



US 20190037884A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2019/0037884 A1**

**Franz et al.** (43) **Pub. Date: Feb. 7, 2019**

(54) **FEED SUPPLEMENT BOLUS WITH ACTIVE YEAST**

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(21) Appl. No.: **15/670,285**

(22) Filed: **Aug. 7, 2017**

**Publication Classification**

(51) **Int. Cl.**  
*A23K 10/18* (2006.01)  
*A23K 50/10* (2006.01)  
*A61K 36/06* (2006.01)  
*C12N 1/16* (2006.01)  
(52) **U.S. Cl.**  
CPC ..... *A23K 10/18* (2016.05); *A23K 50/10* (2016.05); *C12N 13/00* (2013.01); *C12N 1/16* (2013.01); *A61K 36/06* (2013.01)

(57) **ABSTRACT**

A ruminant dietary supplement in the form of a pressed shelf-stable solid pill or bolus that effervesces when administered into the reticulum of a ruminant and releases calcium and dried active yeast.

**FEED SUPPLEMENT BOLUS WITH ACTIVE YEAST**

## CROSS-REFERENCED TO RELATED APPLICATIONS

[0001] Not applicable

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable

## BACKGROUND OF THE INVENTION

## I. Field of the Invention

[0003] The present invention relates generally to a feed supplement preparation for administration to ruminant animals and, more particularly, to a solid tablet or bolus that provides an effervescent release of calcium and dried active yeast into the reticulum of large ruminants for the prevention or treatment of hypocalcemia and to provide a positive increase in additional dietary supplement materials.

## II. Related Art

[0004] It is known to administer several essential nutrients required by lactating cows following parturition. Prevention of low blood calcium, commonly referred to as hypocalcemia, is of great concern to the producer. Because of the calcium required for colostrumogenesis and subsequent lactogenesis, the requirement for calcium increases greatly during the periparturient period. Clinical hypocalcemia is characterized by a blood calcium concentration drop below a critical threshold resulting in a potentially life threatening state of recumbency. Solid boluses containing calcium chloride have been produced and administered to animals orally. The bolus may also contain acid and base ingredients which react to effervesce in the reticulum of the animal. One such bolus is described in U.S. Patent Publication No. 2016/0058760 A1.

[0005] Another acute problem associated with cows is that in the days leading up to parturition their dry matter intake decreases, in some cases profoundly. As selection for higher producing genetics continues to be emphasized the severity of this periparturient dry matter intake suppression becomes of greater consequence. Dry matter intake reduction of 20-25% in the first 24-48 hours after calving is common, independent of calcium status. Should the dry matter intake not increase in concert with milk production the fresh cow is at an increased risk for hypocalcemia (milk fever), displaced abomasum, ketosis, and poor lactational performance. Dry matter intake and nutrient absorption following calving are also influenced by the transition of the rumen microflora to a diet greater in carbohydrate content, specifically rapidly fermentable starch, and lower in fiber than they were exposed to prepartum. To rapidly foster the growth and prefoliation of starch digesting bacteria in accordance with energetic demands there is a need for a dietary supplement that acts as food for these bacteria and ultimately enables the

cow to maintain a higher level of dry matter feed intake and resulting in more available energy to support lactation in the immediate period after calving.

## SUMMARY OF THE INVENTION

[0006] By means of the present invention, there is provided a unique formulation for a bovine supplement for fresh cows that delivers calcium chloride, calcium carbonate, magnesium, potassium and other electrolytes in a stable pressed solid bolus form which also contains dried live active yeast. The successful incorporation of dried stable active yeast in the formulation in which the yeast remains active in a shelf-stable compressed dry bolus dosage form greatly enhances the effectiveness of the supplement. The formulation also includes sufficient amounts of acidic and basic components which react to generate a gas release in an aqueous medium to accomplish effervescent release of calcium and dried active yeast into the reticulum via a solid bolus dosage form.

## DETAILED DESCRIPTION

[0007] The present invention provides a unique formulation for a bovine supplement to be administered to fresh cows that delivers calcium chloride, calcium carbonate, magnesium, potassium and other beneficial constituents in an anhydrous pressed solid bolus dosage form and which also contains dried live active yeast. The successful incorporation of live active yeast which remains stable in a pressed bolus has greatly enhanced the effectiveness of the supplement.

[0008] It has been found that administering ruminant supplements containing large amounts of calcium is more successful if a stable pressed solid bolus is used so that the animal swallows the bolus whole into the fluid in the reticulum where it dissolves and reacts. Effervescent release of calcium has also been found to be very effective.

[0009] The present invention further has successfully added dried stable active yeast to an anhydrous pressed solid bolus dosage form. Thus, the supplement not only provides needed calcium, but it also produces a previously undocumented positive increase in dry matter feed intake and milk production. In this manner, the supplement treats the two biggest problems encountered by cows right after calving—low blood calcium and low feed intake and demonstrates direct economic benefit from treatment. It is believed that the yeast successfully enhances microbial action stimulating rumen fermentation.

[0010] The yeast is in the form of micro-granules of dehydrated yeast coated with a homogeneous hydrophobic substance such as a fat or fatty acid that stabilizes the yeast against physical and chemical stresses including heat and compression. Such a yeast form is available from Lallemand S. A. of Blagnac, France.

[0011] One successful combination had the following range of ingredients.

Product Ingredients (wt)

[0012]

INGREDIENT	MIN %	MAX %	ABOUT
Calcium Chloride	30.000%	70.000%	
Calcium Carbonate	5.000%	25.000%	
Sugar Alcohol	10.000%	30.000%	
Organic Acid			5.000%
Potassium Chloride	2.300%	15.000%	
Niacin RP			3.000%
Live Yeast	1.000%	5.000%	
Magnesium Sulfate	1.000%	5.000%	
Vitamin E			0.050%
Betaine HCL	0.025%	1.000%	
Zinc Sulfate			0.050%
Magnesium Stearate	0.500%	2.000%	

[0013] The sugar alcohol is selected from sorbitol, maltitol, erythritol, mannitol, and combinations thereof. The acid constituent, which reacts with the carbonate to provide an effervescence is selected from citric acid, sorbic acid, formic acid and combinations thereof.

[0014] One example of a successful product has about 2-3% live yeast, about 8% calcium carbonate and about 60% calcium chloride. The formula may contain varying amounts of dried live active yeast between 1% and 5% with 2%-3% being typical. A typical dose is 2-110 g solid boluses.

[0015] This invention has been described herein in considerable detail in order to comply with the patent statutes and to provide those skilled in the art with the information needed to apply the novel principles and to construct and use embodiments of the example as required. However, it is to be understood that the invention can be carried out by specifically different devices and that various modifications can be accomplished without departing from the scope of the invention itself.

What is claimed is:

1. A ruminant dietary supplement in the form of a pressed shelf-stable solid pill or bolus that effervesces when administered into the reticulum of a ruminant and releases calcium and dried live active yeast.
2. A ruminant dietary supplement as in claim 1 wherein the amount of dried live active yeast is from 1% to 5% (wt) of the bolus.
3. A ruminant dietary supplement wherein the amount of dried live active yeast is 2-3% (wt).
4. A ruminant dietary supplement as in claim 1 wherein the yeast is live yeast in the form of particles coated with a hydrophobic substance that reduces degradation of the yeast and enables it to remain stable when incorporated in a pressed solid bolus.
5. A ruminant dietary supplement as in claim 2 wherein the live yeast is in the form of particles coated with a hydrophobic substance that reduces degradation of the yeast and enables it to remain stable when incorporated in a pressed solid bolus.
6. A ruminant dietary supplement as in claim 1 wherein the effervescence is produced by the reaction of an acid and a carbonate.
7. A ruminant dietary supplement as in claim 6 wherein the acid includes citric acid and the base is calcium carbonate.
8. A ruminant dietary supplement as in claim 1 comprising about 2-3% (wt) live yeast, about 8% calcium carbonate (wt), about 60% calcium chloride (wt) and about 5% of an acid constituent (wt).
9. A ruminant dietary supplement as in claim 8 wherein the acid constituent is selected from citric acid, sorbic, formic acid and combinations thereof.

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