

**INTRODUCTION AND PURPOSE**

The automated VIDAS® system (bioMérieux) using the Enzyme Linked Fluorescent Assay (ELFA) technique is suitable for routine, emergency, specific or complementary testing, notably in infectious diseases diagnostics.

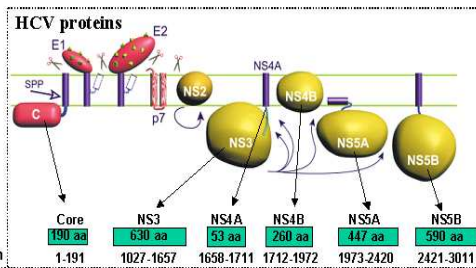


The VIDAS® system

To complete its existing HIV-Hepatitis (HAV & HBV) panel, a VIDAS® Anti-HCV prototype is currently in development allowing qualitative detection of antibodies to hepatitis C virus (anti-HCV) in human serum or plasma. We performed an evaluation of this prototype in terms of sensitivity and specificity compared to 4 already CE-marked tests: Architect® (Abbott), Elecsys® (Roche), Centaur® (Siemens) and Ortho HCV 3.0 ELISA (Ortho-Clinical diagnostics).

**METHODS**

The VIDAS® Anti-HCV principle combines a two-step enzyme immunoassay indirect sandwich method with a final fluorescent detection (ELFA). Anti-HCV antibodies present in the sample bind with antigens representing the HCV core, NS3 and NS4 proteins (solid phase) and with a monoclonal anti-human IgG antibodies conjugated to alkaline phosphatase (revelation step).



ASSAYS	Format	Detection	Antigen
VIDAS (ELFA)	Indirect sandwich	IgG	peptide (44aa), recombinant (1192-1457), peptide (43aa), peptide (29aa)
ARCHITECT (CLIA)	Indirect sandwich	IgG+IgM	E coli HC43, Yeast rec C100-3, 1192-1457, 1569-1931
ELECSYS (ECLIA)	direct sandwich	Total Ig	peptide (9-48), recombinant (1192-1457), peptide (1689-1743)
CENTAUR (CLIA)	Indirect sandwich	IgG	peptide (C22), Yeast rec C200, Yeast rec 2054-2995
ORTHO HCV (uplates EIA)	Indirect sandwich	IgG	protein (C22-3), Yeast rec C200, Yeast rec 2054-2995

FIGURE 1: Formats and representative HCV proteins used in the different Anti-HCV assays

The sensitivity study was performed on a collection of samples:

> 402 positive samples collected from patients at different stages of HCV disease (Biomnis Laboratory). 252 samples covering the 6 genotypes (1 to 6) have been drawn from the above collection. All of them have been tested in comparison with Architect®.

> 132 positive samples collected have been compared to 2 assays (Architect® and Ortho HCV 3.0 ELISA). Out of these samples, we also tested 22 dilutions.

The specificity study was performed on:

> 5,216 French blood donor samples (drawn from different plants in France), HCV negatives after being tested with molecular biology assay. A population of 450 samples has been tested in comparison with 4 immunoassay tests, Architect®, Elecsys®, Centaur® and Ortho HCV 3.0 ELISA.

> 476 samples have been selected on the basis of potential interference from other clinical context: HSV, VZV, Syphilis, HBV, HAV, HIV, CMV, EBV, Lyme, Rubella, Toxoplasmosis, presence of Human Anti-Mouse Antibodies, rheumatoid factors or Anti-Nuclear Antibodies. These samples have been tested in comparison with Architect®.

**RESULTS**

**1. SENSITIVITY:**

Performed on 402 positive samples, this analysis demonstrated the correct antibody detection of the VIDAS® Anti-HCV assay independently of the HCV genotype with a large majority of index values (S/CO) higher than 10: 87% versus 74.1% for Architect®.

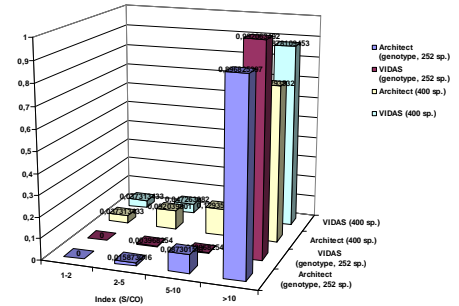


FIGURE 2: distribution of positive samples in Index (S/CO)

The comparative study performed on 154 tests (132 samples + 22 dilutions) shows that VIDAS® Anti-HCV has a sensitivity equivalent to Elecsys® systems while Ortho HCV and Architect® seem less sensitive for low positive samples.

Samples	VIDAS	ARCHITECT	ORTHO HCV
Natural*			
Tested	132	132	131
Positive	132	127	128
Negative	0	5	3
Diluted**			
Tested	22	22	22
Positive	22	19	16
Negative	0	3	6

\* all discrepant samples were confirmed with Elecsys® device or Immunoblot.

\*\* all diluted samples were confirmed as reactive with Elecsys® device

TABLE 1: Comparative evaluation of VIDAS Anti-HCV sensitivity on natural and diluted samples

**2. SPECIFICITY:**

> The study performed on the 5216 blood bank donor specimens demonstrated a high specificity of 99.71% [99.52%-99.83%],

> In the comparative specificity study performed on 450 negative samples, VIDAS® Anti-HCV showed comparable performances to the 4 other tests with <1% of discrepancy.

Samples	VIDAS	ORTHO HCV	ARCHITECT	ELECSYS	CENTAUR
Negative	448	450	449	449	446
Positive	2	0	1	0	4
Equivocal	NA	NA	NA	1	0
% Specificity	99.56%	100%	99.78%	99.78%	99.11%
	[98.36%-99.88%]	[99.12%-99.88%]	[98.72%-99.96%]	[98.72%-99.96%]	[97.70%-99.66%]
% Concordance with the other assays	99.55% to 99.56%	99.11% to 99.78%	99.33% to 100%	99.11% to 100%	99.11% to 99.55%

TABLE 2: Comparative specificity observed on 450 blood bank donors samples

> Analysis of potential cross-reactions was also investigated by testing 476 negative clinical samples showed no particular interference.

**CONCLUSION**

Evaluation of VIDAS® Anti-HCV sensitivity and specificity showed that this new prototype VIDAS® assay is as performant as other already CE-marked tests, notably Architect® and Elecsys® assays.