# MiRA Test

## Microbiological test with spores of *Geobacillus stearothermophilus* for the detection of antimicrobial agent residues in milk


Clear color change interpretation

Results within 4 hours

Some groups of antimicrobial agents, including beta-lactams and tetracyclines, are thermo-sensitive: the molecules belonging to those chemical classes are rapidly inactivated at growth temperature of thermophilic bacteria. The **MiRA Test** includes a quick pre-incubation in which *G. stearothermophilus* is allowed to germinate and proliferate, followed by a phase at room temperature suitable to allow the contact between the vegetative form of *Geobacillus* and the thermo-sensitive antibiotics, if present in the sample. Finally, the tube is reintroduced into the incubator for the last incubation. The incubation sequence of **MiRA Test** is the critical characteristic that allows the method to reach extremely low detection limits.

## MiRA Test

Ref. 80355
Content of the package: 50 tests

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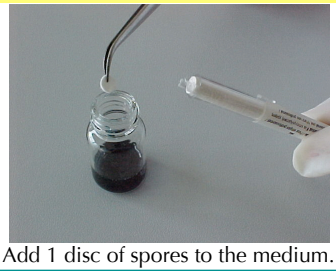
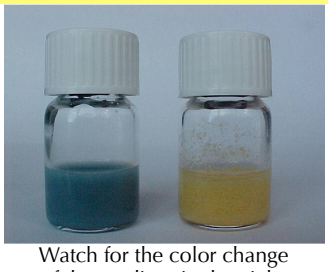
# Test procedure

| 1 | 2 | 3 |
|---|---|---|
|  |  |  |
| Pack content: liquid medium + spore cartridge. | Add 1 disc of spores to the medium. | Pre-incubate for 20′ at 64 ± 0.5 °C. |
| **4** | **5** | **6** |
|  |  |  |
| Remove the vial from the incubator and let it reach room temperature (roughly 5').<br>Introduce 1 mL of the milk sample.<br>Let the antimicrobial agent, if present, act at room temperature for 20′. | Reintroduce the vial in the waterbath or in the Termoblock at 64 ± 0.5 °C for the second incubation for 3h - 3h 30′. | Watch for the color change of the medium in the vials.<br>No color change (**gree-blue color**): milk sample containing antimicrobial agent residues in concentration above the detection limits.<br>Color change (**yellow color**): milk sample containing no antimicrobial agent residues, or residues in concentration under the detection limits. |

| **Antimicrobial agents** | **MRL** for milk<br>MAXIMUM RESIDUE LIMITS (µg/kg) | **MiRA Test** Sensitivity in 3h 30' [1]<br>DETECTION LIMITS (µg/kg) |
|---|---|---|
| **BETA-LACTAMS** | | |
| Penicillin G | 4 | 2-4 |
| Ampicillin | 4 | 2-4 |
| Oxacillin | 30 | <10 |
| Cloxacillin | 30 | <10 |
| Dicloxacillin | 30 | <10 |
| Amoxicillin | 4 | 2-4 |
| Benzylpenicillin | 4 | 2-4 |
| Nafcillin | 30 | 15-30 |
| Penethamate | 4 | 2-4 |
| Cefalexin | 100 | 50-100 |
| Cefazolin | 50 | 25-50 |
| Ceftiofur | 100 | 50-100 |
| Cephapirin | 60 | 5-10 |
| Cefquinome | 20 | 10-20 |
| **TETRACYCLINES** | | |
| Tetracycline | 100 | 50-100 |
| Clorotetracycline | 100 | 50-100 |
| Oxytetracycline | 100 | 50-100 |
| **MACROLIDES** | | |
| Erithromycin | 40 | <10 |
| Tylosin | 50 | 25-50 |
| Tilmicosin | 50 | 20-40 |
| Spiramycin | 200 | 100-200 |
| **LINCOSAMIDES** | | |
| lincomycin | 150 | 75-150 |
| Pirlimycin | 100 | <50 |
| **AMINOGLYCOSIDES** | | |
| Gentamicin | 100 | 50-100 |
| Neomycin | 1500 | <100 |
| Streptomycin | 200 | <100 |
| Dihydrostreptomycin | 200 | <100 |
| **SULPHAMIDES** | | |
| Sulfadiazine | 100 | <150 |
| **SULFANILAMIDES** | | |
| Sulfadimidine | 100 | <200 |
| **BENZIL PIRIMIDINE** | | |
| Trimethoprim | 50 | 25-50 |
| **QUINOLONES** | | |
| Flumequine | 50 | 50-100 |
| Enrofloxacin | 100 | 50-100 |
| **NOVOBIOCIN** | | |
| Novobiocin | 50 | 100-200 |

1. Sensitivity of **MiRA Test** to antimicrobial agents commonly used in veterinary medicine and relevant MRL (Maximum Residue Limits) values valid in Europe. (Regulation 37/2010 EC)