

## Serological, Bacteriological, and Molecular Investigation of Brucellosis in Bovine in Four Egyptian Governorates

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For testing purposes 347 documented positive and negative serum samples were collected from large ruminants with a history of *Brucella melitensis* infection. The buffer acidified plate agglutination test (BAPA) achieved highest relative sensitivity. In the case of BAPA, Rose Bengal Plate (RBPT), indirect ELISA (iELISA) and rivanol (Riv. T) tests, the kappa ( $\kappa$ ) agreement assessed for both species indicated a substantial agreement ( $p$  possibly 0.05). The diagnostic performance of serological tests in cattle was arranged in descending order as follows, according to the data obtained from the receiver operating characteristic curves (ROCs), the area under the ROCs and the diagnostic odd ratio; BAPAT, Riv. T, RBPT, iELISA, EDTA-modified micro-agglutination test (EDTA-mMAT), and MAT. In buffaloes the equivalent picture was, Riv. T, RBPT, BAPAT, iELISA, EDTA-mMAT and MAT. Eleven *Brucella* field isolates have been recovered while four cattle areolates have been recognized as *Brucella abortus* biovar 1 and seven as *Brucella melitensis* biovar 3 from cattle and buffalo Usage of phenotypic sorting and molecular speciation of bacteria (Bruce-ladder PCR). Due to the improved diagnostic performance offered by EDTA-mMAT over MAT under investigation, the authors recommended switching from locally adopted MAT version to EDTA-mMAT, and to a limited extent, Riv. T could be used to validate established reactors via screening tests. Since *Brucella melitensis* is frequently isolated from the liver of slaughtered seropositive ruminants, The Ministerial Decree No 1329 of 1999 needs to be amended to include an explicit clause on liver condemnation, as it poses public health hazards.

### Introduction

Brucellosis is the common name used by many species of the genus *Brucella* to cause animal and human infections (OIE, 2016). *Brucellae* displays a broad variety of preferences for the host. There are currently twelve species of *Brucella*, including three recorded in Egypt, viz. *B. Aborto*, *B. Melitensis*, and with *B. Am I. B.* In both the pathological and epidemiological perspectives, melitensis infection of small ruminants is fairly close to *B.* Infection of cattle with abort.

The key signs of brucellosis in ruminants are reproductive disorders in the form of abortion or birth of non-surviving poor offsprings, low milk yield (reduction of 20-25 per cent), orchitis, epididymitis, and less common arthritis. *B. Melitensis* does not cause storms of abortion in pregnant livestock. In addition, brucellosis is known for its latent infection that hinders any programs of control. The diagnostic method providing conclusive evidence of brucellosis is the isolation and typing from the suspected animal of *Brucella* microorganisms. This method, however, has an inadequate sensitivity and also has a difficulty in applying control strategies on a wide scale (Gall and Nielsen, 2004). The most effective methods of diagnosis are still the identification of different immunoglobulins to *Brucella* in serum or milk samples. Usually screening all samples using an inexpensive and rapid test that is sensitive enough to detect a high proportion of infected animals is the most proficient and cost-effective approach. For the final diagnosis to be made, reactors to screening tests are then checked using normal, reliable and precise tests (Corbel, 2006). Serological findings must be measured against the circumstantial occurrence of disease, the degree of false positive serum reactions resulting from cross reactions with associated Gram-negative bacteria, or vaccination (Gall and Nielsen, 2004; Corbel, 2006).

### Results

Validation is a process that determines the fitness of an assay for a planned purpose which has been properly established, optimized and standardized (OIE, 2013). All diagnostic immunoassays, either in the laboratory or in the field, should be checked for the species in which they are to be used or should provide diagnostic performance estimates for each test (OIE, 2013). Typically, bacteriological isolation cannot establish the sensitivity of a test as false negative culture results can occur for several reasons, including the absence of the micro-organism in the cultured tissues or insufficient numbers of the micro-organisms present to grow on different media. (Nielsen & Gall, 2004). In addition, inadequate tissue storage, failure to choose a suitable tissue variety or insufficient tissue material, and collection of samples from uninfected tissues.

