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Popular Article

Embryo Transfer and In-Vitro Fertilization in Bovine

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Embryo transfer (ET)

Embryo transfer is a bio-technique where embryos are collected from the donor females and transferred in to the uterus of recipients which serves as a foster mother for its development throughout the remainder period of pregnancy.

It can be performed every 6-8 week per donor. On average 6.9 viable embryos are recovered per flush in females this number fluctuates depending on cow breed, age, and within breed variation (AETA, 2018**).**

Steps of Embryo transfer

1. Selection of donor animals
2. Selection of recipient animals
3. Estrus synchronization
4. Super ovulation
5. Fixed time AI
6. Embryo flushing
7. Evaluation of embryo
8. Embryo transfer into recipient animals

In Vitro Fertilizer (IVF)

In Vitro Fertilization (IVF) is also known as an Aspiration or Ovum Pick Up. During in vitro fertilization, mature eggs are collected from ovaries and fertilized by sperm in a laboratory.

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Steps of In Vitro Fertilization

1. Selection of donor animals
2. Selection of recipient animals
3. Collection of oocytes
4. In vitro maturation (IVM) of collected oocytes
5. In vitro fertilization (IVF)
6. In vitro culture (IVC)
7. Embryo transfer into recipient animals

Differences between ET and IVF

ET	IVF
Required estrus synchronization	Not required estrus synchronization
Not possible to conduct in juvenile heifers nor in older neither in pregnant animal	Use in juvenile heifer, older and pregnant animal
Required higher units of semen	Required fewer units of semen
Embryo survibility is higher	Embryo survibility is lower
Better ability to freeze	Lower ability to freeze
Approximately 50 freezable embryos can be produced per cow per year using superovulation	Approximately 150 freezable embryos can be produced per cow per year using ovum pickup or IVF
Cost of 1 embryo production in moet is less	Cost of 1 embryo production in IVF is more
Embryos develop is slower, decreased birth weight	Embryo develop is faster, increased birth weight
50% pregnancy in case of ET and produce 18 calves per year	40% pregnancy rate in IVF and produce 76 calves per year.
In Moet shorter gestation period, decreased incidence of abortion, low perinatal mortality and less congenital abnormality	In IVF longer gestation period, increased incidence of abortion, high perinatal mortality and more congenital abnormality
Embryo produced in vivo is high resistant to cryopreservation	Embryo produced in vitro is less resistant to cryopreservation

(Chaubal *et al*., 2007 and Takuma *et al*., 2010

Advantages ET and IVF

- Increase the number of offspring sired from superior females.
- Results in faster genetic progress.

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- Increase the frequency of desired mating, capitalizing on excellence of a mating.
- Obtain offspring from old or injured animals incapable of breeding or calving naturally.
- Increased farm income through embryo sales.
- Exportation and/or importation of embryos is easier than with live animals.

Disadvantages of ET and IVF

- Can be cost prohibitive and success rates are less than AI.
- Cost and maintenance of recipient females.
- Requires a technician with the skills to flush embryos from the reproductive tract.
- Possible spread of disease through recipients.

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