

# Factors Affecting the Adherence of a Dry Cow Teat Sealant

K. E. Leslie, K. J. Day, J. TenHag, D. F. Kelton, T. F. Duffield, T. L. Kerbler  
*University of Guelph, Guelph, Ontario, Canada N1G 2W1*

## Introduction

The risk of new intramammary infection (IMI) is dramatically increased during the first week of the dry period.<sup>1</sup> Intramammary treatment with a long-acting antibiotic formulation is recommended for all quarters of all cows, in part to control the new IMI in the early dry period. Recently, a dry cow teat sealant has been marketed for protection of the teatend after dry-off. Efficacy trials have demonstrated a reduction in new IMI caused by environmental *Streptococci*.<sup>2</sup> The sealant should persist on the teat end until the keratin plug has formed in the streak canal. The objective of this project was to study the association between various teat and cow-level variables and the duration of adherence of a dry cow teat sealant.

## Materials and Methods

Mid-dry-period cows and late-gestation heifers from eight dairy farms in southwestern Ontario were enrolled in the study. At enrollment, each animal was evaluated for teat conformation and cow characteristics. Each teat was dry-wiped with an individual paper towel and randomly assigned to an experimental group identified as "A" through "T". Three of the experimental groups involved use of the commercially available dry cow teat sealant product (Stronghold®, West Agro Technologies, Kansas City, MO), while the other experimental groups were made up of variations of the commercially available teat sealant formulation. In each case, the whole teat was immersed in the experimental sealant product. At approximately 24± 2 hour intervals for 14 days, each teat of each cow was assessed for adherence of the sealant. The adherence was given a numerical score according to standard criteria: 5- sealant tightly covered teat with few signs of wear, 4- light rolling or tearing of the sealant, 3- significant sealant wear with rolling or tearing down at least half the length of the teat, 2- major signs of sealant wear but teat end still covered, and 1- sealant completely gone from teat. The two important outcome measures were the average adherence score by observation day, and the average

days the teat end was covered (i.e. adherence score ≥2). Descriptive statistics and simple associations were evaluated using the Statistix statistical analysis software. Multiple logistic regression models were used to determine important risk factors associated with adherence of the teat sealant.

## Results and Discussion

A total of 947 teat sealant applications were completed using 142 cows on eight farms. Some dry cows were re-used in repeat replicates of the experiment. The average number of days of teat end cover by variations in sealant formulation is shown in Figure 1. The mean number of days the teat ends were covered was 6.3 ± 0.1 for all formulations of teat sealant. The range of days teat ends were covered was 0 to 15 with considerable variability by formulation. Variation in the composition of the sealant appears to influence viscosity and other factors that affect adherence. Adherence was significantly associated with teat end lesion score. Teats having rough, raised lesions had the greatest number of days teat end covered (Table 1). Longer teat length resulted in an increase in average days teat-end covered (Table 2). Teat sealant adherence was not significantly associated with days dry, days prior to calving or teat shape. A mixed-effects analysis of variance model confirmed that adherence was significantly associated with formulation, teat-end lesion score and teat length while controlling for other variables. A random-effects component demonstrated a significant effect of specific cow on teat sealant adherence, beyond the teat characteristics that were measured. Herd of origin was not a significant random variable. However, there was considerable variability in average days teat-end covered among the eight herds on the study (Figure 2).

In summary, some measurable teat characteristics such as teat length and teat-end score significantly influence the duration of teat sealant adherence. In addition, cow effects beyond the teat variables measured were associated with adherence. Ongoing research should further clarify the cow and herd effects on teat sealant adherence.

**Table 1.** Avg. days teat-end covered by teat-end lesion

Teat-end lesion score	N	mean $\pm$ S.E.
1 - no callus, no lesion	752	6.0 $\pm$ 0.1
2 - raised smooth ring	155	7.2 $\pm$ 0.3
3 - raised rough ring	28	10.1 $\pm$ 0.9
4 - teat-end injury	12	5.9 $\pm$ 0.6

**Table 2.** Avg. days teat-end covered by teat length

Teat Length	N	mean $\pm$ S.E.
short	314	6.0 $\pm$ 0.2
average	540	6.4 $\pm$ 0.2
long	93	7.0 $\pm$ 0.4

### References

1. Eberhart, R. J. 1986. Management of dry cows to reduce mastitis. *J. Dairy Sci.* 69:1721.
2. Timms, L. L. 1997. Field trial evaluation of a persistent barrier teat dip for preventing mastitis during the dry period. *J. Dairy Sci.* 80: Suppl. 1, 225.