

Teat-Dips Past, Present and Future

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Origins of Teat & Udder Care

- Started with washing udders with common household soap.
- Soon discovered that a sanitizing solution was beneficial.
- First sanitizing product was a pine oil base.
- In the early 50's tamed iodine solutions compounded with acids were brought to market as "udderwashes".
- Tamed iodine or iodophors are complexes of elemental iodine that are stabilized with non-ionic surfactants or polyvinyl pyrrolidone.
- Resulting in a water soluble iodine complex with low oral, dermal or inhalation toxicity

The 60's



60's

- The coming of age of teat dipping in the form of an acceptable post milking practice.
- Prior most mastitis prevention was performed by using udderwashes prior to milking and little or no post milking sanitizing practice.
- First products developed for teat dips were primarily 1% available iodine teat dips.
- Typical level of emollients were 5 or 10%.
- Some products were buffered to make the pH of the product less irritating.
- The pH range of products was from a low of 2.5 to a high of 5.5.

The 70's



70's

- Teat dipping became a more common practice vs. udderwashing.
- With the increased demand came new concerns about iodine levels in milk. So new variations of iodine based teat dips at 0.1%, 0.25% and 0.5% iodine concentrations were developed as well as variations in emollient concentration and make up.
- New active ingredient germicides worked their way into the teat dips.
- Quaternary ammonium compounds, Bronopol, Chlorhexidine Acetate (CHA), Chlorhexidine Gluconate (CHG) and concentrated solutions of Sodium Hypochlorite (bleach) were some of the more popular products that were introduced.
- CHG is by far the one that has had the most success as an alternative to iodine. Sodium hypochlorite is still used but not as widespread.

70's

- Quaternary ammonium compounds left residues in milk that would inhibit cultures that would be used to make cheese. Quats are also very irritating and damage skin.
- Bronopol still surfaces from time to time. It will also leave residues in milk and has limited effectiveness.
- Chlorhexidine gluconate more popular than the acetate salt due to cost and solubility. NOTE it is the chlorhexidine portion of the molecule that is the germicide and not the gluconate or acetate portion.
- Sodium hypochlorite (bleach) is a very good germicide. It kills a broad spectrum of bacteria. The high pH >12 is detrimental to skin and it can not be formulated with skin conditioners

80's



80's

- Concept of pre-dipping took hold. Substantially reducing the practice of udder washing as a prep to milking.
- More rapid methods to administer the teat dip prior to milking such as automatic feed dip cups and spraying teats became a new practice were put in place on large and small farms to speed up udder prep and reduce labor.
- New products introduced for pre & post milking.
- Traditional liquid products with DDBSA, hydrogen peroxide and Lauricidin and low concentration iodine generators and a powdered organic chlorine products that were mixed with water were also introduced.
- A powderd teat dip for use in cold winter conditions was introduced.
- Teat dip concentrates were now available providing economics in transportation and packaging.
- Start of film forming dips or more commonly known as barrier dips.

80's

- Of the teat dips introduced in the 80's, acidified chlorite solutions (ACS) and hydrogen peroxide based teat dips have had the biggest impact on the iodine teat dip market. These products have a similar mode of action in that they are oxidizing chemicals like iodine.
- DDBSA has limited germicidal properties and it must have a pH <3.2 to be effective. DDBSA is also a surfactant and defats the skin so it needs to be compounded with high levels of emollients.
- Products manufactured with only DDBSA as an active ingredient are no longer available. One product from the 80's was compound with DDBSA and Iodine and is still produced.
- Lauricidin and powdered organic chlorine have disappeared from use.
- Iodine generators are still produced but have had limited acceptance.
- Powdered winter dips are seasonal and continue to grow with the acceptance that a powdered dip will perform under adverse climate conditions.

The 90's



90's

- Farm numbers diminishing but cow numbers stable.
- The practice of foaming teat dips began as well as dipping and spraying.
- New teat dips to hit the market contained Nisin and alcohol. Nisin is an antibacterial peptide.
- More winter dips in the form of liquids. Most products contained high levels of propylene glycol to lower the freezing points of the teat dips and used fatty acids as the active germicide.
- With larger farms and more environmental challenges, barrier dips were the answer to control mastitis outbreaks.

90's

- Nisin product has vanished from the scene because of its limited germicidal activity.
- Liquid based winter dips are still used under limited conditions.
- Barrier dips that are compounded with iodine and ACS are very popular and effective. They have a proven track record and when environmental pathogens are the source of mastitis outbreaks they have been the go to solution.

2000



2000

- Organic Dairy Farm Certification. Teat dips are reviewed to meet the requirements set by “Organic Certifying Organizations”.
- Lower SCC standards were being implemented so product efficacy and skin conditioning are driving factors to the dairyman.
- New products that entered the market were based on short chain organic acids and hydroxyl acids. Many of these products are still on the market but have met with limited success because they do not kill as broad a spectrum of pathogens as other products.
- Phenol was used as an active ingredient in a teat dip for a short time. Phenol is an excellent germicide but proved to have some major issues. Phenol is a suspected carcinogen and it left a strong residue odor in milk causing finished dairy products to be disposed.

Today



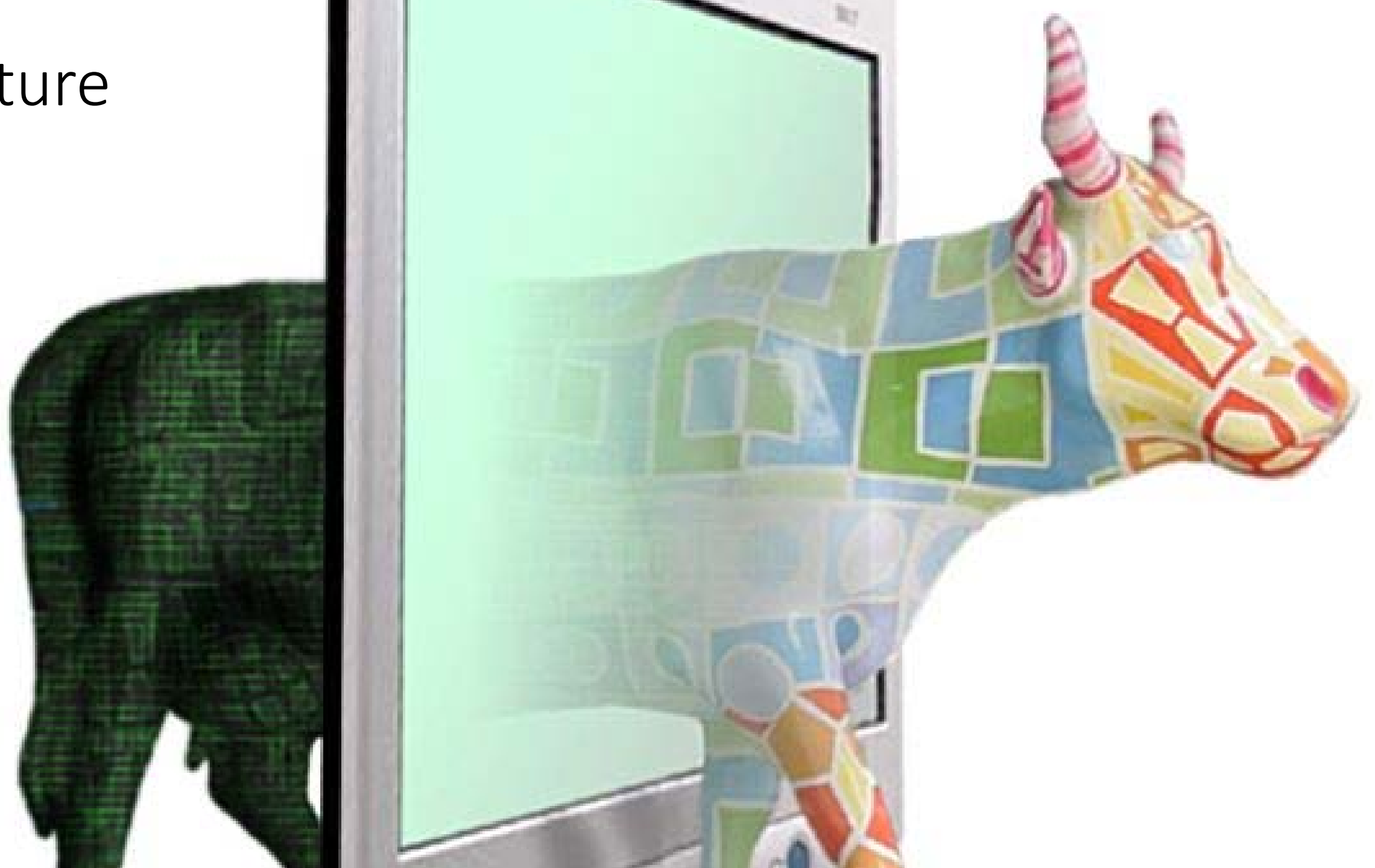
Today

- Continue to have repercussions from the Iodine crisis that arose when the tsunami hit Japan. This caused a worldwide shortage of iodine. The shortage caused the price of iodine to double and even triple overnight. Forcing suppliers and dairymen to look at alternative ingredients.
- New products and revamped older products were introduced such as the organic acid based products.
- DDBSA resurfaced in various forms mixed with other organic acids.
- A combination product of reducing the level iodine and replacing it with CHG to provide an equivalent active ingredient level as the original higher level of iodine was introduced to the market.

Today

- Robotic milkers are on all size dairy farms.
- For robotic milking there is a wide variety of pre-milk products that are out there but not one particular active based product has displayed superior results and taken the market by storm.
- Post milking products are of the sprayable nature, hence no viscous or barrier products.
- Chemical manufacturers and suppliers are working on products that will provide the best prep and post milking sanitation for teat ends to work for robotic applications.

Future



Future

- Recently there has been restrictions on products containing NPE's or NonylPhenol Ethoxylates which are surfactants.
- NPE's are the most common complexing agent used to make iodine into iodophors. They are also used in many other teat dips as cleansing agents.
- Today companies that export milk products to China, Canada and the EU are not allowed to have NPE residues in the milk.
- Some manufacturers have products in their lines or are in the process of converting products to alternative chemistries to meet this criteria without altering the efficacy and performance of the teat dips.

Future

- Future teat dips will need to :
 - Meet new environmental regulations.
 - Leave non-toxic residues on teat ends.
 - Be compatible with new milking methods and equipment.
 - Meet the demands created from larger farms.
 - Be user friendly for the hired hands.
 - Incorporate renewable chemistries.
 - Reduce the carbon footprint.
 - Be effective to meet worldwide demands to meet the SCC regulations and milk quality from importing nations.

Animal Drugs

- Teat dips are animal drugs.
- Teat dips must be registered with the FDA and assigned a National Drug Code number or NDC.
- Manufacturers must be registered with the FDA.
- Manufacturers must follow the rigid GMP's set by the FDA.
- Manufacturing facilities are inspected by the FDA.
- An FDA facility inspection will typically take 3-4 days.

FDA Inspection Highlights

- Accountability
- Record keeping for the inspection of raw materials, cleanliness of equipment used to manufacture, cleanliness of equipment used to manufacture, lab standards, test methods, test results, labels, containers, batch sheets, yield of product and shipments.
- Test procedures and validation of the procedures.
- Product life testing for expiration dates.
- Recall procedures and records of customer complaints.
- Internal annual review by staff.

Questions



Thank you

