

MICROBIOLOGICAL RESULTS

PERFORMANCE BY TYPE OF PACKAGING
(FRAUNHOFER INSTITUT / CLARANOR)

BEVERAGES AND LIQUID FOOD MARKETS

CAP STERILIZATION



Tethered cap 28 mm

- Spray inoculation - *A. brasiliensis* DSM 1988 surface in contact with the product
- Initial contamination: 4.6×10^3
- 1 lamp reflector

| | | |
|--------------------|------|--|
| Flash N° | 1 | |
| Mean log-reduction | >3.7 | |



Flat cap Bericap 28 mm

- Spray inoculation - *A. brasiliensis* DSM 1988 surface in contact with the product
- Initial contamination: 1.8×10^5
- 1 lamp reflector

| | | |
|--------------------|---|-----|
| Flash N° | 1 | 2 |
| Mean log-reduction | 4 | 4.4 |



Flat cap Silgan 38 mm with foil

- Spray inoculation - *A. brasiliensis* DSM 1988 surface in contact with the product
- Initial contamination: $10^{4.9}$
- 1 lamp reflector

| | | |
|--------------------|-----|------|
| Flash N° | 1 | 2 |
| Mean log-reduction | 4.9 | >4.9 |



Sport cap Bericap 30 mm

- Spray inoculation - *B. subtilis* DSM 675 surface in contact with the product
- Initial contamination: 2.2×10^5
- 2 lamps reflector

| | | |
|--------------------|-----|------|
| Flash N° | 1 | 2 |
| Mean log-reduction | 5.1 | >5.3 |



Sport cap Aptar Uno 38 mm

Full Cap : internal / external sterilization

- Spray inoculation *A. brasiliensis* DSM 1988 all surfaces
- Initial contamination: 5×10^4
- 2 lamps reflector for inside, surface in contact with the product, seal and thread
- 2 lamps reflector for surfaces under the cover « dead volume »

| | | |
|--------------------|------|--|
| Flash N° | 1 | |
| Mean log-reduction | >4.6 | |



Flat cap 43 mm with an aluminium foil

Full Cap : internal / external sterilization

- Spray inoculation *B. subtilis* spores SC 204-2
- Initial contamination: 1.2×10^3
- 2 lamps reflector for internal surface
- 1 lamp reflector for external surface

| | | |
|--------------------|------|------|
| Flash N° | 1int | 2ext |
| Mean log-reduction | >4 | >3.8 |



Crown Cap

- Spray inoculation - *A. brasiliensis* DSM 1988 surface in contact with the product
- Initial contamination: 3.6×10^5
- 1 lamp reflector

| | | |
|--------------------|------|--|
| Flash N° | 1 | |
| Mean log-reduction | >4.9 | |

BEVERAGES AND LIQUID FOOD MARKETS

BOTTLE LID STERILIZATION



Lid ø 23 mm

- Multi dots inoculation - *A. brasiliensis* DSM 1988
- Initial contamination:
inner surface: 2.8×10^3
- 1 lamp reflector

Inner surface

| | |
|--------------------|------|
| Flash N° | 1 |
| Mean log-reduction | >3.4 |

PREFORM STERILIZATION



Preform neck

- Multi dots inoculation - *A. brasiliensis* DSM 1988
- Initial contamination:
inner surface: 2.7×10^4
outer surface: 1.4×10^4
- 2 lamps reflector
- Interior preform 1-2log depending on size and color, for sizes up to 2L.

Inner surface

| | |
|--------------------|-----|
| Flash N° | 1 |
| Mean log-reduction | 4.4 |

Outer surface

| | |
|--------------------|---|
| Flash N° | 1 |
| Mean log-reduction | 4 |

METAL CAN AND LID STERILIZATION



Can 568 ml ø 55 mm x 190 mm

- Inoculation by spray whole internal surface
- Initial contamination:
A. brasiliensis DSM 1988 : 2×10^3
- 2 lamps reflector

| | |
|--------------------|-----|
| Flash N° | 3 |
| Mean log-reduction | 3.4 |

Lid 500 ml ø 202



- Inoculation by spot – both sides of the lid
- Initial contamination:
A. brasiliensis DSM 1988 8.7×10^3
B. subtilis : 3.1×10^4
- 2 lamps reflector

| | | |
|--------------------|------------------------|--------------------|
| Flash N° 1 | <i>A. brasiliensis</i> | <i>B. subtilis</i> |
| Mean log-reduction | >3.9 | >4.3 |