

VALIDATION OF 4SENSOR[®] MILK (KIT060) FOR THE TESTING OF RAW MILK ON THE PRESENCE OF β -LACTAMS, TETRACYCLINES, (DIHYDRO)STREPTOMYCIN AND CHLORAMPHENICOL

Wim Reybroeck and Sigrid Ooghe

Flemish Government, Institute for Agricultural and Fisheries Research (ILVO), Technology and Food Science Unit, Brusselsesteenweg 370, 9090 Melle, Belgium

Wim.Reybroeck@ilvo.vlaanderen.be

Introduction

The 4SENSOR[®] Milk (KIT060) (Unisensor s.a., Ougrée, BE) is a competitive antibody/receptor test for the rapid (10 minutes) and simultaneous detection of residues of antibiotics in raw cows' milk on Russian Federation level (Customs Union, 2010).

Aim

Evaluation study of the 4SENSOR[®] Milk (KIT060) according to Commission Decision 2002/657/EC and the CRLs' Guidelines for the validation of screening methods for residues of veterinary medicines (Anon., 2010).

Evaluation parameters

Following analytical parameters were evaluated: detection capability and test robustness (evaluation for influences from compositional components or milk quality, rate of false positive results and participation in a national ring trial).

Results

1. Detection capability

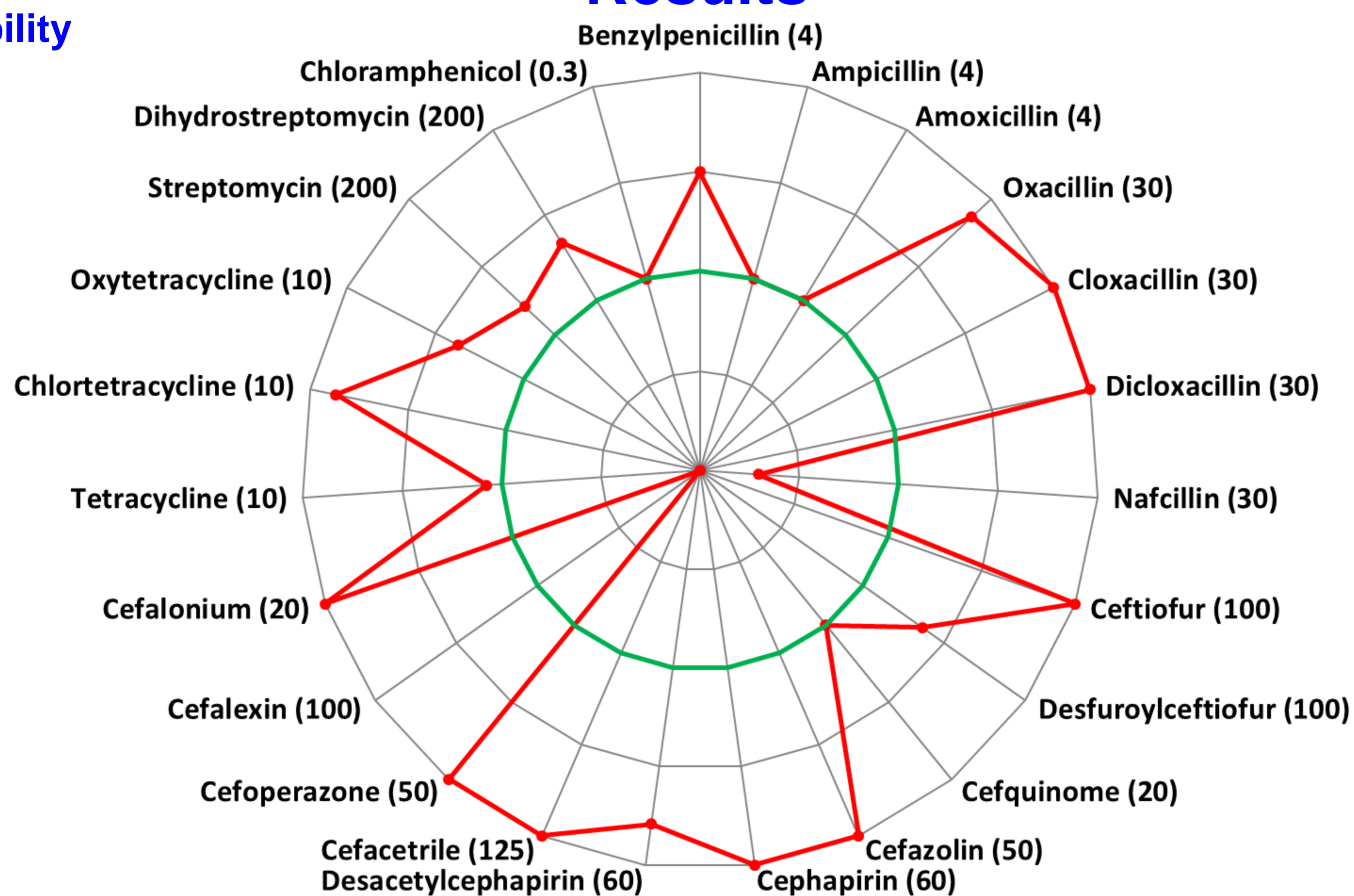


Figure 1. Detection capability of 4SENSOR[®] Milk (KIT060) for β -lactams, (dihydro)streptomycin, and chloramphenicol related to their respective MR(P)L (Commission Regulation (EU) N^o 37/2010 and Commission Decision 2003/181/EC) or Customs Union MPL (Customs Union Commission 2010) and for tetracyclines related to their respective Customs Union MPL; legislation situation on 01/01/2016. Inner circle = 2 \times MR(P)L or MPL; circle 2 = MR(P)L or MPL; circle 3 = 0.5 \times MR(P)L or MPL; circle 4 = 0.25 \times MR(P)L or MPL. MR(P)L or MPL (μ g/kg) in cows' milk in between brackets after the name of each substance. Results obtained with Readsensor and cut-off ratio = 1.10 except for chloramphenicol (cut-off ratio = 1.25).

2. Test robustness

Table 2. Robustness of the 4SENSOR[®] Milk (KIT060).

Parameter	Impact on test result (ratio)					Parameter	Impact on test result (ratio)				
	Blank milk	Doped milk					Blank milk	Doped milk			
		Pen G 3 μ g/kg	OTC 10 μ g/kg	DHS 200 μ g/kg	CAP 0.3 μ g/kg			Pen G 3 μ g/kg	OTC 10 μ g/kg	DHS 200 μ g/kg	CAP 0.3 μ g/kg
High SCC (>10 ⁶ per ml)	↓ a*,b,c*,d*	no	↓	no	no	Low protein (<2.5 g per 100 ml)	↑ a,c,d	↑ **	↓	no	↑ **
High TBC (>5 \times 10 ⁵ CFU/ml)	no	no	no	no	↑ **	High protein (>4 g per 100 ml)	↓ d*	no	no	no	↑
Low fat (<2 g per 100 ml)	↓ a,b	no	no	↑ **	↑ **	Low pH (6.0)	↓ a*,b	↓	↓	no	no
High fat (>6 g per 100 ml)	↓ a,b,d*	↓	↓	no	↑ **	High pH (7.5)	no	no	no	no	no
False positive results	3.33% b*	---	---	---	---						

Notes: Pen G: benzylpenicillin; OTC: oxytetracycline; DHS: dihydrostreptomycin; CAP: chloramphenicol; SCC: somatic cell count; TBC: total bacterial count; ↑: increased ratio, lower detection capability; ↓: decreased ratio, better detection capability; *: false positive results; **: negative results; a: β -lactam test line; b: tetracycline test line; c: streptomycin test line; d: chloramphenicol test line.

Conclusions

The 4SENSOR[®] Milk (KIT060) demonstrated a detection capability profile for β -lactams, tetracyclines, streptomycin and chloramphenicol in line with Russian Federation levels. Most interference was found caused by an abnormal high number of somatic cells (>10⁶ per ml). Since false positive results on the tetracycline channel could occur, it is recommended to confirm a positive tetracycline result by repeating the test with a second dipstick.



Flanders
is agriculture and fisheries



Institute for Agricultural
and Fisheries Research