The effect of package type and sperm concentration on the quality of frozen-thawed ram spermatozoa

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Laparoscopic artificial insemination (LAI) is a form of assisted reproductive technology (ART) that facilitates genetic gain within the Australian sheep industry, by using frozen-thawed ram spermatozoa. This method has faced slow adoption due to various factors, including cost and concerns over fertility outcomes. Inconsistent success is thought to be because of key cryopreservation elements such as sperm concentration and freezing method. Therefore, the AI industry currently lacks a thorough understanding of the relationship between sperm concentration and package type on the quality of frozen-thawed ram spermatozoa, and a direct study is yet to occur.

Accordingly, our study set out to investigate this relationship: semen from Merino rams was frozen at four different concentrations (200, 400, 600, and 800 x 106 sperm/mL), and as two package types (pellet/straw). Samples were thawed and incubated over 6 hours with aliquots taken for semen assessment at 0, 3 and 6 hours. Our results displayed low occurrences of interactions between sperm concentration and package type. However, we observed frequent interactions between concentration and time, package type and time, and the sole influence of package type on the quality of frozen- thawed ram spermatozoa.

Sperm frozen at 200 x 106 sperm/mL often displayed higher in vitro quality at 0h, but frequently recorded the lowest in vitro quality by 6h. Sperm frozen at 400 x 106 sperm/mL recorded similar in vitro sperm quality to the 200 x 106 sperm/mL treatment at 0h, but often recorded the highest in vitro sperm quality than sperm frozen at any other concentration by 6h.