The case for Cinnatube

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Background:
Consumers in many countries are concerned about the use of antibiotics in livestock. If herbal alternatives to antibiotics could be proven effective as dry cow therapy, both organic and conventional dairy producers could decrease their usage of antibiotics and decrease the risk of antibiotic residues or the development of antibiotic resistance. The following studies evaluated an herbal intramammary product, Cinnatube, as an alternative to antibiotics for use as dry cow therapy.

Effect of Cinnatube on Milk Production (Mullen et al., 2013):

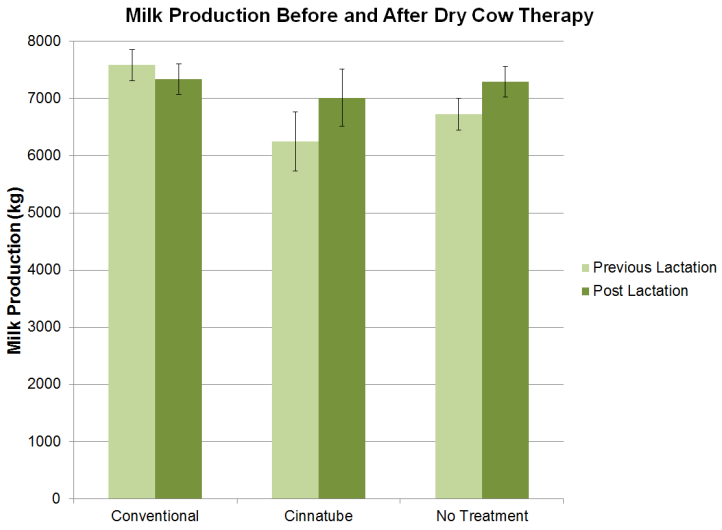
Materials and Methods:
Study design in a spring-calving, pasture-based dairy research herd in North Carolina with Holstein-Jersey cross, Holstein and Jersey cattle:

Calving Year	Conventional[1]	Cinnatube	NoTreatment
2010-2011	22 cows	24 cows	23 cows
2011-2012	20 cows	20 cows	20 cows

[1]Cows receiving conventional treatment had Quartermaster (penicillin-dihydrostreptomycin; Zoetis, Inc) infused first, followed by Orbeseal (bismuth subnitrate; Zoetis, Inc.).

Treatments were balanced by projected calving date, breed, and age of the cow. Milk production was obtained from monthly Dairy Herd Improvement Association tests.

Results:



The difference in milk production from the lactation preceding treatment to the lactation following treatment was not significantly different among treatments, but Cinnatube-treated cows had higher milk production in the lactation following treatment whereas conventional-treated cows had lower milk production.

Conclusion:
Cinnatube has no apparent negative effects on milk production as compared with conventional or no dry cow therapy.

Effect of Cinnatube on Milk Quality and Microbiology (Mullen et al., 2013):

Materials and Methods:
Study performed from 2010-2012 on 5 dairy farms with Holstein, Jersey, or crossbred cattle in North Carolina. Treatments were balanced by breed, lactation number, and expected calving date. Total quarter samples (paired from dry off to post-calving) used in analysis: 104 conventional (Quartermaster and Orbeseal), 230 Cinnatube, and 241 no treatment.

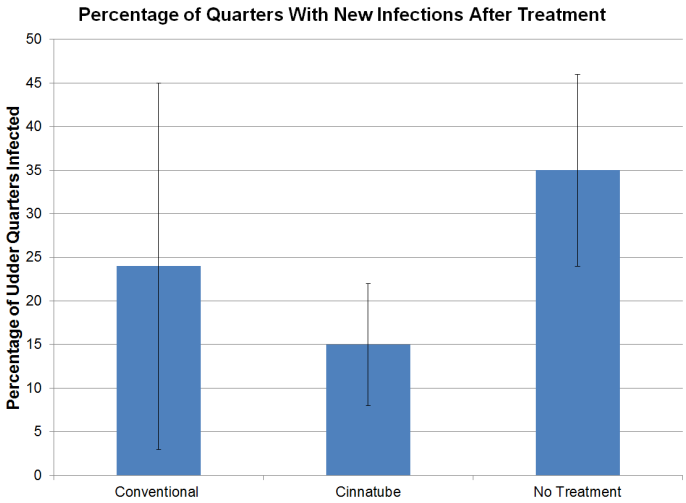
Aseptic milk samples were taken directly before dry off and 3 to 5 days post-calving and assessed for somatic cell concentration and microbiological content. Udder quarters were considered infected if at least 100 cfu/mL were present in the milk sample, except for coagulase-negative *Staphylococcus* which had to be present at a concentration of at least 200 cfu/mL. Cured udder quarters had one or more microbiological organisms present at dry off and none present after calving. Quarters with new infections had a new infection present after calving, regardless of if they had an infection present at dry off or not. Generalized linear mixed models were used to model the proportion of quarters infected or cured and the difference in somatic cell score over the dry period.

Results:

Somatic cell count data on 5 farms in North Carolina			
Treatment	Dry SCC	Fresh SCC	SCC Difference
Conventional	227,050 ± 6788[a]	531,217 ± 6926[a]	10,970 ± 8127
Cinnatube	385,743 ± 6204[a]	385,743 ± 6266[ab]	4,689 ± 7136
No Treatment	263,794 ± 6266[a]	229,332 ± 6393[b]	4076 ± 7353

Adapted from Mullen et al., 2013

The proportion of quarters cured was not significantly different for cows treated with conventional therapy (75 ± 25%), Cinnatube (34 ± 9%), or no treatment (41 ± 9%).



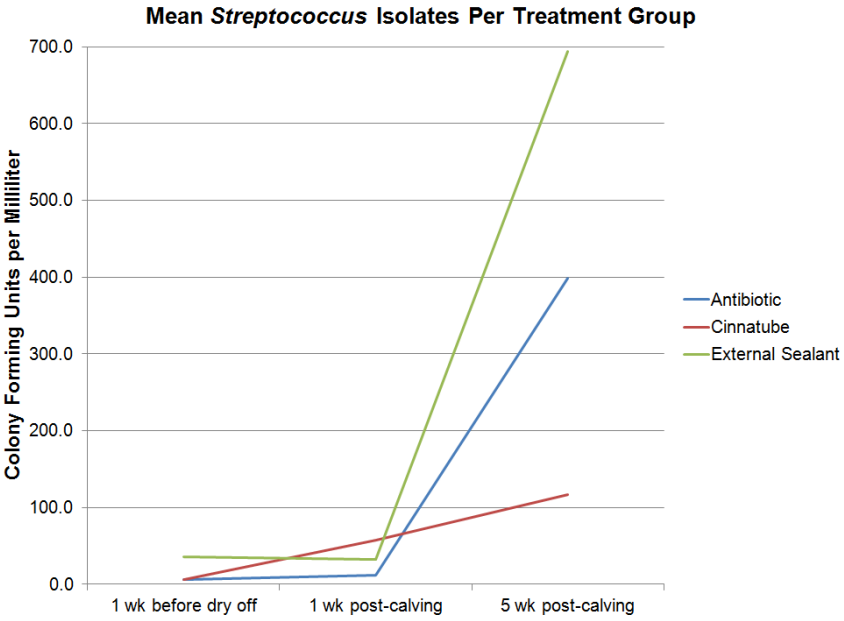
Cinnatube was the only treatment tested that was significantly better than no treatment at preventing infections from occurring during the dry period. The proportion of quarters with new infections was 24 ± 21% for cows receiving conventional therapy, 15 ± 7% for cows receiving Cinnatube, and 35 ± 11% for untreated cows.

Conclusions:
Cinnatube is a more advantageous dry cow therapy than conventional antibiotic + teat sealant therapy because in this trial, Cinnatube had no negative effect on SCC, had a similar cure rate to conventional therapy, and had a lower new infection rate than conventional therapy.

Effect of Cinnatube on Mastitis Post-Calving (Green et al., 2003):

Materials and Methods:
Study performed from June 2002 - April 2003 using 51 pedigree Holsteins, treated with an antibiotic (cephalosporin; Cepravin, Schering-Plough Animal Health), Cinnatube, or an external teat sealant (DryFlex, DeLaval Ltd.). Milk samples were taken a week before dry off, a week after calving, and 5 weeks after calving. Somatic cell count, total viable count, *Streptococcus* spp., *Staphylococcus* spp., and coliforms were measured in the milk samples.

Results:



Cows treated with Cinnatube had similar SCC after calving to the cows receiving the antibiotic or external sealant treatments. Cinnatube significantly reduced the amount of *Streptococcus* spp. isolates ($P < 0.001$) at week 5 compared with external teat sealant or antibiotic therapy.
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Conclusions:
Cinnatube is a viable alternative to antibiotics for use as dry cow therapy, due to its ability to prevent infections with *Streptococcus* spp. from occurring up to 5 weeks after calving as compared to conventional antibiotics therapy.

Final Conclusions:

☑ Cinnatube is a viable alternative to antibiotic use at dry off.

☑ Cows receiving Cinnatube at dry off had higher milk production and lower somatic cell count than cows receiving penicillin dihydrostreptomycin + internal teat sealant dry cow therapy.

☑ In addition to preventing infections from occurring during the dry period, Cinnatube's protective effects versus *Streptococcus* spp. extend 5 weeks into lactation.

☑ Cinnatube is significantly better than no treatment at preventing infections from occurring during the dry period.

☑ Cinnatube is the first herbal dry cow therapy proven to prevent new infections during the dry period, and has great potential to replace antibiotics for dry cow therapy.

References:

Green*, E. K. S., J. F. Robertson, and E. J. Allan. 2003. *The Effect of Different Dry Cow Therapy Treatments on Milk Quality in a Dairy Herd Undergoing Organic Conversion*. Proceedings of the British Mastitis Conference p. 127-129. (* University of Aberdeen)

Mullen, K. A. E. 2013. *Evaluation of Herbal Oils in Various Preparations for Treating Mastitis in Dairy Cattle*. PhD Dissertation. North Carolina State Univ., Raleigh.