

**CONTROLLED RELEASE TRANSDERMAL
DOSAGE FORM**

The imposed rate-limiting factor is the release of drug from the device, which can be more precisely controlled. A transdermal delivery device must release the drug to be absorbed at a slower rate than the rate of penetration through the stratum corneum, yet absorption must be rapid and sufficiently complete to provide therapeutic plasma concentrations.

The physicochemical properties of a drug suitable for transdermal delivery ideally include:

- **Low molecular weight (<500 daltons),

- **High potency,

- **Water solubility (to facilitate movement of the drug out of the reservoir and to allow passage through the epidermal and dermal layers of the skin), and

- **Lipid solubility (to permit penetration of the stratum corneum of the skin).

A spot-on formulation is a solution of active ingredient(s) that typically contains a co-solvent and a spreading agent.

These liquid products affect systemic activity after being poured onto an animal's backline or applied as a one-spot concentrate on the animals back or rump.

The active ingredients in spot-on products for flea, GI parasite, or heartworm control in dogs and cats include fipronil, imidacloprid, selamectin, pyriproxyfen, ivermectin, and moxidectin.

Some spot-on products help small animals combat fleas and ticks.

Pour-on formulations are liquid solutions, frequently containing anthelmintics and/or ectoparasiticides, that are poured onto the dorsal skin (back) of the animal.

The staying power of these medications depends on the unique properties of the active agents and excipients that promote the adhesion of the drug to the skin.

Ear tags to control flies on cattle are available.

Two types of insecticide-releasing ear tags to control flies on cattle are available.

One is constructed from a polymer that provides structural support and acts as a release rate-controlling matrix.

The other is a membrane-based ear tag that consists of an insecticidal reservoir with a relatively impermeable backing on one side and a rate-controlling membrane on the other.

Dust bags facilitate the self-treatment of cattle to control flies and lice. Dosing is accomplished by the animals brushing against the bag as they walk beside or under it.

The bag has an inner porous storage bag containing the insecticide dust formulation. This is protected from the elements by an outer protective waterproof skirt open to the porous dust bag at the bottom

Flea and Tick Collars

Insecticidal collars are plasticized polymer resins impregnated with an active ingredient.

Collars for the control of ticks and fleas on dogs and cats release the active ingredient as a vapor, a dust, or a liquid, depending on the physicochemical properties of the chemical.

Transdermal Delivery Patch

- A transdermal delivery patch typically consists of a drug incorporated into a reservoir, a protective backing layer, a rate-limiting release membrane, and an adhesive layer to secure the patch to the skin.
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