

Reproductive disorders in Bovines due to misuse of exogenous Oxytocin supplementation

Deepak Kumar¹ and Mahesh Kumar²

¹Department of Veterinary Physiology, OUAT, Bhubaneswar

²Department of Veterinary Medicine, OUAT, Bhubaneswar

[DOI: 10.5281/Vettoday.13365160](https://doi.org/10.5281/Vettoday.13365160)

Introduction

India is the world leader in both the total number of animals and the total amount of milk produced. Approximately 22% of the world's milk is produced in India. The usage of several exogenous chemicals has increased dramatically as a result of the rise in milk demand. The rise in oxytocin supplementation is one instance of this. To increase milk production, oxytocin injections are used on animals. Approximately 90% of the milk in the udder can be readily extracted with improved milking management techniques because of the natural hormone system, or endogenous oxytocin released in response to milking cues.

The teat sphincter can be opened to readily remove cephalal milk. Remaining milk from a typical milking is called residual milk, and it is eliminated by giving the animal artificial hormones, such as oxytocin. Therefore, producers commonly use it to increase their profit after selling more milk

to consumers. However, they are unaware of its detrimental consequences on the animals' reproductive systems.

Oxytocin & milk ejection

The word "oxytocin" (OT) is Greek in origin and means "quick birth." The OT hormone is crucial for milking physiologically. During lactation, milk is expelled from the teats due to natural OT.

A working milk ejection reflex is necessary for the mammary gland to remove milk from its cells. This process is dependent on neurohormones. A nerve signal that an animal identifies with milking or nursing, such as suckling, manual udder teat massage, or the sight and scent of the calf, causes the animal to expel milk. The posterior lobe releases oxytocin when the neuronal stimulation reaches the central nervous system. Milk is forced into the duct system from the alveoli by the contraction of myoepithelial cells and the mammary gland when oxytocin reaches these cells.

It is a peptide hormone that is produced in magnocellular neurosecretory cells in the paraventricular and supraoptic hypothalamic nuclei. A neuroendocrine reflex causes the hormone to be released into the bloodstream from the posterior pituitary lobe. In addition to the brain, OT is also produced in a number of other tissues and organs, such as the heart, ovary, testis, uterine epithelium, and vascular endothelium.

The smooth muscle cells that surround the milk-producing cells contract as a result of it. Known as alveoli, these cells are useful during birthing. They induce the uterus's smooth muscles to contract, causing the foetus to be expelled from the mother's body. OT is also engaged in the management of postpartum uterine prolapse and the parturition process.

Following OT's discovery and investigation into its function in the neuro-hormonal-milk-ejection pathway, it was identified as a pharmacologic agent that might help regulate the milking process through the administration of exogenous OT. As a result, it raises dairy animals' milk output.

Reproductive disorders

The reproductive system of cows is immediately impacted by OT administration, which shortens the animals' lives. The use of OT in dairy animals has an impact on the quality of their milk as well. Due of its accessibility at retail stores, farmers frequently utilise this hormone to treat milk letdown. Farmers utilise this medication based only on their personal experience; they are unaware of the drug's negative effects on milk quality and reproductive health. This is because the doses they use are not regulated.

Repeated oxytocin injections interfere with the natural functioning of the mammary epithelium, which in turn hinders the normal process of milk ejection and has an adverse effect on reproductive health.

Therefore, the persistent use of oxytocin injections could result in addiction and a lack of response to typical milk ejection triggers, which was a drawback.

Long-term oxytocin injection use is thought to contribute to fertility problems such as low oestrus signals, shortened breastfeeding durations, decreased conception rates, and elevated embryonic mortality rates. There have also been reports of delayed puberty, decreased rates of conception, elevated rates of abortions, decreased likelihood of becoming pregnant, lengthened ovulation intervals, delayed placenta expulsion, shortened postpartum oestrus intervals, and early calf death due to inadequate quantity and quality of milk.

Animals receiving an oxytocin injection had lower milk yields and lower percentages of fat in their milk, and they also experienced mastitis at that time. Additional side effects of OT treatment have been noted, such as delayed puberty, dystocia (difficult childbirth), abortions, dead foetuses, and placental membrane retention in buffalo and cows. There have also been reports of reproductive abnormalities in cattle and buffalo, including ovarian follicular cysts, corpus luteum cysts, placental retention, anestrus, and recurrent oestrous cycles.

Regular usage of oxytocin in cycling cows and buffaloes results in early corpus luteum lysis because oxytocin triggers the release of PGF2 α . This causes early ovulation, and since an immature ovum cannot be fertilised, sterility results. When oxytocin is administered continuously to milking animals, the uterine muscles contract repeatedly and repeatedly, which prevents the fertilised ovum from implanting.

Oxytocin-induced overstimulation of the uterine glands causes glandular degeneration, which prevents the developing embryo from receiving uterine milk during the pre-implantation phase and causes early embryonic mortality. Overuse of oxytocin



during labour results in a higher risk of foetal problems, such as respiratory distress and jaundice, as well as increased vaginal and cervical tears.

In cattle, frequent use of oxytocin led to a variety of reproductive disorders, as reported by Mustafa et al. (2008). In buffalo, these disorders included follicular ovarian cysts (18.33%), luteal cysts (28.33%), retention of placenta (11.66%), repeated oestrus (25%) and, in cattle, follicular cysts (26.66%), luteal cysts (23.33%), retention of placenta (8.33%), and repeated oestrus (23.33%).

Conclusions

It is currently unknown how safe and beneficial it is to administer OT to dairy animals at various concentrations. It is clear that OT has a significant impact on the composition of milk and the health of an animal's reproductive system. On the other hand, there don't appear to be any effects on milk consumption from animals that received OT. It is important to raise awareness among farmers and discourage the indiscriminate use of it for milk letdown. It should only be used for therapy, not to promote milk production, and sold with a veterinarian's prescription.

References: -

- Chaudhary, Dr. (2009). Studies on the Effect of Oxytocin Administration on the Cow's Performance With Special Reference to Welfare Measures. 10.13140/RG.2.2.11372.99202.
- D.Mahto, & B.Singh, & Verma, A.. (2008). Effect of Oxytocin and Cofecu on Post Insemination conception rate in repeat breeder cattle on subsequent time interval. *Veterinary World*. 1.
- Faraz, Asim & Waheed, Abdul & Hameed, Aneela & Tauqir, Nasir & Mirza, Riaz & Ishaq, Hafiz. (2020). Impact of Oxytocin Administration on Milk Quality, Reproductive Performance and Residual Effects in Dairy Animals – A Review.
- I Assad, Nafis & Pandey, Anand & Sharma,

L.M.. (2016). Oxytocin, Functions, Uses and Abuses: A Brief Review. *Theriogenology Insight - An International Journal of Reproduction in all Animals*. 6. 1. 10.5958/2277-3371.2016.00001.2.

Pérez-Marín CC, Quintela LA. Current Insights in the Repeat Breeder Cow Syndrome. *Animals*. 2023; 13(13):2187. <https://doi.org/10.3390/ani13132187>