

Evaluating Buffers

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Evaluation of buffers can be confusing as similar claims may be made for dissimilar products. Like all feed ingredients, there are several different types of buffers available to the feed market, some of these are pure products and some are unrefined. When evaluating buffers the main variables appear to be purity, efficacy, and supplier.

Purity:

Is the buffer processed to eliminate or minimize impurities? The highest quality buffers contain more than 99% active ingredient. The active ingredient of most buffers is either sodium bicarbonate or like S-Carb®, purified sodium sesquicarbonate. The highest quality buffers may be manufactured to ISO standards and will guarantee consistency as well as purity.

If there is minimal or no processing in the production of the buffer, is the source of the product consistent across the deposit? The amount of variability, as well as purity may effect the inclusion level. In some cases, it may be necessary to feed higher levels of an impure ingredient to insure adequate buffering in times of nutritional or environmental stress. If the content of the buffer varies, it will be very difficult to determine effective feeding levels.

What are the impurities? The value of the impurities needs to be evaluated before the value of the buffer can be determined. If the impurities are anions such as chloride, sulfate, or phosphate, they will provide an offsetting value to the desired buffering capacity. A good way to evaluate these impurities is to calculate the electrolyte balance (EB) of the buffer using the equation that $EB_{meq/kg} = (Na + K) - (Cl + PO_4 + SO_4)$. Impurities such as calcium and magnesium may provide other added nutrients. However, if they are in the form of sulfates, chlorides, or phosphates any benefit will at least partially be offset by the negative effect of the anions. Other impurities referred to, as 'insolubles' may also be present. Identification of the content of these insolubles should be made whenever possible. Typically insolubles do not add nutritional value, but may dilute the efficacy of the buffer.

What about reactivity or acid titration data? Many buffer products will show comparisons of acid the amount of titratable acid. This is a common chemical evaluation, but may have limited applicability in a physiological situation. Acid titration is measured a laboratory flask that is a closed system. In a physiological system, sodium and bicarbonate are transported across rumen walls, carbon dioxide may be lost, and water may move in or out of the rumen as well as multiple other reactions that effect rumen metabolism. All of these factors effect the ability of the buffer to act. The reactivity or acid titration value may be the least useful value provided.

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Efficacy:

Is there research data documenting the response to this buffer? Data to support the active ingredient of the buffer should be well documented and done by an impartial researcher. Research trials should reflect usage of the buffer in situations similar to on farm inclusion. It is not uncommon for research to intentionally use low fiber rations and feed levels much higher than common usage levels to maximize response. The levels of the buffer fed to achieve response should be similar to the levels used commercially.

Has the product been used under commercial conditions? Product response by everyday users should be similar to other well-established buffer products. Although it is difficult to evaluate testimonials, it is sometimes useful to directly contact someone that has actually used this product.

Supplier:

When evaluating a buffer, the supplier as well as the supply chain is often an overlooked element. The supplier / manufacturer should be well established and be able to provide a consistent product that meets the published specifications. A reputable supplier will provide product on analysis and recommended usage. The supply chain of the product should also be evaluated carefully. As many users of buffers are quite a distance from the point of buffer production, long transports are not uncommon. The supply chain must have the ability to meet delivery requirements on a regular basis. Although some problems are inevitable, there should be a system available for rapid resolution. As many feed manufacturers know, the cheapest product is of no use if it doesn't show up on time or perform up to expectations.

FMC has been committed to providing the feed market with only the highest quality buffers with S-Carb and sodium bicarbonate. S-Carb has been used as a buffer since 1977 and FMC's sodium bicarbonate since 1990. We have a well established long-term relationship with our regional sales representatives to provide timely service and easy accessibility for our customers.

FMC is committed to being a valued supplier of only the highest quality buffers and service to the feed industry.