

Two-dimensional polyacrylamide gel electrophoresis of Bali bull (*Bos javanicus*) seminal plasma proteins and their relationship with semen quality

ABSTRACT

The present study evaluated the relationship between Bali bull (*Bos javanicus*) seminal plasma proteins and different semen quality parameters. Semen samples from 10 mature Bali bulls were evaluated for conventional semen parameters (general motility, viability, and normal morphology), sperm functionality (acrosome reaction, sperm penetration rate, sperm penetration index), sperm kinetics (computer-assisted semen analysis parameters such as sperm velocity), and sperm morphology (acrosome and membrane integrity). Frozen-thawed semen with higher sperm motility, viability, acrosome integrity, and membrane integrity ($P < 0.05$) are consistently higher in acrosome reaction and sperm penetration assay. Three bulls showed the highest, four bulls displayed the medium, and the remaining three bulls showed the lowest for all sperm parameters and SPA. The proteome maps of seminal plasma from high-quality and low-quality Bali bulls were also established. Seminal plasma of both high-quality and low-quality Bali bulls was subjected to two-dimensional SDS-PAGE with isoelectric point ranged from 3 to 10 and molecular weight from 10 to 250 kDa. Approximately 116 spots were detected with Blue Silver stain, and of these spots, 29 were selected and identified by MALDI-TOF/TOF-MS/MS. A majority of the proteins visualized in the seminal plasma two-dimensional maps was successfully identified. An essential group of the identified spots represented binder of sperm 1 (BSP1), clusterin, spermadhesin, tissue inhibitor of metalloproteinases 2 (TIMP-2), and phospholipase A2 (PLA2). Other proteins found in high abundance included seminal ribonuclease, serum albumin, cationic trypsin, and peptide similar to $\beta 2$ microglobulin. Thus, a reference map of Bali bull seminal plasma proteins has been generated for the very first time and can be used to relate protein pattern changes to physiopathologic events that may influence Bali bull reproductive performance.

Keyword: Bali bull; Proteomics; Seminal plasma fluid