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Reproductive biotechnology: Its necessity for livestock production with special reference to pig

It is important to make scientific efforts for livestock to increase their production as the need for livestock products is increasing. As an important food animal, pigs need attention for scientific exploration through advanced technologies to increase their productivity, performance and adaptability to local environments. Advanced reproductive biotechnologies find a significant place in augmenting productive and reproductive performances of most of livestock species in the world and have opened a new dimension for conservation and multiplication of germplasm of threatened species of animals as well. Multiple ovulation and embryo transfer (MOET) is well established techniques widely applied to all domestic and some of the wild and threatened animals as well. For *in vitro* production (IVP) of embryos, necessary for preserving genetic diversity, it is important to collect the oocytes from living animals against the conventional use of slaughter house material. The birth of animals on transfer of *in vitro* produced embryos was reported in cattle, goat, pig and buffalo. Considerable attempts were made to enhance reproductive efficiency through application of reproductive biotechnologies in yak. The technique of *in vitro* production of embryos may be used for bulk production of high quality embryos; cryopreservation of such embryos would provide germplasm conservation and freezing of high quality oocytes and semen would help in undertaking conservation programs. Embryos developed up to the stage of compact morula and blastocysts (24.66% through conventional & 22.73% through OPU) in yak could be cryopreserved using vitrification method for further study. The first ever embryo transferred borne female yak calf in 2005 and production of IVF yak calf in the world in 2013 at the ICAR-NRC on Yak, Dirang, Arunachal Pradesh were encouraging success for use of advanced reproductive biotechnology in yak. Advances in porcine reproductive biotechnology make it possible to use cryopreserved sperm, embryos and somatic cells. Artificial Insemination (AI) in pigs developed more than 40 years back has become an important biotechnology tool in the porcine industry in the last 20 years. Consistent effort has been made for use of frozen boar semen with an attempt to distribute superior swine genetics nationally and internationally towards swine population improvement. Abattoir ovaries are the source of oocytes for *in vitro* production of embryos (IVEP); however, super stimulation of gilts or sows using oocyte pickup (OPU) may be done for obtaining oocytes, if specific breeds are desired. Porcine embryos or immature oocytes can be collected ex vivo from living donors by either surgical or endoscopical flushing of the uterine horns or from slaughtered animals. The embryo transfer (ET) that includes the collection or production of embryos (ex vivo or *in vitro*) from donor pigs, their temporary culture and transfer suitable recipient provides an effective biotechnological tool for improving pig production. Reported embryo recovery and pregnancy rates through surgical approach range from 80-90% and 60-85%, respectively in pig. Many of the reproductive technologies like AI, IVEP, ET, sperm oocyte & embryo cryopreservation, offer possibilities for improving the rate of genetic progress with desired livestock production.

Biography

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