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Sexed Semen – A Gift to Dairy Farmers

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Abstract
Sexed semen can help dairy industry reach greater heights. Production of calf of specific sex with 80-90% accuracy can be done through sexed semen technology. Flow cytometry is the most commonly used method for sorting of sperms. Increase in milk production owing to more female calves and lowered chances of dystocia are some of the advantages of using sexed semen. High cost and lower conception rates as compared to conventional semen are the main obstacles in the widespread use of this technology. Providing sexed semen to farmers at a subsidised rate and educating them could help in the adoption of this technology nationwide.

Keywords: Sexed semen, flow cytometry, dairy industry, milk production

Introduction
In order to meet the growing demand for milk and milk products, a greater emphasis on developing the dairy industry is required. As per 20th livestock census, only 125.34 million of the total milch animals (cows and buffaloes) are in milk or dry, while the remainder is made up of male calves, heifers, sterile animals, animals that have never given birth to calves, etc (Anonymous, 2020). Modern dairy farming prefers female animals over males with the latter being considered a burden on farmers. Sexed semen technology could play a pivotal role in making the livestock industry profitable by shifting the sex ratio in favour of female calves.

Sexed semen: Sexed semen can be defined as semen having X or Y bearing sperms to produce a progeny of a desired sex either female or male. The use of sexed semen technology allows the predetermination of calf sex through the separation of X-sperms from Y-sperms with 80-90% accuracy. In comparison to Y chromosome-bearing sperm, X chromosome-bearing sperm often has 3-4% more DNA while the head, neck and tail is larger and the dry mass is more (Williamson, 2004; Morrell *et al.*, 2008). Several methods of sperm sexing are available such as albumin gradient, percoll density gradient, free-flow electrophoresis, immunological methods, sorting based on volumetric differences, identification of HY antigen and flow cytometry. Among this flow cytometry is proved to be highly accurate and the most commonly used method for sorting of sperms.

Advantages of sexed semen: Since only female calves can be produced, the number of unwanted male calves can be reduced which would help the farmer in saving the resources that would have been required in the management of these male calves. Further welfare concerns that might arise can be minimised. Sexed semen can be used to generate replacement heifers for expansion of herds at a faster rate, lowering the biosecurity risk

involved with bringing in animals from other herds. Further surplus heifers can be sold to other farms which would improve the profitability of the dairy farm. Since the focus is on producing more female calves, genetic improvement in milk yield can be done quickly in a short time thus increasing the overall milk production of the country. The chances of dystocia are lowered through the use of sexed semen along with the associated factors like infertility, diseases of uterus and retention of foetal membranes. Even at low concentrations sexed semen is more successful than conventional semen since the process of sperm sorting ensures the presence of only viable sperms.

Limitations of sexed semen: Sexed semen is subjected to several technological and implementation limitations. Technological limitation includes high cost of sex-sorting machines, low sorting efficiency and speed, lack of skilled persons to operate the machine, sperm damage due to shear force, sudden stop and electrostatic force and approximately 50% sperms are wasted during the sorting process. Implementation limitations include the high cost and low conception rate associated with sexed semen. The cost of intellectual property right makes sexed semen more costly than conventional semen straws. Only 2-4 million sperms/dose is present in sexed semen which is lower when compared to the 20 million sperms/dose in conventional semen. Conception rates with sex-sorted semen are 10-15% lower than those with conventional semen which is unfavourable under Indian field conditions.

Current status of sexed semen in India: In India, sexed semen is available for Gir, Sahiwal, Tharparkar, Kankrej, Red Sindhi, Hariana, Gangatiri and crossbreds and pure of Holstein Friesian (HF) and Jersey, etc. breeds of cattle and Mehsana, Murrah and Jaffarabadi breeds of buffalo. Sexed semen straws are available at the rate of ₹ 900-1200 per dose but subsidised rates are given to farmers in some states such as the state of Punjab is providing sexed semen to farmers for only ₹ 100 per vial.

The two companies producing sexed semen in India are Sexing Technology (ST) and ABS. 81 million doses is the annual production potential of the 51 semen stations present in the country. In order to increase the number of indigenous and crossbred cattle population in the nation, the National Dairy Research Institute (NDRI), Karnal, is providing sexed semen to farmers (Kumar *et al.*, 2016).

Conclusion

The use of sexed semen can greatly benefit the society not just by producing calf of desired sex or saving money on replacement heifers but also reducing the number of stray male animals. More research needs to focus on fertility related constraints of sexed semen. For adoption of sexed semen nationally, financial support and education of poor farmers is necessary.

References

1. Anonymous (2020). 20th livestock census. www.vikaspedia.in/agriculture/livestock. 12 September, 2020.
2. Williamson, S. (2004). Sex (IST) Selection? *Medical Law International*, **6**(3): 185-206.
3. Morrell, J.M., Dalin, A.M. and Rodriguez-Martinez, H. (2008). Prolongation of Stallion Sperm Survival by Centrifugation through Coated Silica Colloids: A Preliminary Study. *Animal Reproduction*, **5**: 121-126.
4. Kumar, A., Vineeth, M.R., Sinha, R., Singh, R.K., Thakur, A. and Gupta, S.K. (2016). Current status, scope and constraints of sexed semen-An Indian perspective. *Agricultural Reviews*, **37**(3): 240-44.