taken poorly, non-representative, with excess/lack of fat, which affect the analysis of fatty acids, must be taken into account.

It is essential to have a good backup laboratory, in order to carry out the necessary calibrations, since the maintenance of the equipment influences the quality of the data.

The different variation factors that affect the production of fatty acids must be considered, such as the number of calvings, days in milk, seasonality, the number of milkings, etc. when interpreting the results.

BIOTECHNOLOGY WORKSHOP

W19

In vivo and in vitro production of embryos: competing or complementary techniques?

Gabriel Bo[1], Pietro Baruselli[2].

[1]IRAC, Argentina; [2]USP, Brazil.

Commercial bovine embryo transfer began in North America in the early 1970s, but soon extended to several countries around the world, including in South America. Although North America has consistently accounted for more than 50% of in vivo-derived (IVD) embryos, South America became the center for in vitro embryo production (IVP) beginning in 2002. Between 2002 and 2012, IVP increased more than 600% in Brazil, and in 2016 represented more than 57% of the world's IVP embryos. However, IVP has also increased rapidly in North America, and by 2017, numbers were similar between North and South America. It is noteworthy that on a world-wide basis, the number of IVP bovine embryos now exceeds the numbers of IVD embryos.

The objective of ovarian superstimulatory treatments in cattle is to stimulate the growth of the maximum number of antral follicles that will produce competent oocytes. For *in vitro* embryo production (IVP), the necessity of superstimulation with gonadotropins prior to ovum pick-up (OPU) is still under discussion, and the approach may differ depending on whether the donors are of *Bos taurus* or *Bos indicus* breeding.

Besides the requirements for FSH treatments, some other advantages of using in vitro embryo production (IVP) vs multiple ovulation and in vivo embryo transfer (MOET) are the following: 1) frequency of collections: every 2-3 weeks for IVP vs every 35-60 days for MOET, 2) IVP can be performed in pregnant (up to 3 months) and prepubertal donors (2 to 8 months), 3) a reduction in the semen required for embryo production (1-2 straws can fertilize up to 100 oocytes vs a minimum of 2 straws per donor superovulated).

Although IVP results are improving throughout the world, some of the disadvantages of IVP vs MOET are the following: 1) high investment is required for IVP, the cow is the incubator to produce in vivo embryos, 2) IVP needs high numbers to pay the fixed costs vs relatively low fixed costs are required for MOET, 3), there are still lower pregnancy rates with IVP than with MOET embryos (35-45% for IVP vs 50-60% for MOET embryos transferred fresh, 30-35% for IVP vs 45-50% for MOET cryopreserved embryos), 4) more embryo/fetal losses with IVP (5-20% for IPV vs 5-10% for MOET between 30 and 60 days, 5-20% for IVP vs 3-5% for MOET between 60 days and calving). The objective of this workshop is to objectively discuss the pros and cons of both technologies and to propose alternatives by which the two embryo production technologies can be complementary in some programs.

W20

In vivo and in vitro production of embryos: competing or complementary techniques?

Pietro Baruselli Sampaio[1], Gabriel Bo[2].

[1]USP; [2]IRAC, Argentina.

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ANIMAL HEALTH WORKSHOP: Managing dairy calf health: New insights and back to the basics.

W21

Managing dairy calf health: new insights into the basics of calf management

David Renaud[1], Chris Chase[2].

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The level of morbidity and mortality in the perinatal and preweaning period remain high in dairy calves. To reduce the impact of disease on dairy farms and calf raising facilities, a well thought out calf management program is critical; however, when building a program, it is important to consider economic considerations as well as time constraints to ensure uptake of recommendations. The prepartum period before the calf is born is the place to start as the nutrition provided to dry cow's influences colostrum quality and quantity as well as the size of the calf born. In addition, managing heat stress in dry cows can not only reduce transition disease but also improve survivability of calves. Following that, the perinatal period (birth to 24 hours of age) is likely the most essential period to mitigate disease. Ensuring that timely and appropriate calving interventions are provided will substantially reduce the level of mortality seen during this period. In addition, ensuring timely provision of high-quality colostrum soon after calving as well as an additional meal within 12 hours of birth will maximize the chance the not only excellent levels of passive immunity are reached but will ensure the proper development of the structure and microbial community of the gastrointestinal tract. Beyond the first 24 hours of life, how calves are managed in the first 60 days of life will have a great influence on their future productivity. Mitigating disease, such as diarrhea and respiratory disease, is also critical to maximize productivity and improve the welfare of calves. This can be achieved through transition milk feeding, free choice supplemental water, managing the environment, and implementing a strategic vaccination strategy. In addition, a high plane of milk nutrition ($\geq$ 8 L of milk per day) in combination with a step-down weaning program is critical to not only reduce disease but take advantage of the high level of efficient growth that can be achieved during this period. By going back to the basics with producers and focusing on delivering information that can be practically implemented substantial improvement in calf health and productivity can be seen.