# Dasc 485 Project

**Testing the Effectiveness of the Airwash System**
**at the**
**Texas A&M University Dairy Center**

## *Introduction*

Clinical and sub clinical cost dairy producers hundreds to thousands of dollars every year in discarded milk. The goal of the dairy industry is to continue to develop new technology and products to assist the producer in reducing mastitis problems within his herd. This experiment deals with such a technology, the Airwash system. The purpose of a Airwash system is to wash out the milking unit with hot water, and air after each cow has been milked to reduce the probability of the next cow to be milked getting a contagious form of mastitis form the residual milk in the teat cup or inflation. However, often a producer is not fully satisfied that a new technology is either working or necessary to install. Therefore, to prove that the Airwash system does infact reduce the numbers of microorganisms left in the inflation after milking at the TAMU dairy center, a simple experiment was performed during one of their milking sessions. The experiment was performed on small numbers of cows. Therefore, is not valid for research data, it is only intended for the use of the TAMU dairy center's personal information on their system with their cows.

## *Producers*

**Materials used:**

Phosphate buffered saline in a sterile container - used as a means of collecting the organisms from the inflation shells of the teat on the milking unit.

The saline solution consisted of 2.50 ml of concentrated phosphate buffered saline stock added to 2 liters of sterile distilled water in a sterile container. All of which were autoclaved prior to the actual experiment was performed at the dairy (Page 121, section 5.3 'Preparation of dilution water', Sub topic: MEDIA).

5% above blood auger – used to determine if 1) actual microorganisms by growth on the media and establisment of colonies and also, 2) to determine of the organism was hemolytic or non hemolytic. Hemolysis usually in most cases denotes a pathogenic organism is present.

Tergisol auger – this auger depicts gram (-) organisms with colony establishment. The lactose fermenters turn the auger pink and lactose nonfermenters turn the auger a yellow-green. Gram (+) organisms do not grow on Tergisol and two of the mastitis causing organisms, Staphylococcal and Streptococcal, are in the Gram (+) family.

Salt Mannitol auger – Gram (+) organisms only grow on this media. The fermenters as in the case of Staphylococcal turn the media green. The non fermenters in the case of Streptococcal (non hemolytic) leave the media a pink color. In this particular experiment this media was obtained from Dr. Keahey's. Veterinarian Microbiology 405 instructor, micro lab.

**Other materials needed to perform the experiment**:
Forceps clamps (2), sterile rubber stoppers (number 6), sterile 10-20 ml pipettes, sterile collection tubes, sterile swabs, and an incubator.

## *Results*

| Cows Tested | Cows Milked | Before Flush | After flush | Type of Microorganism on Blood from before flush plates |
|---|---|---|---|---|
| Before milking | 0 | 0* | 0 | no organisms detected |
| PBS before test | 0 | 0 | 0 | no organisms detected |
| 1 mastitis cow | 1 | 3 | T | Staph – hemolytic |
| 1 | 24 | 3 | T | Staph – Hemolytic and Non-Hemolytic, Gram (-) on Tergisol |
| 2 | 84-96 | 2 | 0 | Staph – Hemolytic |
| | | 3 | 2 (contaminants) | Staph – hemolytic, Strep – Beta, Gram (-) |
| 1 | 144 | 3+ | 0 | Staph – Hemolytic and Non-hemolytic, Strep-incomplete Hemolysis |
| 1 | 180 | 3++ | 1+ (Fecal Waste Contaminants) | Staph – Hemolytic and Non-hemolytic, Gram (-), Unidentified non-hemolytic colonies |

*
0 – No colonies present
T – Slight growth
1 – Slight to Moderate growth
2 – Moderate growth
3 – Heavy growth

## *Discussion*

All of the samples were plated on Salt Mannitol media. However, due to a preparation error in the Microbiology Media Preparation Kitchen, the formula was off slightly resulting in no growth from all samples. Staph colonies were present, as indicated on the blood auger.

Only 10 ml's of the saline solution was used for convenience. The pipettes were 10 ml and to add the second equivalent would have increased the amount of time required per sample, therefore increasing the overall milking time. Also, the second equivalent required someone to hold the teatcup upright while getting the second equivalent. Therefore, 10 mls were used instead of 20 mls as indicated in the procedure by Smith et al., 1985.

The results indicate that in every case the Airwash did reduce if not completely climinate the microorganisms within the inflation of the teatcup. In the case of mastitic cows the numbers of organisms prior to the flush were extremely concentrated. The flush eliminated most of the colonies. The colonies that did remain were the non-hemolytic version and therefore most likely not pathogenic. The important point is that the flush reduced great numbers of mastitis causing organisms to just trace amounts of the organisms in the inflation. Therefore, a reduction of the number of organisms causing the infection will decrease the incidence of mastitis in the herd. Furthermore, this simple test of the Airwash system in fact did prove it's effectiveness in reducing the cases of new mastitis cases in a potential herd.