A New Device for the Collection of Bovine Semen

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Introduction

In general, the act of collecting semen for artificial insemination takes semen from its protected storage environment in the male and thrusts it into the unprotected environment of a specimen collection tube. Even with rapid processing, this leads to drastic shifts in temperature and pH, resulting in a quick deterioration of semen parameters and programmed cell death. This laboratory has developed a species-specific modified collection device (MCD), which was designed to optimize semen parameters by controlling temperature, pH and osmotic stress. In previous studies in the equine, canine, ovine and humans, using the new collection container/technique has resulted in improved semen parameters which are maintained over extended periods of time when compared to the traditional collection methods. Further, in a breeding trail in the equine, fertility rates of fresh semen were maintained for extended periods of time over the control. The objective of the current study was to further investigate the usefulness of the modified device in improving semen parameters and fertility rates in the bovine.

Materials and Methods

Eight Angus bulls were collected by electro-ejaculation using a modified AV sleeve. The sleeve allowed the sample to be split at the time of collection between a standard collection tube and the commercial version of the MCD (BreedMAX; Embryonic Technologies Inc, Austin, TX). The samples were then processed for cooled storage using standard techniques. A simple semen analysis consisting of concentration, motility and forward progression was performed at times 0, 1 and 3 hrs, and total breeding was calculated using 20 million cells per breeding dose. A total of 51 animals were bred in this experiment: 25 using control semen and 26 with semen from the MCD.

Results

As seen in earlier studies in other species, the semen collected into the control showed decreases in both motility and forward progression in the three hour observation period. However, semen collected in the MCD maintained improved motility ($P < .001$) and forward progression ($P < .001$) as compared to control samples. Further, the total number of insemination doses available from the MCD was almost double that of the control (595 vs 349 respectively; $P < .001$). Following the single insemination event, 15 of the 26 animals bred with semen from the MCD were pregnant (58%) verses only 12 of 25 controls (48%).

Significance

As in earlier studies, the MCD appears to provide a superior breeding sample as compared to traditional methods. The samples maintain increased cellular activity suggesting an improved collection environment. Results of the small breeding trial demonstrated a 20% increase in conceptions, suggesting the increased cellular activity does translate into increased pregnancy rates. However, a larger breeding trial is needed to confirm this observation.