MODIFIED-RELEASE ORAL DOSAGE FORMS

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- In veterinary medicine, the main reasons for developing a drug into a modified and/or prolonged drug-release system are to reduce animal stress resulting from restraint, handling and dosing, and to reduce the cost in terms of both money and time.

MODIFIED-RELEASE ORAL DOSAGE FORMS

- Modified-release systems are more convenient to administer than repeat-injection dosing and enable the quantity of drug administered to be known, in contrast to the administration of drug in drinking water or food.
- In addition, these dosage forms can also reduce human exposure to veterinary compounds that are unsafe to handle.

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- This prevention is normally achieved by producing

**devices with sufficient density (heavy-metal salts are often incorporated into the conventional tablets to ensure retention in animals) or

**by producing devices that expand in some physical dimension on entry into the rumen. After releasing their drug content, most of these delivery systems either remain permanently in the reticulorumen and are removed by magnets during slaughter or are regurgitated in several parts.

THE PARATECT FLEX BOLUS

The Paratect Flex Bolus is a device designed to treat cattle with prophylactic doses of an anthelmintic intended to prevent the establishment of gastrointestinal worms throughout the entire grazing season.

It consists of a trilaminate design wherein a core matrix containing a 50:50 mixture of morantel tartrate (anthelmintic) and ethylene vinyl acetate (EVA) is coated on its outer surfaces (but not the edges) with a layer of pure EVA, which is impermeable to the drug.

THE PARATECT FLEX BOLUS

A piece of tape with a water-soluble adhesive is used to hold this rolled shape during passage down the oesophagus.

Upon entry into the rumen, the adhesive dissolves and the device unrolls, thereby increasing its dimensions and preventing its regurgitation.

For a given drug–polymer matrix, the quantity of drug released can easily be controlled by variations in the number and diameter of perforations, and by coating the perimeter edge.

The Rumensin ABC (Lilly, Indianapolis, IN, USA), uses wings that remain folded during administration but spread out afterwards, enabling its retention in the rumen.

The Rumensin ABC is a controlled release formulation of monensin (as crystalline monensin sodium) contained in a plastic capsule equipped with retaining wings. Slowly releasing monensin from the opening at its end, the capsule will remain effective for an average of 95 days after administration in lactating dairy cattle,

High-Density Devices:

- One of the simplest approaches consists of a slowly eroding device of high density, where the boluses are made from drug, carnuba wax, barium sulfate, polyethylene glycol and iron powder.
- Spanbolet II is one example of such a product, and is available for controlled release of sulfa drugs.

High-Density Devices:

- This osmotic system consists of an injection-moulded semipermeable membrane that encapsulates an osmotic tablet, a partition layer, the drug formulation and an iron densifier.

Pulsatile release systems:

- For the treatment of cattle or sheep with anthelmintics, a significant concern is the development of resistance, because of the low levels of drug that are administered.
- One method of minimizing this problem is through pulsed dosing, wherein therapeutic levels are administered on a regular basis, followed by periods of no drug delivery.
- For example, the device designed by Holloway has a series of drug compartments separated by degradable cellulosic partitions. Each partition degrades on exposure to ruminal contents. As successive partitions degrade, drug is released periodically.