

Polymers Effecting on Progesterone Implants for Estrus Synchronization in Livestock

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Abstract:

The present work aimed at design and development of subcutaneous implantable drug delivery systems (rod shaped 3mm diameter and 10 mm length implants) containing progesterone for continuous administration of the drug to promote estrus synchronization. With the help of the Galaxy extruder, the implants were fabricated by the extrusion method using polymers ethyl cellulose, cellulose acetate and their combination. The prepared implants were characterized for diameter, uniformity of weight, drug content uniformity, sterility testing, short term stability study and in vivo histopathological study. The in vitro release study in phosphate buffer pH 7.4 at 37 °C was conducted from the implant matrix as function of concentration of the polymers in implants formulations over a period of 14 to 21 days, released the drug between range of 82.45% to 96.37%. The progesterone implants having high polymer concentration releasing less amount of the incorporated drug, compared to drug released from implants having low polymer concentration. Thus, polymer concentration effectively controls the amount of drug released. Short term stability of progesterone implants revealed that the implants formulations were stable, and there were no significant changes in physical appearance and drug content of the implants formulations. In vivo histopathological study of prepared progesterone implants in rabbits shows that the polymers used in implants are compatible with the tissues. Data suggest that the implants prepared from cellulose acetate and ethyl cellulose would be promising and interesting non-biodegradable systems for sustained delivery of progesterone for livestock.

Keywords:

Progesterone Crosslinking, Cellulose acetate, Estrus Synchronization, Ethyl cellulose, Histopathology, Implants.