

# Handling the dry-off problem in organic dairy herds by teat sealing or homeopathy compared to therapy omission

P. Klocke, S. Ivemeyer, M. Walkenhorst, A. Maeschli, F. Heil

**Abstract** – Avoiding antibiotics is one of the crucial goals in organic dairy herd health management. Thus, a trial with 102 cows (408 quarters) was conducted to compare 2 common medical dry-off practices in organic dairying, internal teat sealant (Orbeseal®, Pfizer) and herd specific homeopathic remedies, with an untreated control. Regarding the sub-clinical mastitis protection rate (IPR), the results show no significant benefit for the two treatment groups in general. The homeopathic group had an advantage in the treatment of cows at drying off showing less than 200k cells/ml. The protection OR of these cows was 5.80 (95%-CI 1.36-29.87) compared to control.

Teat sealants showed the best results in protection against environmental infections. Only 13% (n=10/80) of the primarily healthy quarters were infected by environmental Streptococci, Enterococci or Coliforms after calving compared to 21% (15/70; n.s.) after homeopathic treatment and 28% in the control group. This is a 3-fold protection chance (3.04 - 95%-CI 1.2-9.0) compared to control.

The results indicate that in herds with good udder health with few environmental infections, a treatment at drying off can be omitted, while sub-clinically infected cows could be treated by homeopathics. Only in case of increased environmental infection risk, a strategic teat sealant usage is recommended.

## INTRODUCTION

EU regulations according to animal production in organic farms give the prescriptions to reduce chemical therapeutics drastically (Graf et al., 1999). Thus, especially in udder health control many antibiotics free therapies are in use and recommended. For a few years, external and internal teat sealants are the hope of many dairy farmers because they should be able to protect for infections during dry period (Woolford et al., 1998). On the other hand, new developments indicate an upcoming strategy of combined therapy with antibiotic dry-off substances (Godden et al., 2003). This, of course, does not solve problem of antibiotic load in organic farms and is therefore critical.

The alternatives are different homeopathic therapies which have different therapy strategies as background (Klocke et al., 2000). So there are recommendations as well as investigations to the application of homeopathics regarding constitutional therapy with classical homeopathic methods, nosodes or clinical homeopathic therapy with single or complex remedies.

Considering most of scientific investigations, none of these therapies showed clear advances compared to

antibiotics or self cure ratio, yet. Nevertheless, many farmers and lots of veterinarians prefer these methods in advance to chemical treatment.

In contrast to recommendations in conventional herds (Sobiraj et al., 2000), many farmers do not apply additional treatments at drying off. Although there could be an increased risk of new IMI during the first days of dry period there are serious indications that this procedure should be feasible under good management and environmental conditions (Notz et al., 2002). Consequently, this investigation was conducted to compare these three preferred methods of non-antibiotic drying off in organic herds. The study should answer the questions if it is recommendable to avoid any treatments at drying off, if teat sealants provide a benefit compared to therapy abandonment and if homeopathic low potencies are able to provide prophylactic effects compared to therapy abandonment, in contrast to homeopathic theory. The study was conducted choosing a prospective non-blinded (due to the different treatment types) comparative field study design.

## MATERIAL & METHODS

After bacteriological and clinical examination of the quarter milk samples of the 102 involved dairy cows from 13 herds (two times before drying off) all participants were randomly assigned to different dry-off treatment groups avoiding antibiotic treatment. The only excluding criterion for all cows to dry off was a chronic infection with diagnosed major udder pathogens which increases the risk of clinical mastitis. After sampling the cows were treated as follows:

- Group SEAL: Teat Sealer Orbeseal® (Pfizer) for all quarters (n=36)
- Group HOM: On herd level standardized oral homeopathic remedy for 5 days before drying off (n=32)
- Group C: Untreated control group (n=34)

Within the first week after calving, quarter milk samples of each trial cow were taken for bacteriological and cell count investigation.

The assessment of udder health state on cow level regarding clinical and bacteriological findings was done by taking into account the worst quarter at the control investigation. The ranking of quarter diagnosis was (1) clinical mastitis, (2) sub-clinical infection with >100k cells/ml (SCI), (3) increased somatic cell count with no bacterial findings, (4) latent infection with normal SCC.

Afterwards were calculated the intra-mammary infection protection rate (IPR; percentage of cows with no udder pathogens after calving), the Protection Odds ratio (POR) for non-infection during dry off compared to control group, the quarter SCI protection rate (QIPR; percentage of quarters with no udder pathogens after calving). The IPR and QIPR were statistically compared by using Chisquare tests, the POR variables were calculated by using logistic regression models.

#### RESULTS & DISCUSSION

Comparing all animal independent of their state at drying off, 52% of the cows (n=53) showed normal udder health after calving. The three treatment groups had an IPR of 50%, 63% and 44% according to groups SEAL, HOM and C, respectively. These differences were not statistically significant (p=0.319; nominal logistic regression).

Furthermore, the effect regarding the Orbeseal® manufactures recommendation was tested. Only cows with less than 200k somatic cells in the last milk recording before drying off should enter the analysis. In this case an IPR of 50%, 76% and 42% for the 3 groups SEAL, HOM and C, respectively, was calculated after calving. Compared to the control group the POR was 5.80 (95%-CI 1.36 - 29.87) after homeopathic treatment compared to CONTROL, while it was not significantly different for Orbeseal® (0.57; 95% CI 0.15 - 2.07).

To study the protection potential against specific environmental infections (Enterococci, Streptococcus uberis, E coli), the effects on quarter level had to be evaluated. In this analysis 80, 70 and 74 healthy quarters of the Groups SEAL, HOM and C, resp., were regarded. While there was no difference in the general infection rate of all three groups after calving (18%, 15% and 24%, resp.), the ratio of summarized specific environmental infections with Enterococci, Streptococcus uberis and E coli was significantly different. In the SEAL group only 10 of 80 quarters (13%) showed a specific environmental infection after calving in contrast to 21% in the HOM group (15 of 70) and 28% in the CONTROL group (21 of 74). This is a 3.04 fold (95%-CI 1.14 - 8.95) higher protection chance (POR) against environmental pathogens after using teat sealant compared to the untreated control. Homeopathic prophylaxis shows no significant benefit in this model representing an OR of 0.83 (0.33-2.20) compared to control.

In general, Bismuth based internal teat sealants in this study are not able to provide protection effects compared to homeopathy or untreated cows. In general, the homeopathic prophylaxis regarding herd specific constitutional remedies is significantly more effective. The indication to treat all healthy cows with SCC values below 200k/ml during the last milk recording date lead to best results after homeopathy with a benefit (in relation to control) of 81% (+34/42%) compared to a benefit of the sealant of only 19% (+8/42 %). The threshold (200k cells/ml)

which determines the recommendation criterion of teat sealants can not be validated.

Obviously, the teat sealant has its strength in the field of environmental infections as mentioned by their developers.

The results indicate that in herds with good udder health with few environmental infections, a treatment at drying off can be omitted in farms which have to reduce antibiotics at drying off, while subclinically infected cows could be treated by homeopathics. Only in case of increased environmental infection risk, a strategic teat sealant application is recommended, as shown by a 3 fold protection chance versus therapy omission.

#### ACKNOWLEDGEMENT

This study is part of the 6<sup>th</sup> framework EU programme project QualityLowInputFood (QLIF).

#### REFERENCES

- Godden, S., Rapnicki, P., Stewart, S., Fetrow, J., Johnson, A., Bey, R., Farnsworth, R., 2003, Effectiveness of an internal teat seal in the prevention of new intramammary infections during the dry and early-lactation periods in dairy cows when used with a dry cow intramammary antibiotic. *J Dairy Sci* 86, 3899-3911.
- Graf, S., Haccius, M., Willer, H., 1999, Die EU-Verordnung zur ökologischen Tierhaltung - Hinweise und Umsetzung. *SÖL-SonderausgabeStiftung Ökologie & Landbau (SÖL)* 72.
- Klocke, P., Garbe, S., Spranger, J., Merck, C.C., 2000. Homeopathic supported udder health control regarding cow associated factors in Brandenburg (D). In: 13th International IFOAM Scientific Conference, Basel, p. 343.
- Notz, C., Klocke, P., Spranger, J., 2002. Development of an antibiotics-free udder health concept on Swiss organic farms subsequent to farm sanitation. In: XXII World Buiatrics Congress, Hannover, 18. - 23. August, p. 210.
- Sobiraj, A., Illing, C., Friebel, H., Bartel, K., Richter, A., 2000, Effects of antimicrobial treatment at drying off on bacteriological cure rate, new infection rate, and somatic cell count during the subsequent lactation in dairy cows with subclinical or unspecific mastitis: A comparative study. *Tieraerztliche-Umschau*. [print] 1 Juni, 2000; 55, 315-320.
- Woolford, M.W., Williamson, J.H., Day, A.M., Copeman, P.J.A., 1998, The prophylactic effect of a teat sealer on bovine mastitis during the dry period and the following lactation. *NZ Vet. J.* 46, 12-19.