

Drug Administration in Dairy Cows:

Oral Administration



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Overview

The most commonly used routes for administering treatments to dairy cows are intravenous, intramuscular, subcutaneous, intramammary, topical and oral. Of these, oral administration is one of the most economical and non-invasive ways to deliver medications to cattle. Although some of the simplest ways to deliver oral medications are to add them to water or animal feed, it is important to remember that extralabel use of drugs in the feed of food producing animals in the United States is strictly prohibited under the Code of Federal Regulations, title 21, section 530, 'Extralabel drug use in animals'. Practically speaking, this means that medications that are specifically manufactured to be added to feed to treat a specific condition must not be added to feed to treat a different condition than what is approved on the label.

Administering oral medications in liquid form is commonly referred to as 'drenching' and small volumes of liquid are usually administered into the back of the mouth with a device called a 'drenching gun'. Large dosing syringes can also be used for drenching. Larger volumes of fluid or medications are usually pumped into the cow's rumen through a long stomach tube that is passed directly into the rumen through the mouth and esophagus. Many oral medications for cattle are manufactured in the form of a solid bolus that is administered through a 'balling gun'. These include aspirin, antibiotics such as oxytetracycline, sulfamethazine or sulfadimethoxine, electrolyte supplements containing calcium, phosphorus, magnesium and/or potassium, and vitamin/mineral supplements. Different styles of plastic and metal balling guns are shown here. All balling guns are made of two functional parts. A barrel that holds the bolus, and a sliding handle that pushes the bolus into the oral cavity once the balling gun has been placed far enough back in the cow's mouth.



In this video a dairy cow that has recently calved is going to be treated with a bolus containing calcium. Calcium supplementation after calving is a common practice in dairy cattle to treat or prevent hypocalcemia, also known as 'milk fever'. Prior to placing the balling gun into the cow's mouth, the herd manager first loads the balling gun with the treatment bolus. To get the cow to open her mouth, the herd manager places several fingers in what is referred to as the interdental space. This is the space between the lower jaw front teeth and the upper jaw back teeth, where there are no



teeth that can bite his hand. When he does this, the cow reflexively opens her mouth. Next the balling gun is inserted through the side of the cow's mouth and advanced past the base of the tongue so that when the handle of the balling gun is squeezed, the bolus is automatically delivered to the back of the throat and swallowed. Oral delivery of large volumes of fluid to an adult dairy cow is one of the most cost effective ways to treat a variety of conditions including dehydration and electrolyte deficiencies.

The herd manager can be seen here mixing a powder containing electrolytes, vitamins and a nutritional supplement in a 5 gallon bucket of water. Once the powder is dissolved, the propylene glycol is added. Propylene glycol is a common treatment for ketosis in dairy cattle. The drenching equipment that will be used here consists of a metal pump that is attached to a rubber hose that is then attached to a stomach tube that is encased inside a metal covering with a rounded metal weight at the end. At the junction of the rubber hose and stomach tube is a black rubber handle



and nose tongs. Nose tongs are necessary to keep the stomach tube from sliding out of the cow's mouth while the medication is being pumped into the rumen. To drench the cow the stomach tube must first be placed into the cow's mouth and then advanced down the esophagus into the rumen. Once the stomach tube has been advanced most of the way down the esophagus it meets resistance at the point where it enters the rumen. Here the herd manager slightly rotates the tube while advancing it to help pass it all the way into the rumen. Once the stomach tube has been passed all the way into the rumen it is secured to the cow's nose with the nose tongs. At this point the herd manager can step away from the cow so that he can pump the drench into the cow. Once all of the drench has been pumped into the cow the nose tongs are released and the tube is pulled out. After the stomach tube is removed, the cow remains standing comfortably in the chute; dairy cows tolerate drenching very well.