

Update on chlorates

Chlorate workshop 04/05/16

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Introduction

- Reconstituted milk powder
- High TCM milk- link with chlorates
- Chlorates in teat disinfectant products
- How do we differ in our cleaning protocols to that of the Netherlands
- Farm study – changing the bulk tank cleaning protocol
- IMF trial at Moorepark

Chlorate in reconstituted milk powder (detection limit 0.10mg/kg)

TCM	Chlorate - milk	chlorate- freeze dried powder	chlorate- reconstituted powder/milk
0.0007	-	15	-
0.0026	57	450	51
0.0613*	27,000	220,000	21,000

Link between TCM and chlorates

Limit of quantification= 0.002 mg/kg

TCM (mg/kg)	Chlorate ppb
0.0004	-
0.0006	-
0.0017	-
0.0020	-
0.0028	30
0.0035	-
0.0049	-
0.0215	4

Chlorate levels detected in teat disinfectant products (0.50 mg/kg)

Product name	disinfectant	RTU or Concentrate	use	chlorate ppb
Blu-gard N Spray D	Lactic acid	RTU	Post	-
Deosan Teat-foam	chlorhexidine/biguanide	RTU	pre/post	-
Duo-Cel	chlorhexidine/lactic acid	Concentrate	pre/post	-
Laxsan	chlorhexidine/lactic acid	Concentrate	pre/post	<LOQ
Nano-dual	chlorhexidine/lactic acid	RTU	pre/post	-
PureChem	iodophor	Concentrate	post	-
Supergold	chlorhexidine	Concentrate	post	-
SuperCow teatfoam	chlorhexidine/biguanide	RTU	pre/post	-
Virolac film	lactic acid	RTU	post	-
Virolac concentrate	lactic acid/salicylic acid	Concentrate	pre/post	<LOQ
Topsan SC Plus	Chlorine dioxide/sodium chlorite/didecyl Dimethyl chloride	RTU	pre/post	19,000

Cleaning milking equipment in the Netherlands (NL)

- 75% use chlorine based cleaning products on a daily basis to clean milking equipment-similar to Ireland
- 25% use non-chlorine products for the bulk tank-as compared to all using chlorine products in Ireland!
- Rinse routines
- After milking 3 litres/unit v 14 litres Ireland
- Main wash cycle- 6 litres/unit v 9 litres Ireland
- Post wash rinse- 6 litres/unit v 14 litres Ireland

Minimizing chlorine levels in milk-NL farm advice

- **Milk bulk tank cleaning/rinsing considered to be the most likely source of chlorine detected in milk (80%)**
 - **Time between tank wash completion and next milking considered important**
 - **Some farmers include an additional tank rinse**
- **Non-chlorine tank cleaning promoted (2 alkaline washes then acid wash)-considered normal/good cleaning**
- **Avoidance of disinfectants containing chlorine**

Farm study-Ireland- to test if removing chlorine from bulk tank cleaning will impact on TCM and/or chlorates in milk

- One milk processor
- 20 farms presently using chlorine products **for cleaning the bulk milk tank-** converting to non-chlorine products
- Milk to be tested on 3 occasions (at collection time) for TCM & Chlorates before and after the product changeover
- Information on cleaning protocols on those farms will be recorded
- TBC will be measured and monitored by the milk processor

IMF trial-Moorepark

Detergent type	TCM Milk	Chlorate-Milk (0.0002mg/kg)	Chlorate powder (0.01 mg/kg)
Liquid Gold (detergent + chlorine)	0.0004	-	<LOQ
Multi-san CF (detergent only)	0.0002	-	<LOQ

Detergent steriliser used at manufacturer recommended working solution and with recommended rinse water levels.

Conclusions

- Chlorate levels in powder are approximately 8 times higher than that in milk
- Reconstituted powder milk will give similar chlorate results to that in milk
- Not a direct link between TCM and chlorate levels in milk
- Teat disinfectant products containing chlorides or chlorine dioxide likely to contain high chlorate levels
- Chlorine used as part of machine cleaning in the NL at similar rate to that in Ireland
- Removing chlorine from bulk tank cleaning considered important and removed in approx. 25% of tanks in NL
- Initial study of using non-chlorine cleaning products for bulk milk tanks now being implemented on 20 farms, if successful will be rolled out to all farms
- Non detectable chlorate levels can be achieved in milk and milk powder from milking equipment cleaned correctly using both chlorine based detergents and non-chlorine based detergents