

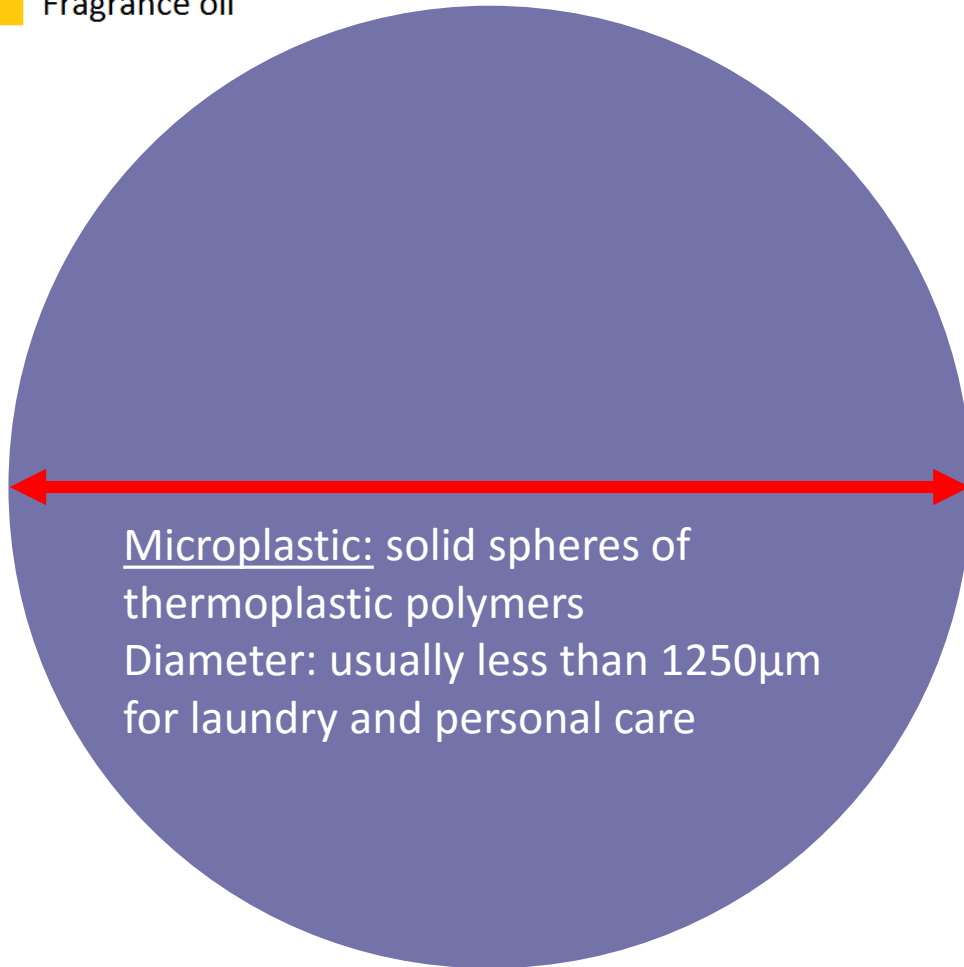
- Maintain the sensory cues related to the important wellbeing, health and hygiene benefits that the use of these products provide for consumers.
- Avoid the use of very high dosages of fragrances.
- Avoid unnecessary repeated product application due to absence of sensory cues.
- Deliver resource efficiency thanks to a 5-20 fold retention level to deliver the same function.

3. Characteristics of fragrance encapsulations used in consumer products

- **Microplastics** are solid spheres of thermoplastic polymer.
- **Fragrance encapsulations** are made of thermoset polymers:
 - Thin membrane around a fragrance droplet designed to release it when expected
 - Once dry the membrane ruptures upon friction, release of the fragrance
 - Diameter from 10µm to 50µm
 - Wall thickness below 1µm
 - From 20ppm to 200ppm of polymer shell in the vast majority of final products sold to the consumer (weight for wall only)

3. Characteristics of fragrance encapsulations used in consumer products

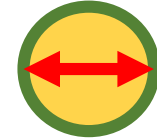
- Thermoplastic polymer
- Thermoset polymer
- Fragrance oil



(Up to scale)



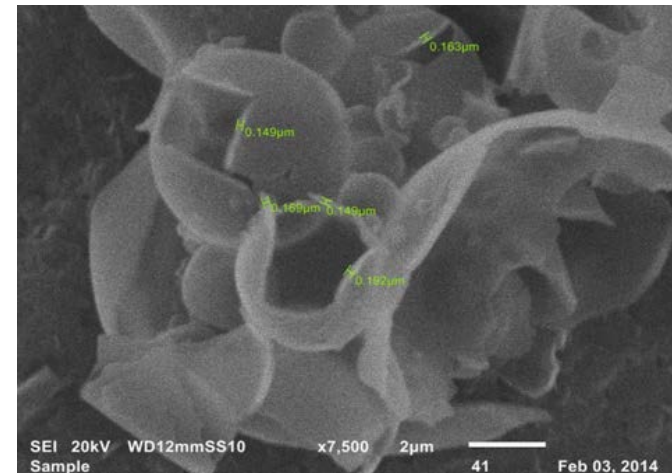
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(Not to scale)

Fragrance encapsulation: thermoset materials

Empty shell filled with fragrance oil
Diameter ranging from 10µm to 50µm
Wall thickness below 1µm



4. Potential for release to the environment during use

Product type	Potential for release to the environment during use
Laundry detergents	50-75%
Fabric softeners and scent boosters	0-50%
Leave-on cosmetics	5%
Rinse-off cosmetics	80-95%
Deodorants	~0%



5. Potential alternatives of current fragrance encapsulations

- In order to be a **viable alternative**, an encapsulation technology needs to:
 - Be able to **resist various changes** in physical and chemical environments to perform their intended function;
 - Provide **appropriate release** of the fragrance at the right time to drive a consumer-perceivable scent;
 - **Minimise raw material consumption** to reduce waste and cost;
 - Be able to encapsulate a **wide range of fragrance** ingredients;
 - Be **easily incorporated** into, and be compatible with a variety of consumer products;
 - **Maintain the fragrance within the capsule** during storage in the consumer product;
 - **Deposit on the target substrate sufficiently**;
 - **Not cause any gross negatives in the product**, during application, or after use; and
 - Be **cost-effective** and **safe to use**.

5. Potential alternatives of current fragrance encapsulations

- Several alternative fragrance encapsulations have been considered:
 - Synthetic amphiphilic/ hydrophobic polymer technologies
 - Clay based particles
 - Higher fragrance levels
 - Natural ingredient based capsules
 - Profragrance technology
 - Starch based systems

5. Potential alternatives of current fragrance encapsulations

- Among the several alternative fragrance encapsulations that have been considered:
 - Synthetic amphiphilic/ hydrophobic polymer technologies
 - Clay based particles
 - Higher fragrance levels
 - Natural ingredient based capsules
 - Profragrance technology
 - Starch based systems
- None of them can be considered as a viable alternative:
 - Do not deliver long lasting fragrance experience and can provoke a very strong and unpleasant smell when opening the product.
 - Unstable in product formulations (aqueous and/or high surfactant concentration matrices).
 - Induce a shift in the distribution of the hydrophobic/hydrophilic phases in the formulation, affecting the stability and shelf-life of the products.
 - Moreover:
 - Profragrance technology can only carry a single odorous molecule, heavily limiting its application.
 - The use of higher fragrance levels are not sustainable.

6. Impact of the fragrance industry through the value chain

- Fragrances are “**technology platforms**”: they create benefits through the value chain.
- The process of consumer initial purchase and subsequent re-purchase creates **added value for brand owners** thanks to the creation of new product categories and products, greater differentiation and improved brand equity.
- The latest socio-economic analysis (2012) of the fragrance industry in Europe shown overall sales of unique fragrances blends estimated to be €1.7 billion euros in 2010. It has been identified that a **factor 35** could be applied to estimate the economic impact through the value chain. So, **close to 60 billion euros of retail sales are depending on the distinctive part played by fragrance technologies.**



7. Impact on the value chain due to an eventual restriction on fragrance encapsulations

- Due to the lack of viable alternatives, the loss of a technology such as fragrance encapsulation:
 - would make it impossible for products to meet consumer expectations.
 - would have significant direct commercial impacts on the organisation that suffers the loss and a knock-out effect in the entire value chain.




- The impact of the inability of the fragrance industry to deliver a unique advantage through differentiation to its brand-holder clients could lead to the cumulative loss of up to **15-25 billion euros in gross value added** and put a quite high number of jobs at risk.

8. Conclusions

- Fragrance encapsulations are polymeric materials that are intentionally added mainly to laundry care products (in common with other intentionally added polymeric materials in these product formulations).
- The encapsulating polymer is a thin, flexible membrane (made from thermosets) surrounding a fragrance droplet. They are not full spheres and cannot be repeatedly moulded or extruded.
- Fragrance encapsulation is the most performant, sustainable and resource efficient solution to deliver long-lasting fragrance benefits to fabrics and personal care products, meeting consumer's expectations.
- Fragrance encapsulation creates a significant differentiation and is *the* innovation driver for the industry and whole value chain.
- All encapsulations systems that have been considered as alternatives are not viable options.

Thank you for your attention



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