

Comparison of physical properties of 6 different teat sealant brands on the US market.

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INTRODUCTION

Teat sealants are being increasingly used as an aid in the prevention of new intramammary infections in the dry period of dairy cows. In the last years, many new products have been introduced on the market. Although they all include 4 grams of ointment containing 2.4 - 2.6 grams (60 - 65%) of bismuth subnitrate, different formulations and physical attributes may lead to differences in convenience of application and risk for iatrogenic new infections.

OBJECTIVE

The objective of the study was to compare the practical physical properties of 6 different brands of teat sealants currently available on the US market.

MATERIALS AND METHODS

Materials - 6 teat sealants of different brands were compared using 2 or 3 batches for each product, evaluating each batch 3 times: BOVIBLOCK® (2 batches, n=6, MWI Animal Health), MASTISHIELD® (2 batches, n=6, Aspen Veterinary Resources), U-SEAL® (3 batches, n=9, Durvet Animal Health Products), LOCKOUT® (3 batches, n=9, Boehringer Ingelheim), ORBESEAL® (3 batches, n=9, Zoetis) and SHUTOUT® (3 batches, n=9, MSD Animal Health).

Syringeability - A gliding force apparatus to measure the force required to empty the tube when the plunger was pushed at a constant speed. Syringeability was defined as the maximum force, in Newtons (N), needed to push the plunger to the end-position.

Plunger Stroke Distance - Plunger stroke distance was defined as the maximum distance, in millimeters (mm), required to completely empty the tube.

Viscosity - Product viscosity, expressed in Pascal-seconds (Pa-s), was measured using a rotational rheometer.

The 6 different brands of teat sealants varied substantially in their physical properties, which are related to convenience of application. To what extent application convenience influences the risk for new intramammary infection is not known and should be a focus of further research.



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RESULTS

SYRINGE CHARACTERISTICS:

Teat sealant syringes showed variations in plunger length, barrel length/diameter, tip length, and cap design. BOVIBLOCK®, MASTISHIELD®, and SHUTOUT® syringes contained breakable (i.e., two piece) caps for administration with either a short tip or long tip length. SHUTOUT® cap pieces were easier to break cleanly in contrast to BOVIBLOCK® and MASTISHIELD® cap pieces which were difficult to break (Figure 1).

AIR PRESENCE:

U-SEAL®, LOCKOUT®, and SHUTOUT® contained small quantities of air in the syringe. Comparatively, BOVIBLOCK®, MASTISHIELD®, and ORBESEAL® displayed larger air pockets within the syringe (Figure 2).

VISCOSITY, SYRINGEABILITY, AND PLUNGER STROKE DISTANCE:

Teat sealant brands showed comparable viscosity, except for U-SEAL® which had the highest viscosity results. BOVIBLOCK®, MASTISHIELD®, and ORBESEAL® required the least force for syringeability, whilst the shortest plunger stroke distance was found in U-SEAL®, LOCKOUT®, and SHUTOUT® (Figure 3).

FIGURE 1. Comparison of syringe shapes and characteristics for 6 teat sealants.



FIGURE 2. Comparison of syringeability force profiles for 6 different teat sealants. The unevenness in profile shape is caused by the presence of air in the sample.

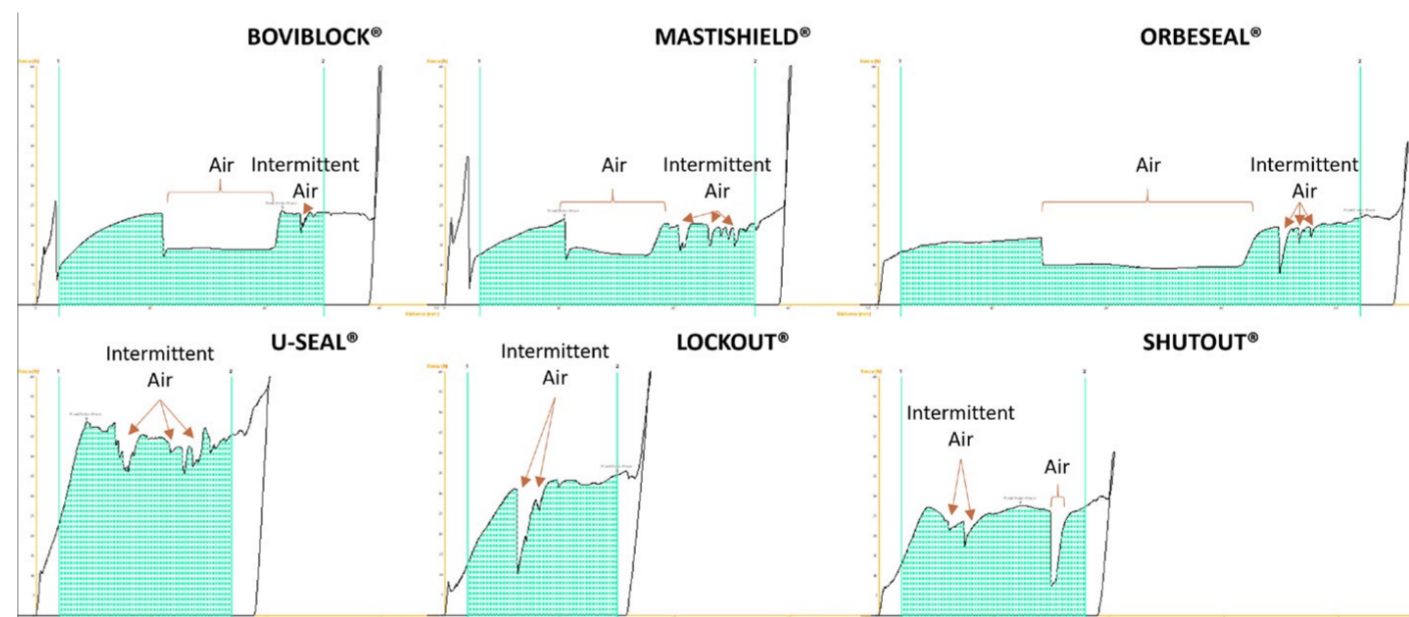
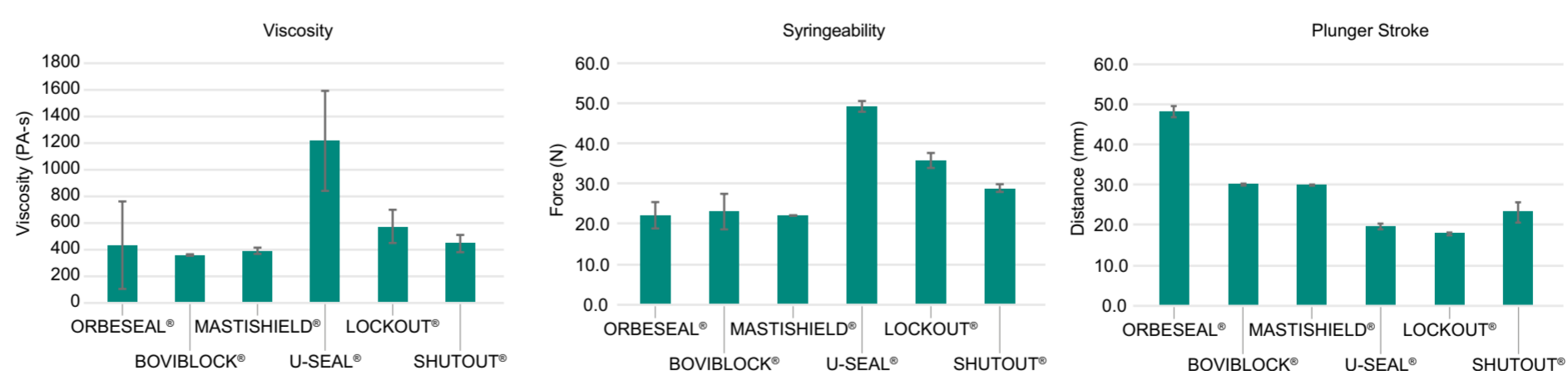


FIGURE 3. Comparison of physical properties for 6 teat sealants.



Teat Sealant Brand	Average Viscosity (Pa-s)	Average Syringeability (N)	Average Plunger Stroke Distance (mm)	Amount of Air in Syringe	Tip Options for Administration	Effort to Break the Cap (to use short tip)	Evenness of Cap Edge After Breaking (to use short tip)
BOVIBLOCK®	360 ± 6	23.1	30.1	Medium	Short and Long	Difficult	Rough
MASTISHIELD®	392 ± 23	22.2	30	Medium	Short and Long	Difficult	Rough
U-SEAL®	1217 ± 375	49.3	19.7	Small	Long	N/A	N/A
LOCKOUT®	575 ± 125	35.8	17.9	Small	Mid-length	N/A	N/A
ORBESEAL®	434 ± 329	22.2	48.2	Large	Long	N/A	N/A
SHUTOUT®	446 ± 65	29	23.2	Small	Short and Long	Easy	Smooth

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