

MONOSCREEN^{Ab} ELISA - *Coxiella* blocking - phase I

BIOK001-Cox_Blocking_Phase1_PP_(EN)_V01
26/01/2024

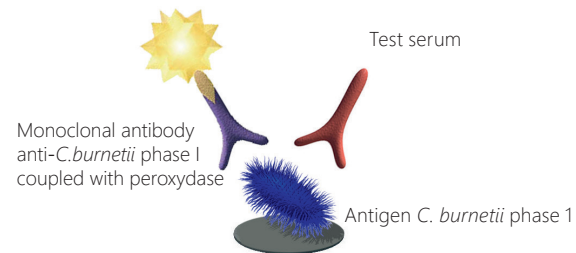
Reference : BIO K 001

BRIEF OUTLOOK ON THE DISEASE

Q fever mainly affects humans, cattle, sheep and goats. The etiological agent, *Coxiella burnetii* is a Gram-negative intracellular bacterium which multiplies in the macrophage phagolysosomes.

Q fever has mostly been associated with late abortions and reproductive disorders such as premature birth, dead or weakened fetuses, metritis and infertility.

Nevertheless, in a given species the serological responses or the isolation of the bacterium do not necessarily correlate with the expression of the clinical disease. Serological analyzes are appropriate for screening herds, but the interpretation at the individual level can be difficult.



Phase I vs. Phase II

Coxiella burnetii can occur in two antigenic forms:

- a **pathogenic phase I**, isolated from infected animals or individuals,
- an **avirulent phase II**, obtained *in ovo* or *in vitro*.

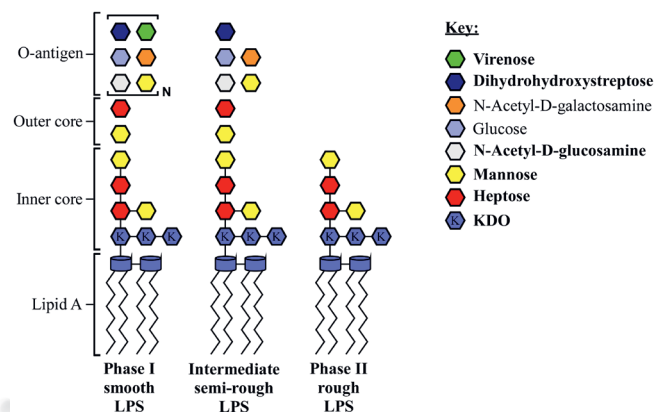
Two forms of infections, **acute** and **chronic**, which have different serological profiles have been described: during the acute phase of the disease, titers of type IgG antibodies are high against phase II, while during the chronic phase of the disease, elevated levels of anti-phase I and II IgG antibodies are observed.

Two unusual O-antigen sugars unique to *C. burnetii* LPS are virenose (6 deoxy-3-C-methylgulose) and dihydrohydroxy-streptose (3-C-(hydroxymethyl)-L-lyxose).

A gene necessary for virenose synthesis and O-antigen addition to an intermediate LPS form was also identified. Organisms synthesizing this form can be derived from a chronically-infected animal.

Persistently infected cows are characterized by elevated Phase I titres and the use of specific phase I kit is interesting for herd infection monitoring.

Genetic mechanisms of *Coxiella burnetii* lipopolysaccharide phase variation:



Beare, P. A., Jeffrey, B. M., Long, C. M., Martens, C. M., & Heinzen, R. A. (2018). Genetic mechanisms of *Coxiella burnetii* lipopolysaccharide phase variation. *PLoS pathogens*, 14(3), e1006922.

Test principle

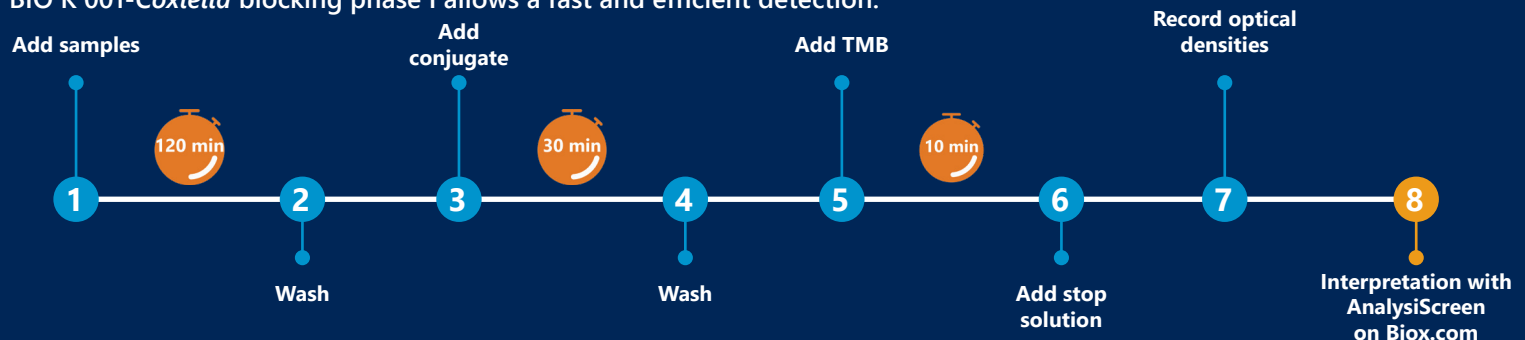
In case of presence of specific immunoglobulins of *Coxiella burnetii* phase I in the samples, the conjugate remains attached to the well containing the bacterial antigen and catalyzes the transformation of the colorless chromogen into a blue product.

The intensity of the color is proportional to the content of specific antibodies present in the sample.

	Results	Status
Bovine, caprine and ovine samples*	%inh < 70%	Negative
	%inh ≥ 70%	Positive

*Serum and milk

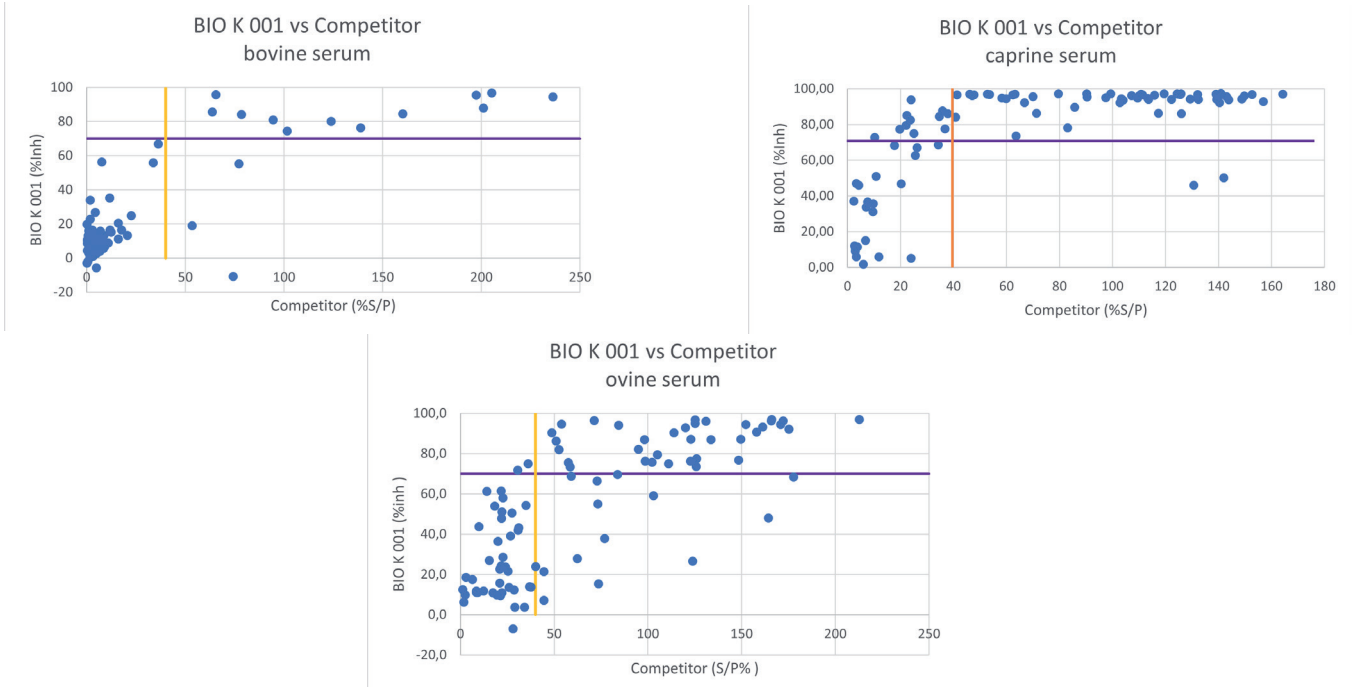
BIO K 001-*Coxiella* blocking phase I allows a fast and efficient detection.



DIAGNOSTIC SENSITIVITY AND SPECIFICITY

Bovine, caprine and ovine serum

Three cohorts each composed of 92 bovine, caprine or ovine serums was analyzed with BIO K 001 and a competitor's kit.

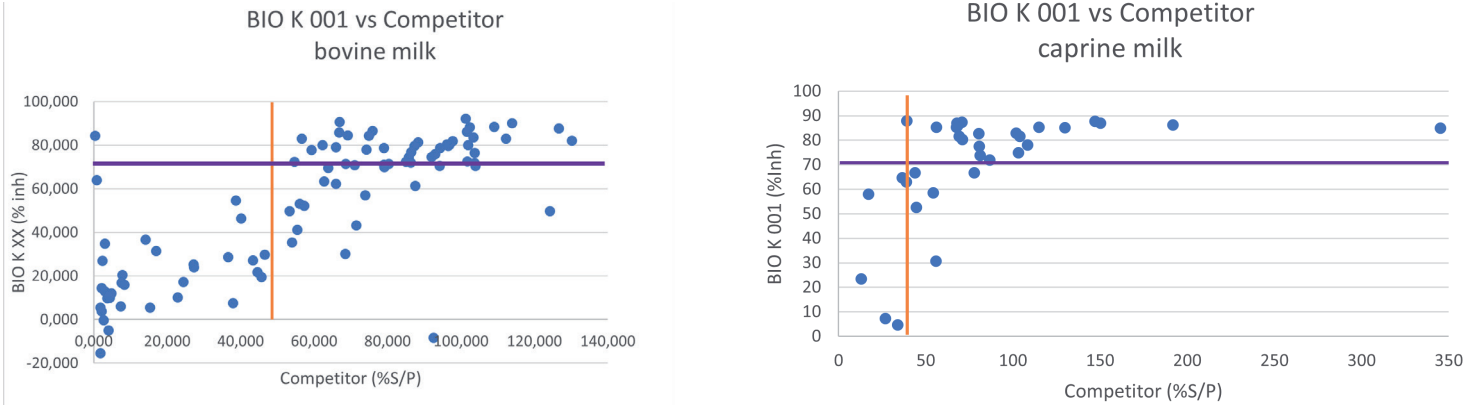


The characteristics of the BIO K 001 Monoscreen™ AbELISA *Coxiella* blocking - phase I kit versus a competitor's kit, for bovine/ovine/caprine sera, are presented in the following table.

	Relative sensitivity (%)	Relative specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Kappa
Bovine	80.00	100.00	100.00	96.25	0.87 - excellent
Ovine	71.43	95.35	95.59	74.55	0.66 - good
Caprine	96.61	66.67	83.82	91.67	0.67 - good

Bovine and caprine milk

Two cohorts each composed of 92 bovine milk samples and 36 caprine milk samples was analyzed with BIO K 001 and a competitor's kit.



The characteristics of the BIO K 001 Monoscreen™ AbELISA *Coxiella* blocking - phase I kit versus a competitor's kit for bovine/caprine milk samples are presented in the following table.

	Relative sensitivity (%)	Relative specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Kappa
Bovine	76.27	96.78	97.82	68.19	0.63 - good
Caprine	84.62	69.23	84.62	69.23	0.66 - good

TO ORDER :

Code	Description	Nb. of reactions
BIO K 001	Monoscreen™ AbELISA <i>Coxiella</i> blocking _ phase I	2 plates / 192 tests



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