



# Remediating “Salty” Water

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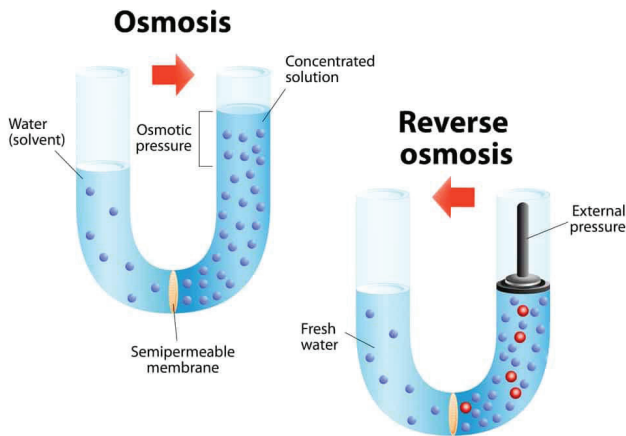
Water quality continues to grow as a primary focus in the animal production model. With this increased focus, the total composition of the drinking water is being taken into consideration and how the concentration of each constituent can impact the production model.

Sodium and chloride or “salt” are two constituents that are often overlooked or not recognized as being problematic. Unlike iron that often has visual indicators or hydrogen sulfide that can be detected by smell, high levels of sodium and chloride are not easily detected unless a water analysis is conducted. If high levels of sodium and chloride are present in the water, it may lead to negative impacts on the animal. It has been shown that the amount of sodium and chloride intake by the animals through the feed and water can have a significant impact on feed conversion, body weight, and overall litter conditions in the house (Fritts et al., 2005). Animals today are receiving a completely balanced diet to meet their nutritional requirements. If the source of drinking water contains high levels of sodium and chloride, it can lead to excess intake of these two constituents and can lead to a negative impact on performance (Abbas et al., 2009). The extent of the impact on performance can be dependent on the concentration of the sodium and chloride in the source water.

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When it comes to addressing water sources with high sodium and chloride, there are two methods that have had good success. The first approach is to adjust the sodium and chloride content in the feed ration. Any adjustments to the sodium and chloride levels in the feed should be based on the concentration of the sodium and chloride in the drinking water (Fritts et al., 2005). This approach is going to be dictated by the individual production model. There are certain models where making adjustments to the feed ration is feasible and others where it would be very difficult to accomplish due to the number of farm locations and the variability of sodium and chloride concentrations in the water source.

The second option is reverse osmosis or RO. Reverse osmosis is the most practical mechanical type of intervention available for the removal of sodium and chloride. Reverse osmosis systems use semi-permeable membranes and pressure to remove solids from the water [Fig. 1]. Reverse osmosis works in the process its name



**Fig. 1.** Reverse osmosis removes solids such as salts from the water by using pressure to force solids to separate from the water across a semipermeable membrane.

describes—it is the reverse process of osmosis. Osmosis is the process of the solvent, or water in this case, moving from an area of low solute (dissolved solids) concentration through a membrane to an area of high solute concentration. Reverse osmosis systems cause the opposite of osmosis to occur by applying pressure to the high solute concentration side of the membrane, forcing water to pass through the membrane but not allowing the solids in the water to do so. The result is two streams of water: (1) the permeate, or the water that has passed through the membranes, which has the majority of the solids removed from it, and (2) the retentate, the solids and other material that was not able to pass through the membranes. The permeate is the portion that will ultimately end up as the drinking water for the animals and the retentate is a waste stream of water that will need to be discarded. The ratio of permeate to retentate will depend on the composition of the water source.

There are solutions for addressing “salty water,” but you need to first know and understand your farm’s drinking water chemistry and follow with sound advice from a reputable technical supplier to truly help.

There are a few things that need to be taken into account with reverse osmosis systems. First is the size of the system. Each system will need to be sized to fit the individual location to ensure the system can produce enough water to satisfy the water demand on the farm. The second piece is the incoming water source. There are certain parameters that need to be met by the incoming water source for the reverse osmosis unit to prevent plugging, scaling, or damage to the membranes. Analysis for these problematic constituents, such as calcium, iron, and other particulate matter (sand, dirt, and other solids), should be conducted prior to the installation of a reverse osmosis system. If any of the parameters are above the maximum threshold for the reverse osmosis unit, pretreatment will need to be put in place to remove or mitigate these contaminants before entering the reverse osmosis unit to prevent damage and reduced performance of the membranes.

There are solutions for addressing “salty water,” but you need to first know and understand your farm’s drinking water chemistry and follow with sound advice from a reputable technical supplier to truly help. If you have questions related to “salty” water and reverse osmosis, please reach out to your MWI Animal Health Territory Manager with your questions. We are here to help!

#### References

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