



Review Article  
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**Animal Semen and Maintenance of Reproductive and Fertility Parameters:  
A Review**

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**Abstract**

The semen extenders are evaluated based on the capacity to maintain the integrity of sperm plasma membrane subjected to hypo-osmotic conditions and capacity to maintain the viability of spermatozoa after *in vitro* storage. Semen extender is graded on its capability to protect spermatozoa, conserving motility and fertility over time by stabilizing the plasmalemma, providing energy substrates and preventing deleterious effects of changes in pH and osmolarity. The present article is constructed to provide the readers with a holistic review on various efficacious semen extenders used for preservation under experimental conditions.

**Keywords:** Extender, Fertility, Semen

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**1. Introduction**

Preservation of spermatozoa is an important tool to preserve genetic diversity and to assist in the reproduction of a species [1, 2]. Coconut water extender with 7% glycerol was used successfully in cryopreservation of caprine semen and is often used in goat breeding [3]. Additionally, coconut water extender has been used to chill semen of other species such as rams [4], pigs [5] and dogs [3].

Among the laboratory-prepared buffers, egg yolk tris-glucose and egg yolk tris-fructose were proposed as semen extenders. Factors which affect semen conservation period include time-dependent metabolite accumulation with pH and osmolarity alteration and depletion of energy substrate [6].

### **Discussion on Researches on evaluation of ideal semen extenders and effect on sperm motility and other physiological parameters**

Concannon and Battista [2] suggested that at least 40–50% sperm motility is necessary for success in artificial insemination with canine frozen semen. However, pregnancies have been obtained with frozen semen with a post-thaw motility between 20 and 30%[7].The value of hypo-osmotic swelling test (HOST) in the present study partially corroborates the findings of the other workers.<sup>8</sup> Coconut water has also been used as a suitable cryopreservative for canine semen.[3]

Motility is the criterion most often used for semen evaluation, both before and after preservation. The spermatozoa need to be motile and gain hyperactivated movement when in the oviduct in order to reach the oocyte and penetrate the membrane surrounding it.

Moura et al. obtained 75.4% motile spermatozoa at 4°C by using tris-extender plus egg yolk. The extender may be the cause of this discrepancy, but it could also be caused by sample preparation, differences between measurements and the better motility in this experiment before sperm freezing. In both cases, loss of motility was probably caused by cold shock that causes changes in membrane organization and also permeability [9,10].

Cardoso *et al.* used coconut water for freezing proved to be efficient for canine semen freezing with coconut water extender. [3]

Motility is a manifestation of structural and functional competence of spermatozoa. Thus, the percentage of progressively motile spermatozoa is usually positively correlated with that of plasma membrane integrity [11,12] normal morphology and with fertility[10].

## **2. Conclusion**

It can be concluded that the selection of an ideal semen extender under in vitro condition depends on its capacity to maintain active motility of sperm cells, high percentage of live spermatozoa, lower percentage of abnormal spermatozoa and high percentage of HOSS positive spermatozoa at 4°C.

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