

## RECOMMENDATIONS FOR TREATMENT OF DAIRY COWS WITH INTERNAL TEAT SEALANTS AT DRYING-OFF

### Definitions

- **Treatment with internal teat sealants** means that bismuth subnitrate, which does not contain antibiotics, in special udder tubes is infused into all udder quarters of a cow via the teat canal after the last milking during drying-off. The substance forms a plug in the teat and teat canal, which stops foreign substances and bacteria to enter the udder via the teat canal.

### Background

- Healthy udders are a prerequisite for sustainable milk production.
- The aim of the recommendations is to reduce the risk for new infections, especially by environmental bacteria such as *Escherichia coli* and *Streptococcus uberis*, during the dry period and thereby reduce the risk for mastitis.
- The recommendations guides the selection of cows so that internal teat sealants only are used for cows when a good treatment effect is expected.
- The recommendations also give instructions on how to reduce the risk for contamination and damages at the treatment occasion and give suggestions for routines for follow-up and evaluation of the treatment.
- The routines should always be based on the herd conditions. Thus, the road to the goal (healthy udders in newly calved cows) can vary between herds.

### Recommendations

- Herd specific written routines for treatment with internal teat sealants should be produced.
- At treatment with internal teat sealants products containing bismuth subnitrate are used. Such products can only be prescribed by veterinarians.
- Treatment with internal teat sealants can be considered for cows with healthy udders in herds with a high proportion (more than every third/second) mastitis caused by environmental udder bacteria (e.g. *Escherichia coli* and *Streptococcus uberis*; Figure 1) during the dry period.
- Cows considered for treatment with internal teat sealants should be chosen based on udder health class (juverhälsoklass; JHKL) at the last test milking before drying off according to Table A.
  - o If information on JHKL is not available, the selection can be based on an average of 2 to 3 evenly distributed on-line cow cell count measurements during 2-3 months before drying-off. See Table A for translation of cow somatic cell counts to JHKL.
  - o If the herd has no access to JHKL or cow somatic cell counts the selection can be based on testing with California Mastitis Test (CMT) according to Table B (see description and video here: <http://www.juverportalen.se/media/1136/cmt-20190412.pdf>). Knowledge on the best way to select cows using CMT is not available. A suggestion is to examine the cows approximately 2 weeks before drying-off and at the last milking before the start of the drying-off. If the cow has at least one udder quarter with CMT 2–5 at both occasions the cow may be considered for treatment.

- Practical performance of treatment with internal teat sealants:
  - o All 4 udder quarters are treated after the last milking after careful cleaning of the teat ends according to the following routine:
    - It is preferable that two persons are present, and that one person assists the other with cotton wool and tubes.
    - Wash hands before treatment and use new disposable gloves for each cow.
    - Remove visible dirt from the teats with dry or moist paper when needed.
    - Dip the teats in teat disinfectant and leave on for 30 seconds. Wipe teats with an individual paper towel per teat. Start with the teat furthest away and end with the closest teat.
    - Prepare one teat at the time according to the following description. Start with the teat closest to you.
      - Wipe the teat end carefully, especially around the opening of the teat canal, with several pieces of cotton wool moistened with 70% alcohol until no dirt is visible on the cotton wool.
      - Let the teat dry for 30 seconds.
    - Perform the treatment of each teat/udder quarter as follows:
      - Remove the top part of the cap on the tube so that the end of the tube tip is exposed. Avoid contaminating the tip by touching the udder skin or fingers.
      - Hold the teat with one hand and angle it so it is easy to see the opening of the teat canal.
      - Carefully insert the end of the tube tip into the teat canal.
      - Infuse all the contents of the tube into the teat.
      - Carefully withdraw the tip of the tube from the teat canal.
      - Do not massage the teat after treatment since the product should stay in the teat/teat canal as a plug.
    - Teat dip/spray all teats with teat disinfectant directly after treatment.
    - Ensure that the cow is standing for at least 30 minutes after treatment.
- Place the cow in a group with cows having healthy udders during dry period and calving.
- Control the udder and the general condition of the cow and apply teat dip/spray twice daily for 14 days according to the routine for drying-off (see separate document).
- After calving, all bismuth subnitrate is removed by hand milking before colostrum is milked from the udder.

- All treated cows should be checked after calving as follows:
  - o Perform CMT day 3–4 after calving (see instruction and video here: <http://www.juverportalen.se/media/1136/cmt-20190412.pdf>)
    - If the CMT-reaction is 2–5 milk samples for bacteriological examination are taken from such quarters. The cow should be milked after healthy cows.
  - o Control the cow somatic cell counts at the first test milking
    - If the cow somatic cell count is above 150 000 cells/ml the udder is examined using CMT and milk samples are taken as described above. The cow should be milked after healthy cows.
- Evaluate the herd routines by regular follow-up of the udder health after calving (e.g. the proportion of cows with CMT 2–5 day 3–4 after calving; the proportion of cows with clinical mastitis during the first month; differences in somatic cell counts at the first test milking compared to the one before drying-off (e.g. the proportion of new infections or the proportion of cured (cut-off healthy/sick 150 000 cells/ml); results from bacteriological examinations).

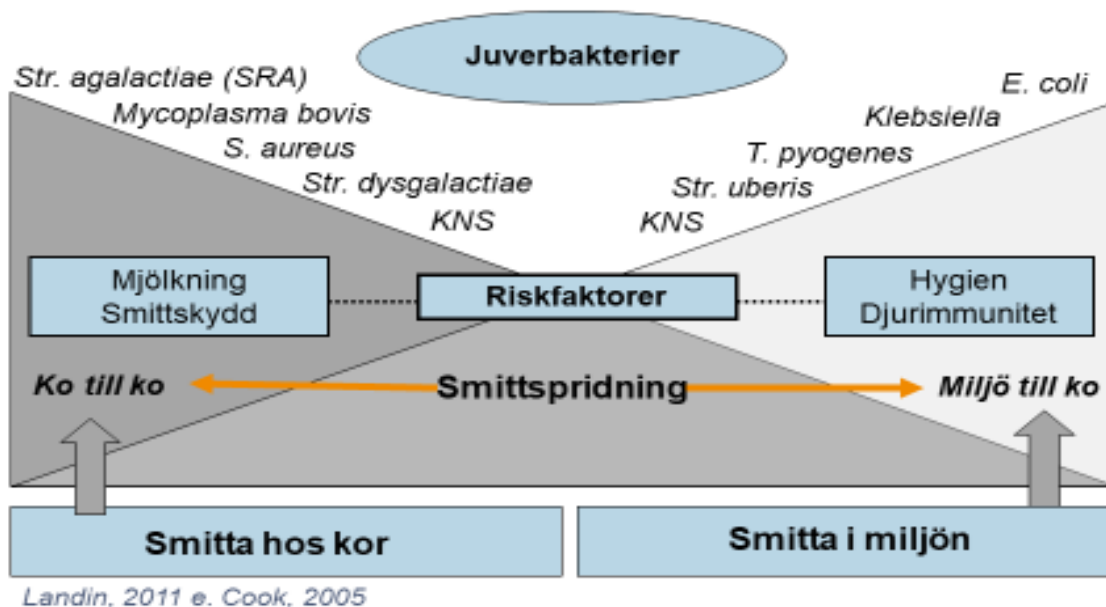


Figure 1. The most common sources of infections and transmission routes vary between udder bacteria.

Table A. Basis for selection of cows considered for dry cow therapy with antibiotics or internal teat sealant based on udder health class (juverhålsoklass (JHKL)) at the last test milking before drying-off or average cow somatic cell counts at 2–3 test milkings during the last 2–3 months before drying-off

Average cell count 2–3 test milkings x 1000 cells/ml	Probability (%) infectious mastitis	JHKL	Dry cow antibiotics	Teat sealants
0–7	0–9	0	NO	YES If environmental udder infections
8–99	10–19	1		
100–129	20–29	2		
130–179	30–39	3	Yes Depending on culture findings and cell count history	NO*
180–229	40–49	4		
230–299	50–59	5		
300–399	60–69	6		
400–499	70–79	7		
500–599	80–89	8		
> 600	90–100	9	NO	

Brolund/Funke/Ekman 2003; Revised by Håkan Landin, Distriktsveterinärerna 2014 & 2020. \* In herds with environmental udder infections a combination of dry cow antibiotics and internal teat sealants may sometimes be considered.

Table B. Basis for selection of cows considered for treatment with dry cow antibiotics or internal teat sealants based on udder quarter California Mastitis Test (CMT) approximately 2 weeks before drying-off and at the last milking before drying-off

CMT	Interpretation	Cell count x 1000 cells/ml	Dry cow antibiotics	Teat sealants
1	Negative	<200	NO	YES*
2	Trace	150–500	YES** Depending on culture findings and cell count history	NO***
3	Weak positive	400–1500		
4	Distinct positive	800–5000		
5	Strong positive	>5000		

Schalm, Carroll and Jain, 1971; with addition of Scandinavian scoring (1–5). \* If all udder quarters of a cow have CMT 1 and the herd has problems with environmental udder infections. \*\* If the cow has at least one udder quarter with CMT 2–5 at both samplings the cow may be considered for treatment. \*\*\* In herds with environmental udder infections a combination of dry cow antibiotics and internal teat sealants may sometimes be considered.

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