



PCR

There is constant improvement of the accuracy of tests in human and animal laboratories. One of the most rapidly developing fields is in molecular diagnostics and specifically the PCR (polymerase chain reaction) tests. This test relies on detection of nucleic acids found in all living organisms. The nucleic acids DNA (deoxyribonucleic acid) and RNA (ribonucleic acid) contain the genetic information that is unique to a species (eg. human, animal, plant, parasite, bacterium and virus) and an individual member of the species.

The PCR is a technique that permits the analysis of any short segment of DNA (or RNA) by reproducing (amplifying) selected sections of the genetic material. These sequences are compared to the nucleotide segments from a known source and can be used to identify the origin with high accuracy.

The PathCare PCR laboratory has developed tests to identify *Trichomonas foetus* and *Campylobacter fetus* subspecies *venerealis* and *C. fetus* subspecies *fetus* in sheath wash samples from bulls. The tests that were developed are validated against known ATCC (American Type Culture Collection) strains of the organisms.

DISEASES

Trichomonosis is a venereal disease in cattle and once established in a herd, very difficult to eradicate. It is a problem in beef cattle and causes repeat breeding, abortions and a high percentage of unbred cows. Bulls are the main source of infection and animals over 4 years of age are long-term carriers of the organism. They show no clinical signs. In cows (and heifers) inflammation of the reproduction tract varies from vaginal discharge to pyometra. In pregnant cows placentitis leads to early abortion (1 – 16 weeks). There is a poor immunity in cows and they may become susceptible to infection within 3-4 months.

Bovine genital campylobacteriosis (vibriosis) is caused by *Campylobacter fetus* subspecies *venerealis*. It causes poor conception, increased returns to service, reduced calving

rates, occasional abortions and permanent infertility. The disease is spread by infected bulls that do not show any clinical signs of disease. Many infected cows "self-cure" in 3-4 months. Some cows develop permanent infertility due to chronic changes in the reproductive tract.

Campylobacter fetus subspecies *fetus* is an inhabitant of the intestine of cattle and may cause sporadic abortions in cattle and sheep.

SAMPLES

Sheath wash samples from bulls can be collected in PBS and transported either in PBS or Steve's medium (the latter if over long distances and time).

Samples should be kept on ice

Tests include direct microscopy, culture (if received within 6 hours) and PCR.

Sensitivity of the tests is influenced by contamination by soil, sand, faecal material, blood and urine. Sensitivity is decreased with delay in sample submission.

It is recommended that a bull is declared negative from infection with either of these organisms after 3 negative tests with 7-10 day intervals.

REFERENCES:

- Prof. Gert Pretorius and Ms. Jaclyn Gerber (2012) (PathCare PCR Department). Personal communication
- www.medterms.com "Definition of Polymerase Chain Reaction"
- Peter Nosworthy (2009), Veterinary Officer, PIRSA. "Bovine genital campylobacteriosis"
- Frank Schulze, Audrey Bagon, Wolfgang Muller and Helmut Hotzel (2006)
- J. Clin. Microbiol. Vol. 44 no. 6 2019-2024
- "Identification of *Campylobacter fetus* Subspecies by Phenotypic Differentiation and PCR"
- Dietmar Holm (2013), Dept of Production Animal Studies, Faculty of Veterinary Science, University of Pretoria. "Choosing the correct Trichomonosis diagnostic protocol"