

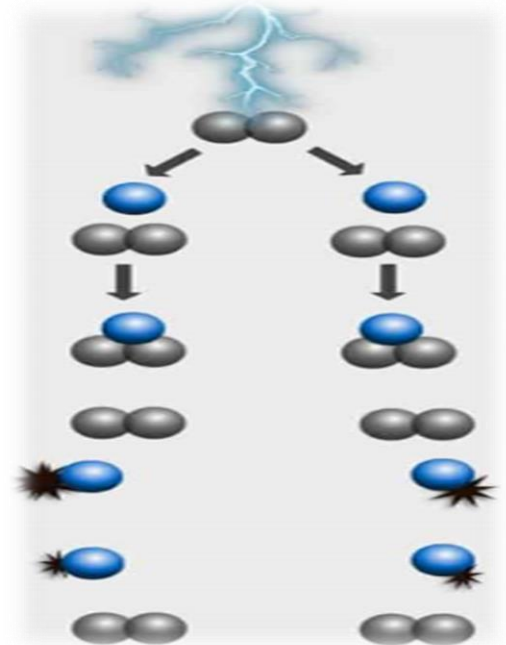
# Ozone Benefits for Dairy Farmers

**Ozone** is a naturally occurring gas that may be referred to as “activated oxygen”. It contains three atoms of oxygen( $O^3$ ) instead of the usual two found in normal oxygen( $O^2$ ). It is a colourless gas with a distinct (but pleasant) odour.

Ozone has a high oxidizing ability which is effective for disinfecting and sterilizing, is the safest and second most powerful oxidant known to man. It is accepted as a broad spectrum, effective disinfectant and antiseptic, Ozone performs 3,125 times faster than chlorine as a bactericide, fungicide and virucide. Ozone as an oxidant neutralizes contaminants or chemically alters them so that they can be more easily eliminated.

Ozone received certification in the US for use on food due to the safety of ozone [The USDA accepted ozone as safe and suitable for use in the production of meat and poultry products in 2000, and the FDA approved ozone as an antimicrobial agent for food in 2001]

The bacteriocidal, fungicidal and virucidal effect (rapidly destroying streptococci, staphylococci and coliform bacteria as well as the most aggressive diphtheria and tetanus toxins) greatly reduces the risks of infections.



## Drinking Water:

If animals suffer from poor growth, poor reproduction, frequent illnesses and poor milk production, water could be the culprit. Sometimes poor water quality can trigger or compound these production related problems (Bodman).

Ozone water can improve water quality and with that improve animal performance. Ozone water treatment technology contribute financial benefits as reflected in their profits (Engineering News - USA).





Lactating cows need to drink 130 to 180 litres of water per day (US data). If cows do not like the taste of the water, they will not drink enough and their milk production will suffer.

Farm animals are discerning about the water they drink. Removal of unpleasant tastes and smells can result in an increase in water, resulting in a measurable rise in milk production (Engineering News). Minerals can affect water taste since high levels of

one or more minerals can cause an off-taste. Ozone treatment of the drinking water can oxidize the minerals and remove them from the water.

Well or surface water can also be laden with bacteria. Bacteria in the drinking water can lead to illness if the levels are very high. However, even low bacteria levels can stress cows and effect milk production levels. Ozone purification of drinking water has resulted in a meaningful drop in the mortality rates on chicken and pig farms (Engineering News). It is a logical conclusion that the same will hold true for cows.

## Ozone as a Sanitizer:

The production of quality milk begins with good hygienic practices. Dirty cows and soiled equipment can lead to elevated bacterial levels in the bulk tank (Wallace). Alternative sanitizing agents that are safe to the environment are desirable to the food and dairy industries.

Ozone is a potent oxidizing agent that aggressively destroys bacteria, pathogens and viruses (B. Dosti). The entire udder and the rear legs can be washed off with ozonated water prior to milking in order to prevent these problems.

Ozonated water can (should) be used for rinsing the milking equipment, sanitizing it, thus reducing the chances of milk contamination. All equipment that is used to provide feed for the cows can (should) be washed out with ozonated water on a regular basis to sanitize it, thus reducing the chances of milk contamination. All equipment that is used to provide feed for the cows should be washed out with ozonated water on a regular basis to kill mould, mildew, and bacteria.





## Ozone in the Air:

Ozone can be added at very low doses to the air in the barn for several beneficial results. It will virtually eliminate the manure smell in the barn. At the same time it will destroy E. Coli, salmonella and many other bacteria. When ozone has been applied to the air in pig barns, it has eliminated odour, reduced the number of flies, reduced illness, and lowered mortality rates.



## Mastitis Prevention:

Ozone dissolved in water can be used for a teat spray prior to milking, to clean, sanitize, and disinfect the teats.

Reducing stress and controlling infectious diseases can not only reduce the impact of environmental mastitis but may also lead to higher milk production levels (Wallace). Milking procedures, particularly udder preparation, can impact the amount of environmental mastitis (Wallace). No single control measure will have as great an impact in preventing mastitis and conserving quality milk production as minimizing exposure to bacteria. Using ozonated water to wash the udder in the milking parlour and to wash the floors when replacing bedding material will help reduce bacteria.

## Waste water / wash water:

Odour from farms has become a big issue in the news. There is a workable solution to reduce the odour at farm level, both in the waste water ponds as well as the recycled wastewater used to wash yards and lanes down. The removal of solids with a weeping wall or separating the solids from the waste water with a screw press. Ozone can then be used to treat the wastewater to dramatically reduce, or even eliminate, pathogens and odour in the wastewater lagoons.



Eliminating the pathogens in the washdown water will improve overall animal health by reducing pathogens in the environment.

## Methane mitigation:

Ozone has recently become the focus of studies for its possible effect as a methane mitigation strategy.

A study by scientists at the University of Sydney found that ozonated water offered to cattle can lead to a reduction in methane emissions of slightly more than 20 percent.

Ozonated water could offer a practical and relatively inexpensive method of reducing methane emissions from ruminants.

A 20 % reduction in methane can lift milk production by approximately 1.5 litres per cow per day or 0.2 to 0.3 litres per goat per day.

## References:

1. Gerald Bodman and Shirley Roenfeldt, Troubleshoot Water Intake. Dairy Herd Management. 5/7/2003
2. B. DOSTI 1, A. K. GREENE 1, Z. B. GUZEL-SEYDIM 2, and A. C. SEYDIM 2. (1) Department of Animal and Veterinary Sciences, Clemson University, B-111 Poole Agricultural Centre, P.O. Box 340361, Clemson, SC 29634-0361, (2) Department of Food Science and Human Nutrition, Clemson University, 224 Poole Agricultural Centre, P.O. Box 340371, Clemson, SC 29634-0371
3. Wallace, Richard L. Production of Quality Milk Through Environmental Mastitis Control. Illini DairyNet.  
[Http://traill.outreach.uiuc.edu/dairynet/paperDisplay.cfm?ContentID=198](http://traill.outreach.uiuc.edu/dairynet/paperDisplay.cfm?ContentID=198)
4. Engineering News, Ozone Water Treatment Coming for Agriculture. Mining Weekly and Policy. Published: 07/27/2001
5. Eleonora Caro, Devin Holman, Peter J Moate, Alexandre Vieira Chaves. Ozone Decreased Enteric Methane Production by 20% in an in vitro Rumen Fermentation System. Frontiers in Microbiology, November 2020
6. Laszlo Varga, Jenő Szigeti. Use of ozone in the dairy industry: A review. International Journal of Dairy Technology, 02/05/2016
7. Chris Grainger. Methane emissions from dairy cows. Department of Primary Industries, Victoria, Australia