



## Charm Gold Standard Tests

Charm® Blue Yellow II and CowSide® II tests have achieved the Gold Standard and established new benchmarks in sensitivity by detecting more antimicrobial drugs in raw and UHT milk in a single test at or below established regulatory levels. (Table 1.)

Before rapid antibiotic test kits emerged in the dairy industry in the 1970s and 80s, microbial inhibition assays (MIA) were the “defacto” standard. Even with widespread acceptance of new rapid tests like Charm I and Charm II, the slower MIA tests retained their “Gold Standard” status as the definitive tests to confirm rapid test presumptive positive results.

|                 |                           | CowSide II     | Blue Yellow II | EU/CODEX MRL             |
|-----------------|---------------------------|----------------|----------------|--------------------------|
| Family          | Drug                      | (ppb)          | (ppb)          | (ppb)                    |
| Beta-lactams    | Amoxicillin               | 3 to 4 ppb     | 2 to 3 ppb     | 4/4 ppb                  |
|                 | Ampicillin                | 3 to 4 ppb     | 2 to 3 ppb     | 4 ppb                    |
|                 | Cefacetrile               | 10 to 15 ppb   | 10 to 15 ppb   | 125 ppb                  |
|                 | Cefalexin                 | 75 to 100 ppb  | 60 to 100 ppb  | 100 ppb                  |
|                 | Cefalonium                | 15 to 20 ppb   | 10 to 15 ppb   | 20 ppb                   |
|                 | Cefazolin                 | 6 to 10 ppb    | 6 to 10 ppb    | 50 ppb                   |
|                 | Cefoperazone              | 20 to 30 ppb   | 20 to 30 ppb   | 50 ppb                   |
|                 | Cefquinome                | 40 to 60 ppb   | —              | 20 ppb                   |
|                 | Ceftiofur and Metabolites | 50 to 100 ppb  | 50 to 100 ppb  | 100/100 <sup>a</sup> ppb |
|                 | Cefuroxime                | 20 to 25 ppb   | 20 to 25 ppb   | None                     |
|                 | Cephapirin                | 8 to 10 ppb    | 4 to 6 ppb     | 60 ppb                   |
|                 | Cloxacillin               | 10 to 25 ppb   | 10 to 20 ppb   | 30 ppb                   |
|                 | Dicloxacillin             | 5 to 10 ppb    | 10 to 20 ppb   | 30 ppb                   |
|                 | Nafcillin                 | 5 to 10 ppb    | 3 to 5 ppb     | 30 ppb                   |
|                 | Oxacillin                 | 5 to 10 ppb    | 8 to 10 ppb    | 30 ppb                   |
| Sulfonamides    | Penicillin G              | 2 to 3 ppb     | 1 to 2 ppb     | 4/4 ppb                  |
|                 | Sulfadiazine              | 40 to 60 ppb   | 80 to 100 ppb  | 100 ppb                  |
|                 | Sulfadimethoxine          | 25 to 50 ppb   | 50 to 75 ppb   | 100 ppb                  |
|                 | Sulfadoxine               | —              | 75 to 125 ppb  | 100 ppb                  |
|                 | Sulfamethazine            | 75 to 125 ppb  | 75 to 125 ppb  | 100/25 ppb               |
|                 | Sulfapyridine             | —              | 75 to 125 ppb  | 100 ppb                  |
|                 | Sulfathiazole             | —              | 25 to 75 ppb   | 100 ppb                  |
| Tetracyclines   | Chlortetracycline         | 200 to 300 ppb | 150 to 200 ppb | 100/100 ppb              |
|                 | Doxycycline               | 25 to 75 ppb   | 25 to 75 ppb   | 0 <sup>a</sup>           |
|                 | Oxytetracycline           | 75 to 100 ppb  | 75 to 100 ppb  | 100/100 ppb              |
|                 | Tetracycline              | 50 to 100 ppb  | 75 to 100 ppb  | 100/100 ppb              |
| Macrolides      | Erythromycin              | 75 to 100 ppb  | 100 to 150 ppb | 40 ppb                   |
|                 | Lincomycin                | —              | 100 to 150 ppb | 150/150 ppb              |
|                 | Pirlimycin                | 25 to 50 ppb   | 50 to 100 ppb  | 100/100 ppb              |
|                 | Spiramycin                | 300 to 400 ppb | 400 to 500 ppb | 200/200 ppb              |
|                 | Tilmicosin                | 25 to 35 ppb   | 25 to 35 ppb   | 50/100 ppb               |
| Aminoglycosides | Tylosin                   | 20 to 30 ppb   | 20 to 30 ppb   | 50 ppb                   |
|                 | Gentamicin                | 75 to 150 ppb  | 75 to 100 ppb  | 100/200 ppb              |
|                 | Neomycin                  | 100 to 150 ppb | 75 to 150 ppb  | 1500/1500 ppb            |
| Other           | Dapsone                   | 1 to 2 ppb     | 1 to 2 ppb     | 0 ppb                    |

### GOLD STANDARD MEANING

The “Gold Standard” is a term associated with establishing standards in monetary systems. It is a standard that has withstood the test of time. In medicine, a “Gold Standard Test” refers to the ultimate diagnostic test that can provide a definitive diagnosis.

At Charm Sciences, a Gold Standard Test is the highest achievement we can apply to a Charm Test. It means the test has achieved the highest standard of excellence in the marketplace.



In the 1990s, the dairy industry around the world realized there was a significant sensitivity gap between MIA tests and the rapid tests, which led to MIA tests being dropped from confirmation programs on bulk milk pick-up tankers. In recent years, MIA tests have been delegated to test on the farm or in central producer testing laboratories. Even here, conflicts have arisen as sensitivity gaps can still leave dairy producers and dairy processors vulnerable.

Today, the Charm Blue Yellow II and CowSide II tests are creating a paradigm shift in antibiotic residue detection in milk. This is achieved with a sensitivity breakthrough that all but eliminates the sensitivity gap when compared to rapid tests. The end result: Charm next-generation MIA tests provide greater uniformity and harmony with established regulatory limits such as EU MRLs (Maximum Residue Limits), CODEX, FDA Safe Level/Tolerances, Australian and New Zealand MRLs.

#### Example Procedure: Blue Yellow II Test



1. Break apart into individual wells, use strips of 8, or full plate of 96.



2. Pipet 50 µL milk sample into each well



3. Seal wells and incubate



4. Remove and observe color

#### Charm BlueYellow II and CowSide II Achieves Gold Star Standard:

- Detect more beta-lactam antibiotics in raw and UHT milk at or nearer EU MRLs
- Only MIA tests to detect ceftiofur at 100 ppb (total metabolites)
- First MIA tests to detect tetracycline antibiotics in milk at or near EU MRLs
- First MIA tests to detect sulfonamide antibiotics in milk at or near EU MRLs
- Detect more aminoglycoside antibiotics in milk at or near EU MRLs
- No reagents to dispense
- Multiple incubator options
- Reader option for Blue Yellow II Test
- Customized incubation times for each new lot
- Antibiotic milk standards included in Blue Yellow II Kit
- Proficiency antibiotic milk standards available

#### PRINCIPLES

The Blue Yellow II and CowSide II tests consist of single service wells that contain pre-measured bacterial spores, media, and a pH indicator. Reagents are unit dosed and compartmentalized to ensure uniformity. The Blue Yellow II is formatted for high volume usage with break-apart wells, and the CowSide II is formatted for single test usage. Customized incubation times for each new kit lot assures uniform sensitivity lot to lot.

As seen in the [Example Procedure](#) to the right, the starting color in the well is blue. Milk is added to the microwell and incubated. Spores germinate and grow, generating acid, which is indicated by color change to yellow. If antibiotics are present in the milk, microbial growth is inhibited so that no acid is generated. Thus, antibiotic positive samples remain blue.

**Analysengeräte, Spezialreagenzien, Schnelltests zur Untersuchung von: Getreide, Futtermittel, Mehle, Milch u. Milchprodukte & Rohmilch**  
**Tests auf Antibiotika & Mykotoxine - Schnellanalyse der Betriebshygiene, Produktsicherheit & Haltbarkeit von Lebensmittel – Peel Plate Mikrobiologische Tests**



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