

PET's Creative Talent: Multi-Component Preforms by INOTECH



Multi-Component-Preforms by INOTECH

New Preform Technology with Multi-Component Injection Molding

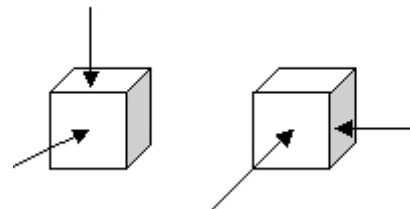
- Multi-Component moulding is a multi-step moulding process that produces an assembly, comprised of two or more integrated components.
- Multi-component processes enable one to:
 - Produce parts not possible with single shot moulding
 - Produce multi-colored or multi-resin parts and assemblies for functionality
- Applications possible with two-component moulding:
 - Colored elements on transparent preforms
 - Haptic elements on hard surfaces
 - Filling levels or windows
- ➔ New designs are made possible!

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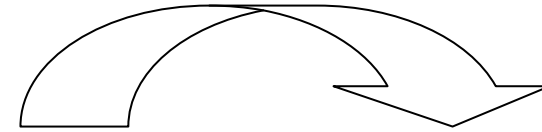
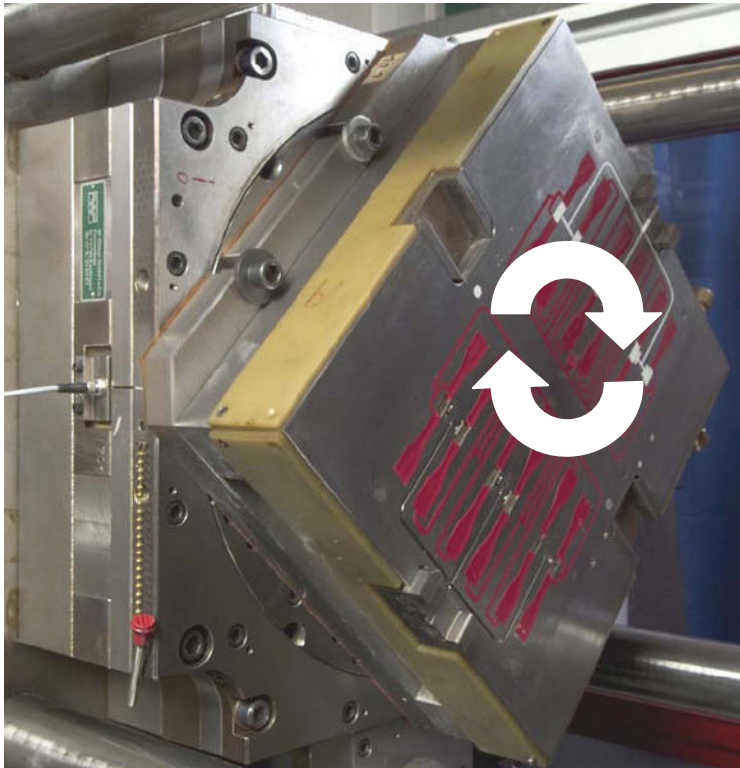
- Normal steps for Multi-component molding:
 - Resin A is used in Shot #1.
 - Mould or part of the mould is rotating in the machine.
 - Resin B is used in Shot #2.

- Machine and Mould:
 - The injection moulding machine will need to have 2 or more plastication/injection units (one unit for each different resin or color).
 - The machine's multiple screws can be arranged in a Vertical position (90 deg.) or an L-position as shown below.



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Mould Concept



1st Shot



2nd Shot

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How to blow the Preforms?

- The Multi-Component-Preforms can be heated and blown on stretch blow moulding machines with Standard IR or NIR Heating Systems or on Krones new FlexWave (microwave) System. So you can handle them like your Standard Preforms.
- Some adjustments have to be done on the process according to the preform design, color and shape.
- Some specific designs may only be possible to be heated on the FlexWave System.

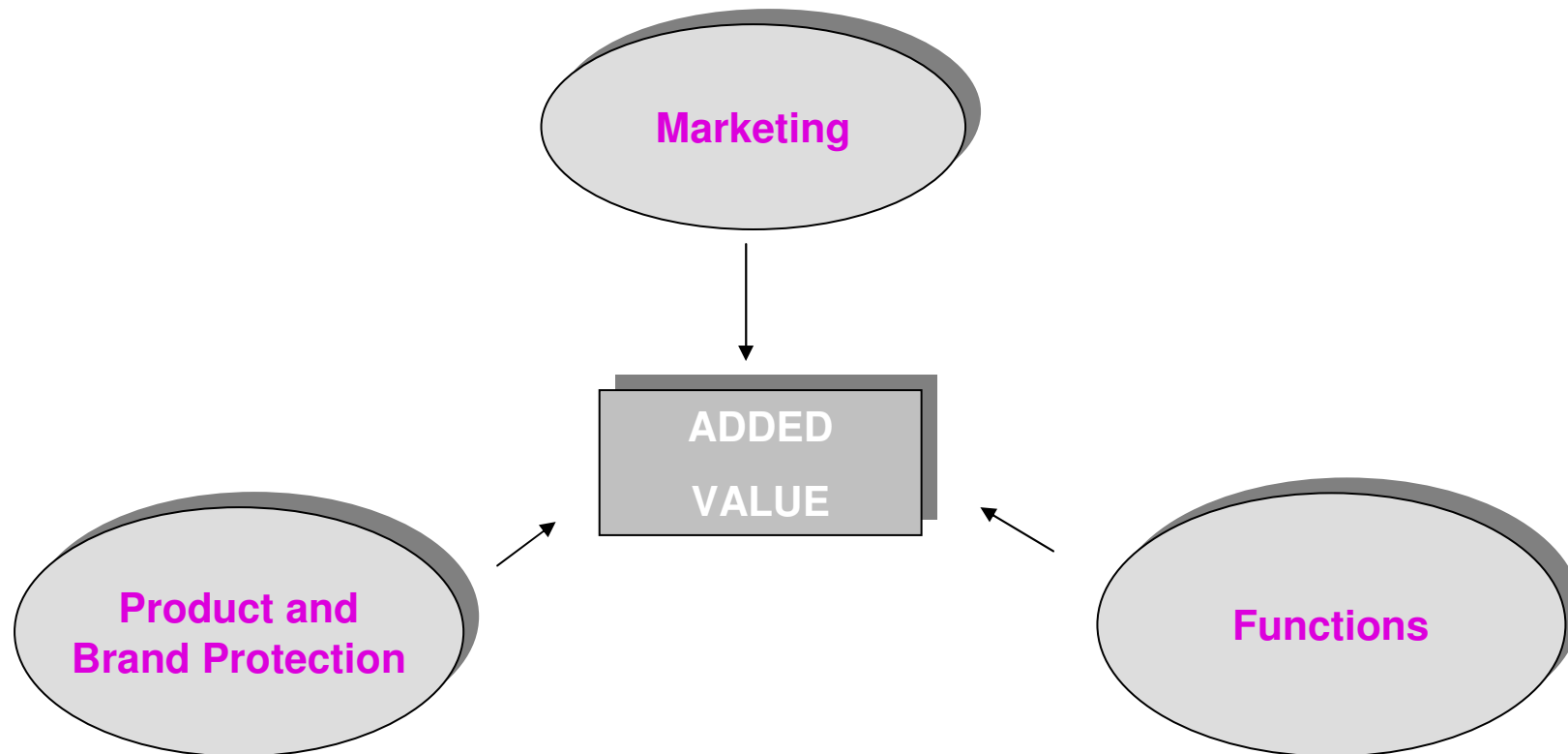
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INOTECH's Advantage and Know-how

- More than 25 years experience in multi-component-processing
- Know-how in
 - Product and Process Development → Preform Design
 - Engineering and Project Management
 - Tool concepts and construction
 - Mould manufacturing
 - Prototyping preforms
 - Material research and development
- Production of Multi-Component Preforms

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Why using the INOTECH's Technology?



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**Realized Samples during
our Development**

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Ideas and Animations

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Food & Beverage



1st Shot:
Black color to protect milk against
UV light

2nd Shot:
White color for design

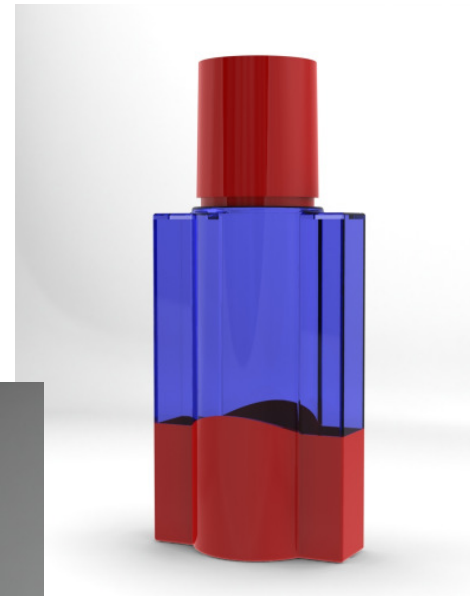
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Household



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Personal Care



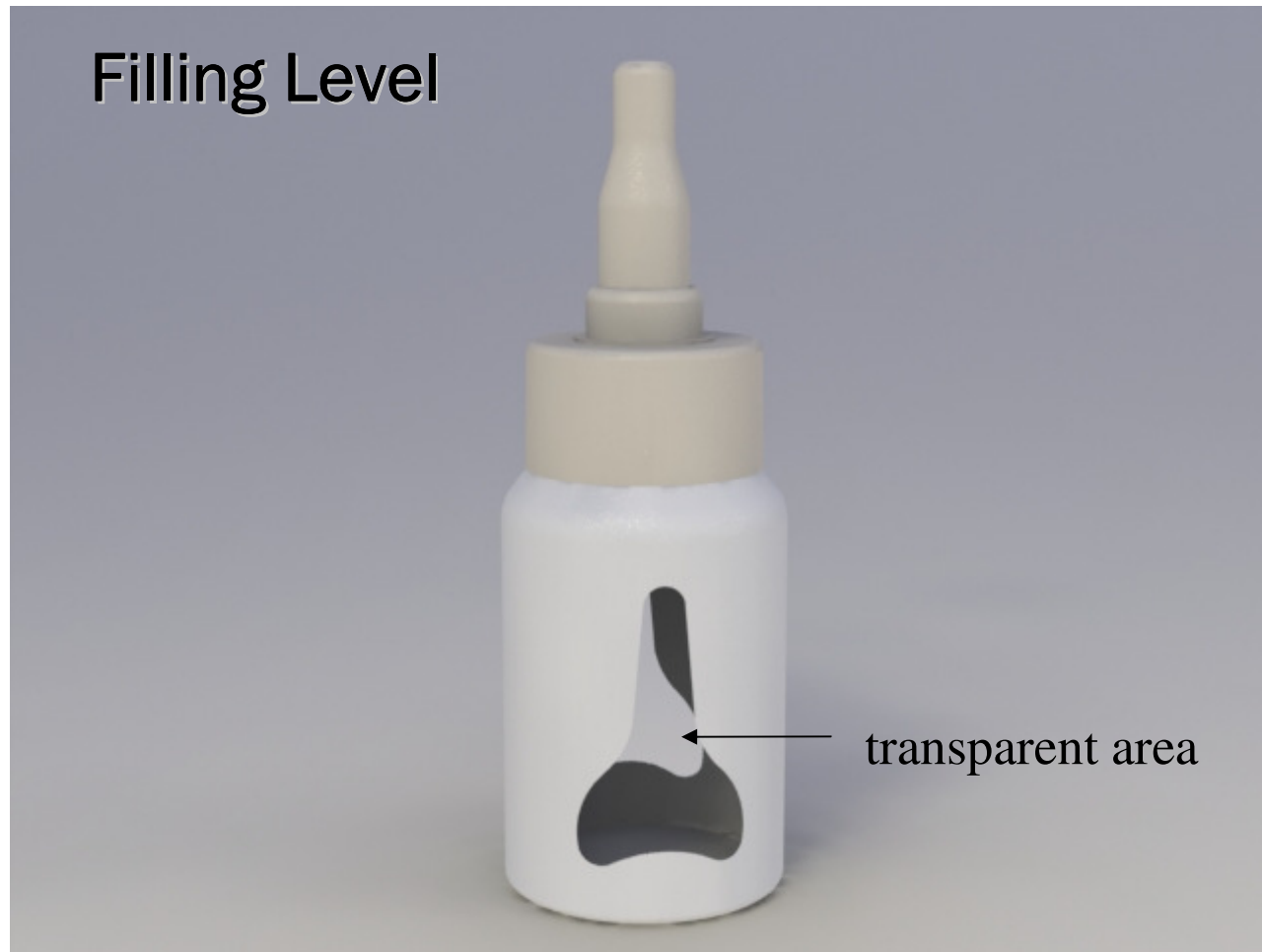
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Lipgloss with viewing window

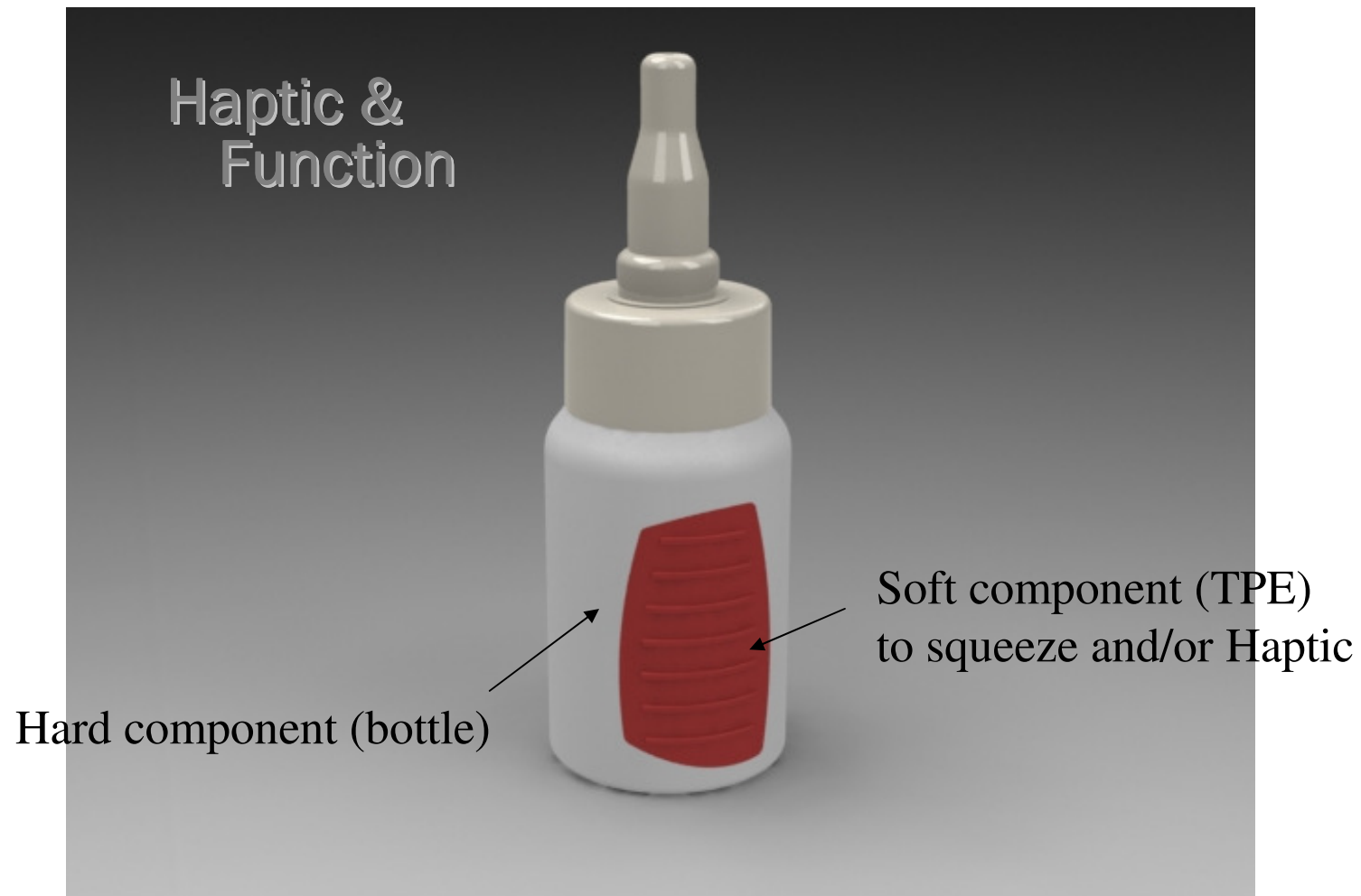


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Filling Level



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Anti-microbial Bottles

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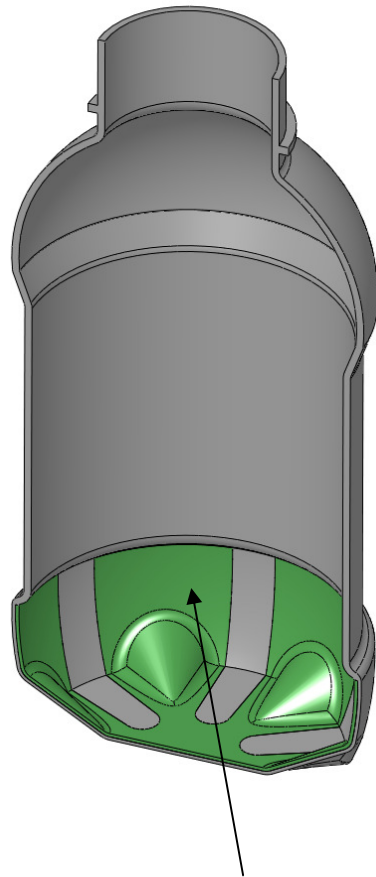
Industry of beverages challenge :

contamination and spoilage during filling process and shelf life by spoilage microorganisms

Solutions:

1. **Preservatives:** affects taste and considered less and less attractive.
2. **Heat treatment:** affects nutritious values, requires energy and doubles amount of Polyethylene terephthalate (PETE) required for the bottles.
3. **Aseptic filing:** expensive.

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Active Polymer Coating

The „**active polymer coating**“ is injected partial at the inner layer of the bottle.

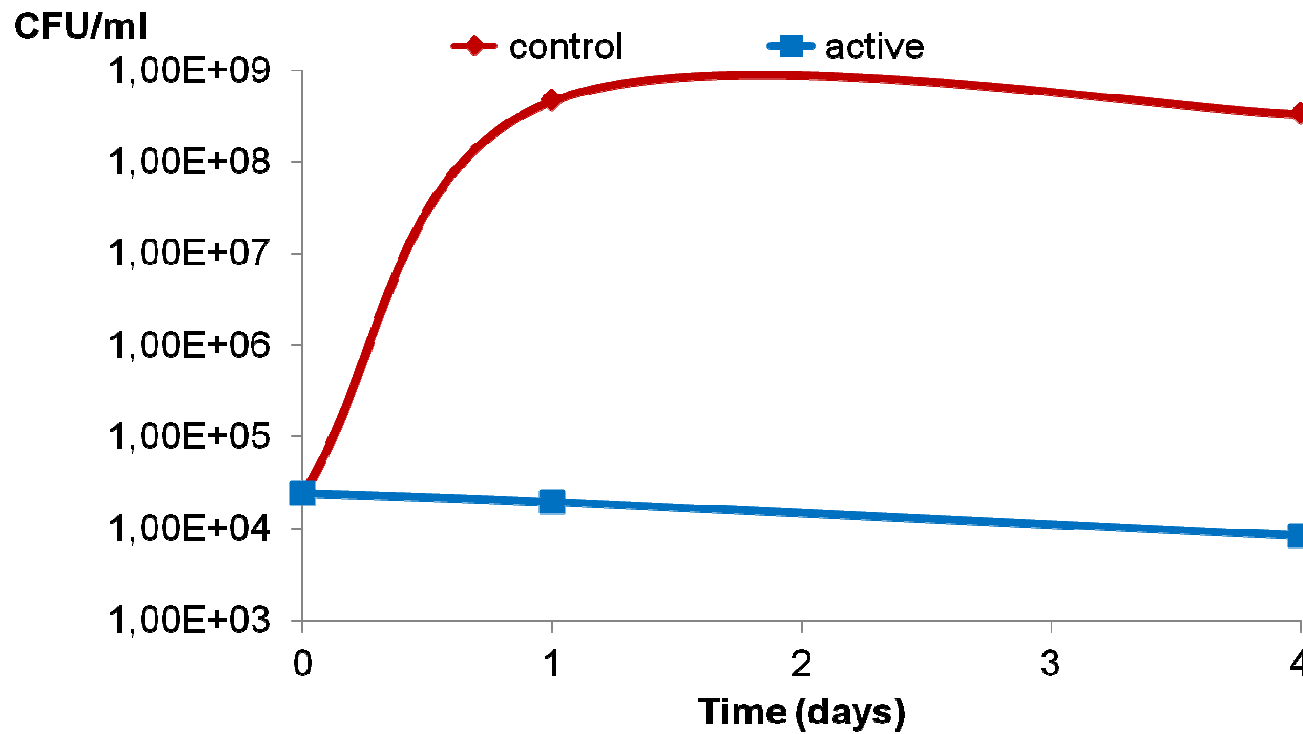
In a second step the bottle is built with PET.

The results are unbelievable:
Filling and storage of Fresh Milk and Orange Juice at 30° C.

See reaction of bacterias in the following sheets:

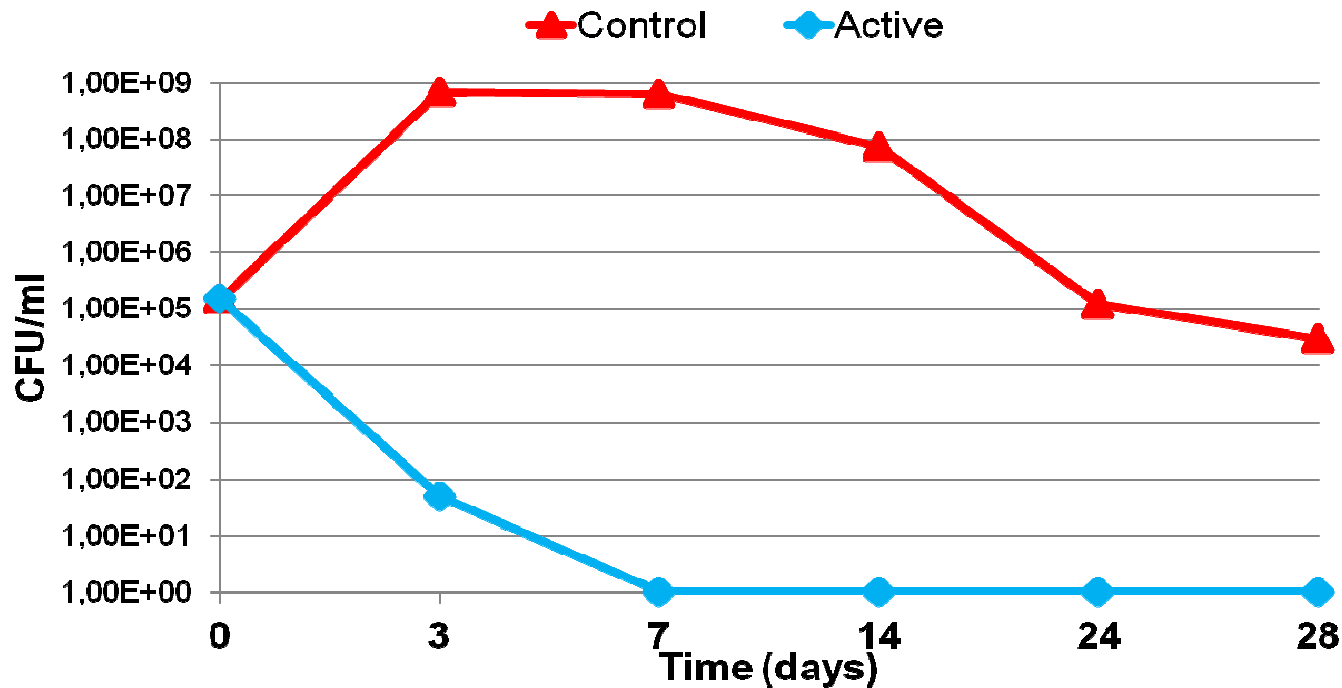
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Milk inoculated with *Lactobacillus lactis*
at 30°C



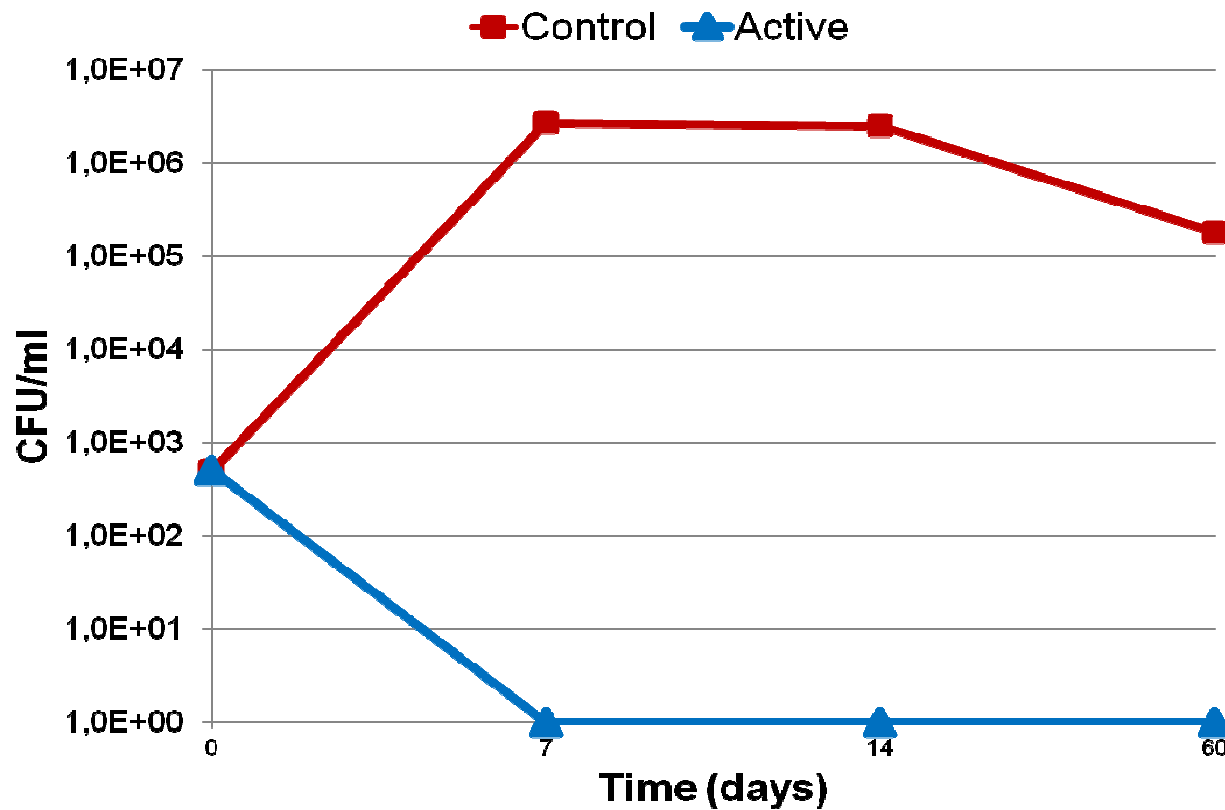
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Orange juice inoculated with *Acetobacter aceti* and *Lactobacillus plantarum* at 30°C



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RTD Tea inoculated with *Saccharomyces cerevisiae* and *Zygosaccharomyces rouxii* at 30°C



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Product and Brand Protection

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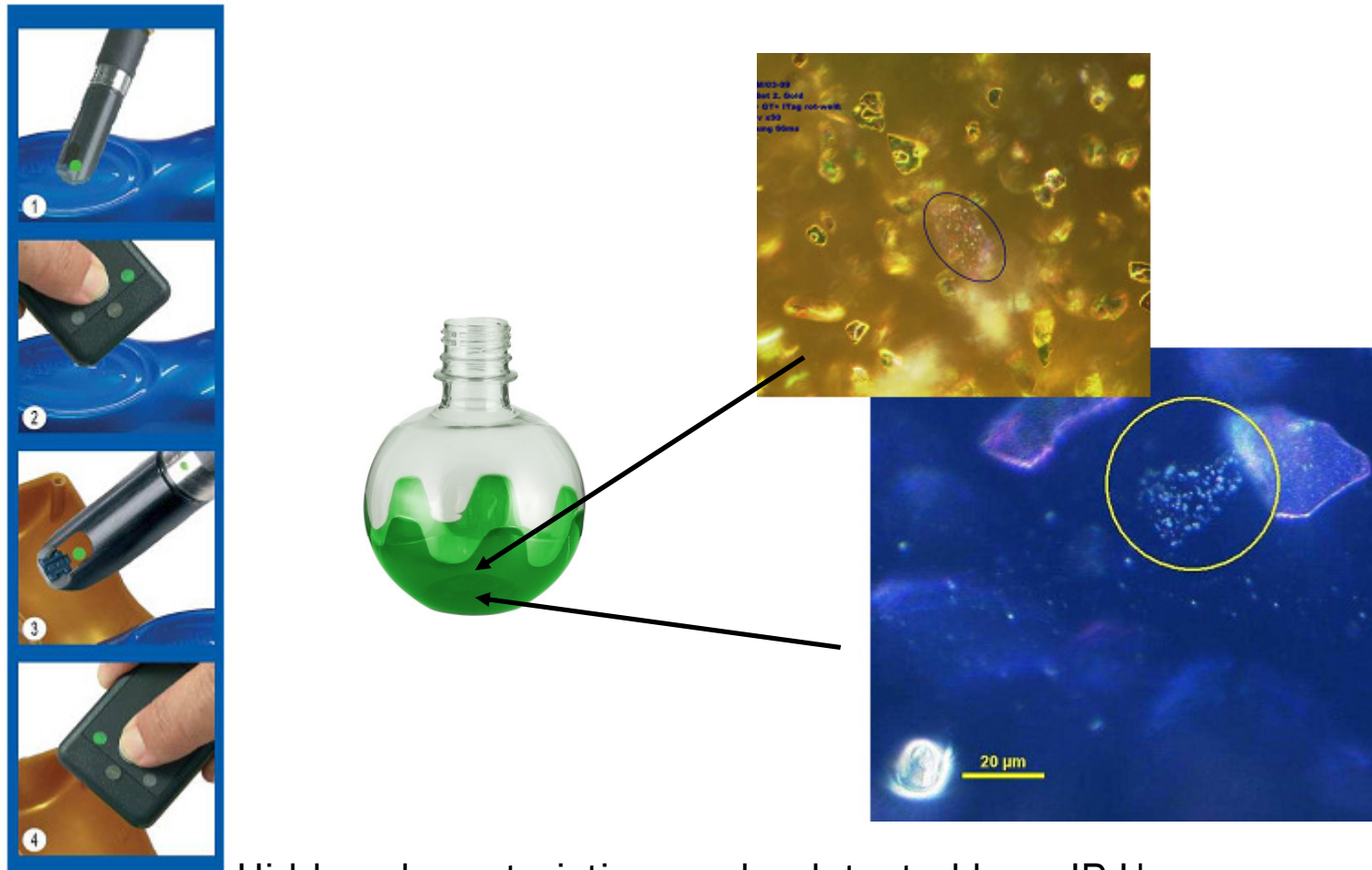
Pigments with **Securalic** from Merck



Advantages with BI-COLOR (partial use):

- Pigments are at a very high price
- Pigments are not removeable
- The share of the Pigments on the total volume of the container is very minor and therefore useless after recycling process
- These security pigments are based on a protected technology by Merck KGaA Darmstadt

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Hidden characteristics can be detected by a IR Up-Converter or with forensic tools.

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The INOTECH GmbH actually has two Patent Applications to produce blown containers:

→ Stretch Blow Moulding (SBM):

Preform partial moulded with minimum 2 components and blow moulded in a second stage



→ Single-Stage Process:

Process and machine to produce multi-component plastic containers by injection blow moulding



Please be invited to PET's Talent

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Thank you very much for your Attention!