

## **Nutrient Dense Liquids™**

“Water sucks” was what Adam Sandler’s character Bobby Boucher was told in the movie “The Waterboy”. In animal production it’s obvious how untrue the comment in the 1998 film was, and how vitally important clean, fresh water can be to animals. But rarely is water thought of as anything other than a means to hydrate; seldom do we think of water as a vehicle that can be used to transport essential nutrients.

During much of the pig’s life nutrients are abundant, the feeders are full, and the waterers are supplying an ad libitum amount of clean fresh water. However, there are short, abbreviated periods in all production systems, regardless of species, where a disruption in the nutrient supply occurs. Among these events are weaning and transportation. The problem is that nutrition is either absent during these periods or is provided but the animal requires time to learn a new environment and locate the feed and water sources. Reducing the length of time that nutrient disruption occurs is critical, especially for the young pig that has limited body reserves. The young pig is facing another problem, it simply cannot eat enough dry feed to satisfy its maintenance requirements during this time.

Fortunately, dry feed is not the only avenue of intake pigs rely on. There is also water. Water is essential to the animal, and functions to hydrate and carry out biochemical reactions in the body, but it contains little nutritive benefit on its own. However, to increase nutrient intake in the weaned pig, soluble nutrients can be delivered through the water.

The most common form of water supplementation has traditionally been electrolytes in powder form. The problem with powdered products is that they require two dilutions to reach the pig. First, producers dilute the powder when they mix with water to create a stock, or concentrated, solution. The stock solution is then inducted into the water lines through a medicator, which further dilutes the solution.

When studying what the pigs actually received at the nipple waterer following the incorporation of dry powder dilutions, the concentration, or osmolarity value, of the solution was extremely low (<10 mOsm/L). Meaning the number of solids, such as sodium, potassium, or sugars was very low, almost nothing, and very inconsequential. The powder intervention employed was offering virtually no benefit to the animal. Rehydration was far from optimum, which could be leading to increased morbidity and mortality.

The obvious corrective action would be mixing the stock solutions at double or triple the label rates, if the directions said four ounces per gallon, then eight would be better. What was quickly and painfully learned was that it is exceedingly difficult to create a stock solution on farm that has more than 20% solids because of the difficulty associated with achieving a true solution. Powders would



fall out of suspension, sedimentation would plug medicator hoses and water lines. Some powder-based solutions wouldn't mix well because of water hardness, water temperature was a factor, or some stock solutions required extensive mixing and continuous agitation. Even if a solution of 20% solids could be achieved, it was not what was being advised on label directions.

Because of these limitations and the physiological need to rehydrate pigs more rapidly, TechMix saw an opportunity to redefine hydration and in doing so developed a technology termed Nutrient Dense Liquids™ (NDLs). Nutrient Dense liquids are ready-to-use stock solutions, but unlike traditional stock solutions contain in excess of 60% solids which is 3-5 times more concentrated than what can be created using a dry powder on farm. Yet these liquids are still flowable, shelf stable, homogenous solutions that are easy to use, simply inducted by medicators without on-farm mixing, dilution, or agitation.

Due to the elimination of one dilution and a concentration of nutrients, TechMix is able to increase the amount of nutrients delivered to the pig, increasing osmolarity over dry powders 3-5 fold. Meaning more nutrients are being delivered to the pig, which translates to better water transport across the intestine, faster rehydration and restoring nutrient supply. As well, NDLs are capable of delivering more than just electrolytes. Depending upon the formula they can provide additional nutrients such as glucose and functional proteins during challenging times. Nutrient dense liquids expand the concept of water-soluble nutrient delivery. Keeping pigs drinking, eating, and producing and is just another way TechMix is redefining hydration.