

Alkaline Phosphatase Activity as an Ancillary Test for Characterizing Infertility in the Boar

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Diagnosing individual boar's reproductive performance has generally focused on semen collection and evaluation of the ejaculate. A battery of cursory tests involving assessment of color, odor, concentration, motility, and morphology has been used to examine the ejaculate. These tests are used to classify the reproductive disorder and the degree of reproductive failure in the individual boar. Additional diagnostic procedures have been applied to the ejaculate and include cytological examination, aerobic microbial culture, acrosome integrity test, and osmotic tests. Analysis of seminal plasma for various constituents has been used in a variety of species to further classify disorders such as azoospermia and oligospermia. Seminal alkaline phosphatase (ALP) is an enzyme found in seminal plasma that has been used in other species such as the dog and human to determine tubular patency of the ducts in the male urogenital tract. Normal canine semen contains 5,000 to 40,000 U/L, and seminal ALP levels of less than 5,000 U/L indicate a deficiency of epididymal fluid, as ALP activity has been found to be much higher in the epididymis than in the testes or prostate. To date, however, there are no standards of measure for ALP in the boar. This study reports preliminary data on the range of values for ALP in normal boars standing in a semen collection facility.

Ejaculate samples (10 mL aliquot of a complete collection) were obtained using the gloved hand technique from 20 boars housed in a semen collection facility. The boars represented various breeds and ranged in age from 10 months to 3 years. All boars were classified as satisfactory for fertility based on breeding history and semen analysis (> 70% motile sperm, >80% morphologically normal sperm, adequate total sperm numbers, and satisfactory longevity of motility at 17°C). Samples were centrifuged and the supernatant submitted to the University of Illinois Clinical Pathology Laboratory for alkaline phosphatase analysis.

Biochemical analysis of the ejaculates of normal boars revealed very high levels of ALP activity. The range in values for the alkaline phosphatase activity was from 8,880 to 66,120 U/L. The mean ALP activity for this data set was $39,977 \pm 15,701$ U/L. As described in the dog and stallion, there is a wide range of values for seminal ALP in normal ejaculates. This is preliminary data for values to be used for interpretation of ALP activity in boar semen.

Although there are a limited number of samples currently submitted for establishment of standards for seminal ALP values in the boar, these will serve as ranges of values for comparison of normal and abnormal samples. The ability to perform additional diagnostics on infertile and subfertile boars to determine the potential etiology (e.g., ejaculatory failure, obstruction or degeneration) may allow swine veterinarians to further characterize a reproductive disorder and offer a suitable treatment and prognosis.

Key words: boar, alkaline phosphatase, infertility, semen