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List of Abbreviations

AMOS: Abortus, Melitensis, Ovis and Suis.

APHIS: Animal and Plant Health Inspection Service.

BAPAT: Buffered acidified plate agglutination test.

BCT: Brucella card test.

bp: Base Pair.

BP26: Periplasmic protein.

Br.: Brucella.

BSA: Bovine Serum Albumin.

cELISA: competetive ELISA test.

CFT: Complement Fixation test.

CFU: Colony Forming Unit.

d-ELISA: Dot Enzyme Linked Immunosorbent Assay.

DNA: Deoxyribonucleic Acid.

dNTPs: Deoxy nucleotide Triphosphate.

FAO: Food and Agriculture Organization.

FPA: fluorescence polarization Assay.

H_2S: Hydrogen Sulphide.

iELISA: Indirect Enzyme Linked Immunosorbent Assay.

IgG: Immunoglobuline G.

IgM: Immunoglobuline M.

IS711: Insertion sequence 711.

IU: International Unit.

Iz phage: Izatnagar

M: Molar.

MAbs: monoclonal antibodies.

MET: mercaptoethanol test.

mRBT: modified Rose Bengal test.

NH: native hapten polysacharride.

NLB: Nucleic Lyses Buffer.

NVSL: National Veterinary Service Laboratories.

OD: Optical Denisty.

OIE: Office Internationale de Epizooties.

OIEISS: international office of epizootology international standard serum.

PAT: plate agglutination test.

PCR: Polymerase Chain Reaction.

p-ELISA: plate ELISA.

PPP: periplasmic protein

R/C phage: Rough/Canis.

RBCs: Red Blood Cells.

rBP26: Recombinant periplasmic protein.

RBPT: Rose Bengal Plate test.

RID: Radial Immunodiffusion.

Riv.T: Rivanol Plate Precipitations Test.

SAT: Serum Agglutination test.

SDS: Sodium dodocyl Sulphate.

S-LPS: smooth lipopolysacharriP-ELISA: Plate ELISA.

SPAT: slide plate Agglutination test.

TAT: Tube Agglutination test.

Tb phage: Tbilisi.

TBE: Tris-Borate-EDTA buffer.

USDA: United State Department of Agriculture.

UV: Ultra Violet.

VOL.: Volume.

WHO: World Health Organization.

SUMMARY

The present study was carried out on 1996 serum samples collected from different animal species (549 cattle and 338 buffaloes, 404 ewes, 336 goats, 217 bulls and 152 buffalo bulls) from some Egyptian governorates and tissue samples were collected from live and slaughtered animals of such governorates (101 tissue samples from cows, 70 from buffaloes, 116 from ewes, 123 from goats, 64 from bulls, 34 from buffalo bulls) to roughly estimate the serological and bacteriological prevalence of brucellosis among animal species. High serological prevalence for brucellosis among cattle was recorded in Beheira, Assuit, Beni Suef and Monofia, (24.4%, 22%, 19.1% and 16.25%) respectively. Average seroprevalence figures of 14.57%, 10%, 25.4%, 30.9%, 6.9% and 3.9% were recorded among cows, buffalo cows, ewes, goats, bulls and buffalo bulls respectively from such governorates. Bacteriological trials for the isolation of *Brucella* from animals resulted in the recovery of 43 field isolates including 11 from cows, 7 from buffalo cows, 9 from ewes, 13 from goats, 2 from bulls and one from a buffalo bull. Phenotypic bacteriological identification at the genus, species and biovar levels in addition to molecular speciation by multiplex PCR resulted in the recognition of all isolates as *Brucella melitensis* biovar 3, the almost sole biovar reported over the last 15 years in Egypt. Seeking the best possible classification of ruminants as either true negative or true positive, the results of a panel of immunoassays were interpreted in parallel rather than in series. For every ruminant species, animals positive to any of the specific tests CFT, iELISA-ppp or cELISA-LPS were considered true positive. Animals negative to both the sensitive BAPA and PAT were regarded as true negative. CFT was used to assess the extent of agreement

with the three ELISA versions tried in this investigation among different animal species. Generally speaking, the overall agreement of iELISA PPP (95.8%) compared favourably better by 1.1% with its corresponding iELISA-LPS (94.7%). Still, cELISA-LPS achieved an even better agreement (96.7%) compared to the other two ELISA versions tested. The highest overall diagnostic sensitivity was achieved by iELISA-LPS (92.4%) and BAPA (92.3%), directly followed by cELISA-LPS (91.2%) and iELISA-PPP (90.6%). The BCT (86%) and CFT (85.9%) achieved almost the same diagnostic sensitivity. The least sensitive test was the PAT (78.7%). The highest overall diagnostic specificity was achieved by cELISA-LPS (96.23%) followed by CFT (92.4%), iELISA-PPP (91.6%) and iELISA-LPS (89.5%). The BCT and BAPA revealed similar figures of 88.5% and 87.1% respectively. The PAT was the least specific of all tests (77.6%). The BAPA proved to be both rapid and sensitive, thus, a practical test. The cELISA-LPS, iELISA-PPP and CFT gave the best specificity. The BCT and PAT offered little compared to other tests due to their reduced sensitivity. As a means for assessment of immunoassay overall performance, a certain criterion was considered, namely efficiency. The efficiency figures of immunoassays tend to be at their maximum levels in cattle (96.9%), with minor reduction in buffaloes (96.5%) and sheep (96.2%), and apparent decrease in goats (95 %) compared to other animal species. Reviewing the detailed efficiency figures of immunoassays in goats, one can notice that the BCT, PAT and CFT are the main tests to blame for such reduction. In an assessment for control program in 3 farms, samples collected from 463 cows (private farm1), 6089 cows (private farm2) and 387 cows (private farm3) were serological examined at 3-week intervals for test and slaughter control policy applied on cattle farms infected with brucellosis. Private farm 1, private farm2 and private farm 3

considered free from brucellosis at 6^{th}, 4^{th} and 5^{th} of 3 consequent negative results to brucellosis examination respectively.