

# RELEASE OF HYDROCARBONS FROM FRESH CHEESE PACKAGING

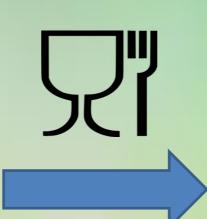


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#### **MOCA:**

"Materiali e Oggetti a Contatto con Alimenti" are defined as materials and objects directly in contact with food (cooking utensils and tableware, containers, machinery for food processing, packaging materials...)



The MOCA regulation only provides a limit of total compounds migration from packaging to foodstuffs of 60 mg/kg of food.

Volatile or trace-level compounds are not detected!



#### **Analytical method:**

Extraction of VOCs from packaging and food using **Purge and Trap** — Analysis in **GC-MS** 



## Aim of the work:

Identify the release of volatile substances from dairy plastic packaging.

#### Samples:

- Samples of dairy products packed in opaque and transparent PE / nylon bags
- Samples of yoghurt in polystyrene jar







### Qualitative analysis results

- Mozzarella cheese and packaging —> benzaldehyde, alcools and khetones, aromatics and alifatics hydrocarbons, in particular **isododecane**
- Yogurt and packaging toluene, xilenes, propyl benzene, etyl benzene, in particular styrene

## Quantitative analysis: Isododecane and Styrene quantification

| Isododecane in packages | Conc. ng/g |
|-------------------------|------------|
| Sample 1                | 53         |
| Sample 2                | 16         |
| Sample 3                | 10         |
| Sample 4                | 88         |
| Sample 5                | 38         |
| Sample 6                | 448        |
| Sample 7                | 114        |
| Sample 8                | 2          |
| Sample 9                | 14         |
| Sample 10               | 10         |
| Sample 11               | 1870       |
| Sample 12               | 919        |
| Sample 13               | 1053       |
| Sample 14               | 1683       |
| Sample 15               | 98         |
| Sample 16               | 181        |
| Sample 17               | 337        |
| Sample 18               | 0.2        |
| Sample 19               | 31         |
| Sample 20               | 84         |
| Sample 21               | 20         |

| Isododecane in mozzarella cheese | Conc. ng/g | µg for<br>mozzarella |
|----------------------------------|------------|----------------------|
| Sample M1                        | 3.2        | 0.641                |
| Sample M2                        | 3.1        | 0.628                |
| Sample M3                        | 0.16       | 0.041                |
| Sample M4                        | 0.19       | 0.046                |
| Sample M5                        | 0.043      | 0.009                |
| Sample M6                        | 0.04       | 0.008                |
| Sample M7                        | 0.22       | 0.022                |
| Sample M8                        | 0.2        | 0.017                |
| Sample M9                        | 0.1        | 0.011                |
| Sample M10                       | 0.2        | 0.019                |
| Sample M11                       | 0.22       | 0.028                |
| Sample M12                       | 0.20       | 0.026                |

| Sample     | Styrene in packages Conc. ng/g | Styrene in yogurt Conc. ng/g |
|------------|--------------------------------|------------------------------|
| Sample S1  | 40                             | 0.03                         |
| Sample S2  | 235                            | 0.02                         |
| Sample S3  | 467                            | 0.4                          |
| Sample S4  | 420                            | 0.4                          |
| Sample S5  | 520                            | 0.3                          |
| Sample S6  | 392                            | 0.4                          |
| Sample S7  | 662                            | 0.3                          |
| Sample S8  | 1137                           | 0.3                          |
| Sample S9  | 162                            | 0.09                         |
| Sample S10 | 35                             | 0.04                         |
| Sample S11 | 13                             | 0.05                         |
| Sample S12 | 53                             | 0.13                         |
| Sample S13 | 62                             | 0,08                         |
| Sample S14 | 3                              | 0.05                         |

#### **Conclusions**

- Aliphatic and aromatic hydrocarbon compounds were found in all analyses.
  - The higher concentration of these compounds were found in packaging, even though these don't overtake MOCA law limits.
  - > Hydrocarbon compounds diffusion from packaging into foods is low.
- Nowadays MOCA don't establish specific limits for these suspected carcinogenic compounds. However, more restrictive limits should be required for them.

