

Guidance on choosing an effective teat disinfectant product for your farm

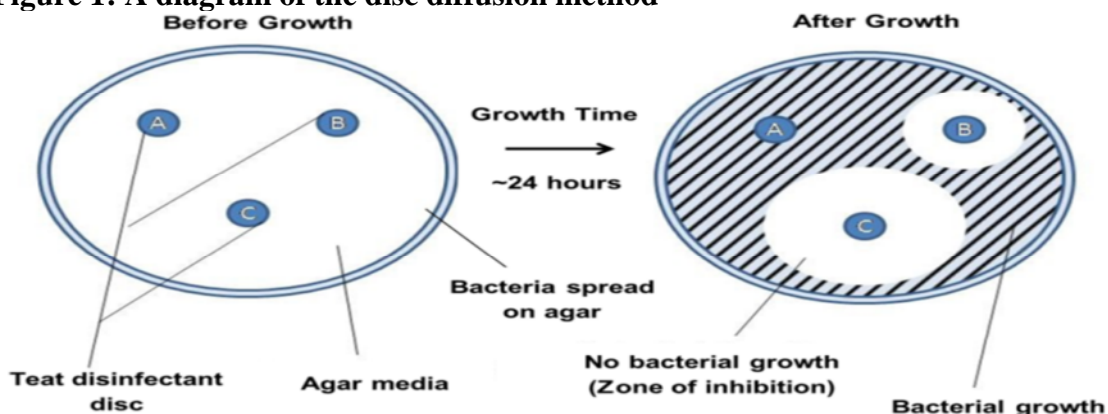
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Teat disinfection has been used for many years in the prevention of mastitis. New intramammary infections caused by contagious pathogens can be reduced by at least 50% when post-milking teat disinfection is carried out. There are many different types of teat disinfectant products on sale in Ireland such as; barrier teat disinfectants, teat foams, high viscosity liquids, thin liquids, liquid concentrates and ready-to-use liquid disinfectants. Some of the main active ingredients in products include chlorine dioxide, iodine, chlorhexidine and lactic acid with combinations of some of these ingredients also used. Unfortunately, there was little knowledge known regarding the effectiveness of these products within an Irish context.

Recent Teagasc studies have evaluated 99 teat disinfectant products commercially available in Ireland against the main mastitis-causing bacteria (*Staphylococcus aureus*, *Streptococcus uberis* and *Escherichia coli*) isolated from the teat skin surface. Evaluations of these products were performed within a laboratory setting, using the disc diffusion method. This method has previously been applied to evaluate the effectiveness of antibiotics but has now been adapted to test teat disinfectants. The disc diffusion method measures the ability of a teat disinfectant product to inhibit bacterial growth.

Figure 1: A diagram of the disc diffusion method



Method: The bacteria that are to be tested are placed onto agar plates. This is allowed to dry and discs are then soaked in the test disinfectant. These discs are then applied to the agar plate. This plate is then incubated at 37 °C for 24 hours. The zones of inhibition, measured in millimetres (mm) using an

electronic calliper, are an indirect measurement of the ability of the disinfectant to inhibit bacterial growth. Therefore, the most effective teat disinfectant product will have the largest zone of inhibition. This method allows screening of teat disinfectant products against specific bacterial strains associated with mastitis.

Table1: List of teat disinfectant products in alphabetical order, active ingredients and zones of inhibition against *Streptococcus uberis*, *Staphylococcus aureus* and *Escherichia coli*

Product	Ingredient (w/w)	Str. uberis	Staph. aureus	E. coli
Arkshield	5% Lactic acid & 0.3% Chlorhexidine	22	19	15
Arrabawn Udder Guard	0.5% Chlorhexidine	17	15	16
Bacto-Lac	5% Lactic acid & 0.05% Chlorhexidine	19	16	14
Barri-max	2.4% Lactic acid	20	16	14
Biolac PrePost	0.25% Lactic acid & 0.03% Salicylic acid	20	16	11
Biolac PrePost	0.25% Lactic acid & 0.03% Salicylic acid	21	15	12
Bisept	0.05% Chlorine dioxide	19	19	12
Blue Barrier Spray	Lactic acid & 0.6% Chlorhexidine	22	22	20
Blu-gard N Spray	3.46% Lactic acid	20	16	11
C-Dip	0.53% Chlorhexidine	18	16	16
Chlorhexsan Dual RTU	1.6% Lactic acid & 0.4% Chlorhexidine	16	15	13
Co-op Source Duo Teat Shield	2% Lactic acid & 0.3% Chlorhexidine	18	17	15
D 4 Iodine	0.5% Iodine	21	16	11
Dairy Pro UltraDip	3% Lactic acid	17	16	12
DairyLac SA	3% Lactic acid	19	15	12
*DeLaval Prima	Hydrogen peroxide,1.42%, lactic .35%, salicylic acid .17%	42	43	27
Deosan Mastocide	0.5% Chlorhexidine	19	17	17
Deosan Summer Teat Care	0.425% Chlorhexidine	17	17	18
Deosan Super Iodip	0.5% Iodine	20	15	12
*Deosan Target	0.6% chlorhexidine	22	22	17
Deosan Teat Foam Advance	0.6% Chlorhexidine	20	16	16
Deosan Teatcare Plus	0.425% Chlorhexidine	16	17	18
Deosan Triathalon	1.76% Lactic acid	20	14	11
Dermalac Emprasan	0.25% Lactic acid & Salicylic acid	21	14	11
Dual Dip	2% Lactic acid & 0.3% Chlorhexidine	18	16	15
Dual Dip Supreme	Lactic acid & 0.6% Chlorhexidine	22	21	19
Duo-cel	2.5% Lactic acid & 0.3% Chlorhexidine	19	16	16
Duogold	2% Lactic acid & 0.3% Chlorhexidine	20	17	17
Duo-Teat Shield	2% Lactic acid & 0.3% Chlorhexidine	18	17	17
Emprasan dual	0.25% Lactic acid & Salicylic acid	20	15	16
Flexigard Spray	4% Lactic acid	22	19	18
Fortress Protect Film	3% Lactic acid & 0.2% Chlorhexidine	20	18	14

Gold Glycodip XL	0.5% Iodine & 1% Lactic acid	22	15	12
Hamra Red	0.42% Chlorhexidine	18	16	16
Hexa-cel RTU	0.52% Chlorhexidine	16	16	15
Hexaguard	0.74% Chlorhexidine	21	18	18
Hexaklene R	0.5% Chlorhexidine	21	16	21
Hexa-Spray	0.5% Chlorhexidine	17	14	12
Hypraspray	2% Lactic acid & .03% Chlorhexidine	19	17	12
Hypred Quick Spray	2% Lactic acid & 0.1% Salicylic acid	17	10	10
Ioguard	0.5% Iodine	21	14	10
Ioklar Multi	0.25% Iodine	12	9	8
Io-Shield D	1.35% Iodine	19	18	16
Io-Shield Spray	0.5% Iodine	17	15	13
Kenocidin Spray & Dip	0.5% Chlorhexidine	17	16	14
Kenolac	3.6% Lactic acid	22	19	10
Kenolac SD	3.6% Lactic acid	19	15	13
Kenomint	0.5% Chlorhexidine	18	16	16
Kenomint SD	0.5% Chlorhexidine	19	15	15
Kenomix	0.0157% Chlorine dioxide	23	18	19
Kenomix SD	0.0157% Chlorine dioxide	21	21	21
Kenopure	3.2% Lactic acid	22	16	11
Lactic Lather	1.6% Lactic acid & Hydrogen peroxide	28	25	19
Lacto dual	2.5% Lactic acid & 1.5% Chlorhexidine	18	15	17
Lacto-cel	2.4% Lactic acid	20	16	12
Lacto-Mil	5% Lactic acid	19	14	11
Lactospray	2.4% Lactic acid	21	19	10
Lanodip 4 XL	0.5% Iodine & 0.5% Lactic acid	22	17	12
Lanodip Pre-Post	0.29% Iodine & 0.8% Lactic acid	21	13	10
Lely Quaress-Cura	3% Lactic acid & Salicylic acid	19	16	12
Luxdip 50B	0.5% Iodine	19	14	11
Masocare Platinum	0.54% Iodine	19	15	12
Masodine 1:3 Concentrate	0.5% Iodine	21	16	11
Masodip Platinum	0.436% Chlorhexidine	16	18	14
Maxadine C	0.5% Iodine	23	16	12
Maxidine RTU	0.5% Iodine	19	13	11
Nano Dual	1.93% Lactic acid & 0.2% Chlorhexidine	22	17	15
Novo Dual	4% Lactic acid & 0.27% Chlorhexidine	21	18	16
Novodip	4.9% Lactic acid & 1.28% Chlorhexidine	19	19	16
Novospray	4.9% Lactic acid & 0.3% Chlorhexidine	20	18	16
Prefoam	2% Lactic acid & 0.1% Salicylic acid	18	12	11
Protect Pre Post	3% Lactic acid & 0.25% Chlorhexidine	22	18	14
PureChem Chlorhexidine	1.49% Chlorhexidine	16	15	15
PureChem Chlorhexidine Summer	1.49% Chlorhexidine	17	16	16
PureChem Dual Dip	1% Lactic acid & 1.49% Chlorhexidine	16	16	15

PureChem Iodophor	0.5% Iodine	19	13	11
Quatro	0.5% Chlorhexidine	16	17	17
Salvodip B	2.4% Lactic acid	20	17	12
Salvohex	2% Lactic acid & 0.3% Chlorhexidine	18	16	17
Salvospray	2.4% Lactic acid	19	17	12
SensoDip	0.5% Chlorhexidine	17	16	16
Sensodip 50	0.5% Chlorhexidine	18	17	17
Sensospray	0.5% Chlorhexidine	17	17	15
Silkdip	0.5% Iodine	22	17	12
Summer C-Dip	0.5% Chlorhexidine	19	15	15
Supa-Max	1.89% Lactic acid	15	15	10
Super Cow Teat Foam	0.6% Diamine	16	15	14
Supergold	0.5% Chlorhexidine	21	17	19
Supreme	2.5% Lactic acid & .375% Chlorhexidine	19	17	15
Sure spray Duo	2% Lactic acid & 0.3% Chlorhexidine	19	17	15
Surespray	0.5% Chlorhexidine	20	19	18
Synofilm	8% Lactic acid	17	19	17
Teat Gard C	0.5% Chlorhexidine	16	15	15
Topsan SC Plus	Chlorine dioxide, DDAC 0.040%	25	21	7
TriCide	0.15% Iodine & 1% Lactic acid	21	13	10
TriCide Gold	0.15% Iodine & 1% Lactic acid	20	13	10
Uddergold	0.32% Acidified sodium chlorite	21	20	17
Valiant	0.038% Sodium chloride	23	22	22
Virolac Concentrate	2% Lactic acid & 0.1% Salicylic acid	17	11	11
Virolac Film	2% Lactic acid & 0.1% Salicylic acid	17	12	11
Virolac Spray	2% Lactic acid & 0.1% Salicylic acid	16	11	10

The numbers in the columns represent the effectiveness of the product against those bacteria within a laboratory setting. * Different bacterial isolates used for these products

Summary of Results

This study has shown that all teat disinfectant products tested showed different levels of effectiveness against the main mastitis-causing bacteria (*Staphylococcus aureus*, *Streptococcus uberis* and *Escherichia coli*). The effectiveness of an individual product may depend on the strain of the bacteria present. In this study the strains chosen were isolated from cow's teats in an Irish dairy herd. Iodine was traditionally considered to be the most effective teat disinfectant and this study has shown that there is a range of alternative teat disinfectant products available which reduce bacterial growth comparable to iodine-based products. The concentration of active ingredient did not influence the effectiveness in the majority of teat disinfectant products. Additionally, different products/ingredients were more effective against specific strains of bacteria within the study. The most effective teat disinfectant product will have the largest zone of inhibition. Therefore, in choosing an all-round effective product against all 3 bacterial strains, a product with an average zone of inhibition of 18 mm or greater would be expected to be the most effective.

The disc diffusion method is an effective method to evaluate/screen a large number of teat disinfectant products, but field trials would be required to fully determine the products effectiveness on

reducing bacterial load on teat skin and the ability of the products to reduce IMIs. The potential impact of some teat disinfectant resulting in residues in milk must also be considered when choosing a teat disinfectant product.

Key guidelines to adhere to when choosing/using a teat disinfectant:

- Check if product is registered. The product will have either a PCS or IMB number on the drum label. This is important for cross compliance checks
- Use products as recommended by the manufacturer/drum label. i.e. if pre-milking disinfecting, ensure product is recommended for both pre- and post-milking disinfection
- Ensure the product is correctly diluted as recommended by the manufacturer. If there are any farm water supply issues with regard to water hardness, bacteria and/or pH, then ready-to-use products should be considered as opposed to those that require dilution
- Avoid adding additional emollients as this may have a negative impact on product efficacy
- Take care when using iodine products and do not use iodine as a pre-milking disinfectant. Iodine products can lead to increased iodine levels in milk
- Chlorine dioxide disinfectant products contain chlorates, and if the product comes into contact with milk will result in chlorates in milk
- Choose teat disinfectant products which have been shown to be most effective against the specific bacteria associated with bacteria on your farm
- Never disinfect teats pre-milking without drying teats with paper. Drying teats will reduce the possibility of residues entering the food chain
- Store teat disinfectants in a cool dry area and do not allow disinfectants to freeze