BOVINE EMBRYO WORLD TRADE: STATISTICS AND LEGISLATION

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Introduction

In 2050 it is predicted that there will be around 9.2 billion people and that the consumption of beef and milk will increase by 180% compared to 2019 (Yitbarek 2019). To face this increase in demand, embryo transfer will be a key tool for the exploitations of the future.

Objectives

- Know the most recent statistical data of the embryo market
- Review the potential risks to animal and human health through embryos and preventive measures
- What is the current legislation that regulates this market

Types of embryos

Depending on the way they are obtained embryos can be IVD (*In Vivo*-Derived) or IVP (*In Vitro*-Produced).

In IVD embryo production, superovulation is induced in the donor cow and artificial insemination is performed. The resulting embryos are collected to be transferred to a recipient cow.

In IVP embryo production oocytes are collected from the donor cow in order to be fertilized *in vitro*. The embryos are grown to the blastula stage and transferred to the recipient cow.

2020 statistics (IETS 2020)

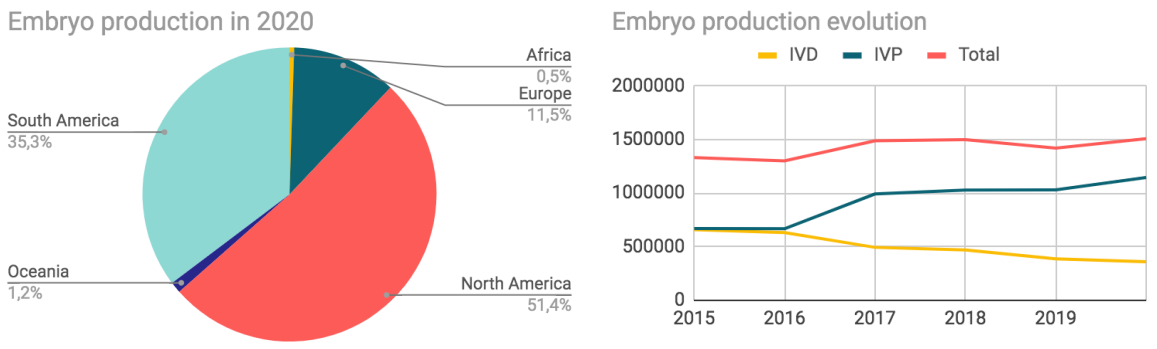

Figure 1 and Figure 2. The main producer of embryos was North America. Since 2015 the production has not stopped increasing and since then there is a clear tendency to produce IVP instead of IVD.

Sanitary risks

The main infectious agents to consider are the Bovine Viral Diarrhea virus and Bovine Herpesvirus type I, which can be found in embryos or gametes. As preventive measures, the OIE states that oocytes must be washed with trypsin and semen must be from certified centers. Embryo procurement and transfer operations must always be supervised by a veterinarian and the use of fetal bovine serum as a suplementation of oocyte and embryo culture is prohibited due to the uncertainty of its composition.

- Tuberculosis
- Brucellosis
- Enzootic leukosis
- Infectious rhinotracheitis
- Rinderpest
- Foot-and-mouth disease
- Blue tongue
- Epizootic hemorrhagic disease
- Contagious vesicular stomatitis
- Rift Valley fever

Figure 3. Main diseases covered by health certificates for embryo trade.

Legislation

The European Union specifies which sanitary requirements embryos must meet in order to be traded according to the type of embryo (IVD or IVP) and according to whether the trade is intra-Community (Directive 89/556/EEC) or extra-Community (Decision 2006/168/EC). In any case, it is required that the equipment and procedures used are authorized and registered. In Spain this regulation is contained in the RD 841/2011 and the Execution Regulation (EU) 2021/404.

Conclusions

- Embryo transfer is a new technology necessary for the future of farms
- North America, IVP and genotyping techniques are the main protagonists of the world embryo market
- Equipment, procedures, semen's origin and sanitary requirements for embryo trade are well established in the in the relevant legislation

Yitbarek MB. Live-stock and livestock product trends by 2050: review. International Journal of Animal Research. 2019;4(30).
IETS Data Retrival Committee. 2020 Statistics of embryo production and transfer in domestic farm animals. Embryo Technology Newsletter. 2021;39(4):24-43.