TECH NOTES

Liquid Supplements in Growing Rations

Liquid supplements offer a range of potential benefits when included in total (or partial) mixed rations:

Nutritional

- Readily customized to effectively complement virtually any base diet;
- Sugars and other nutrients shown to enhance rumen function and fiber utilization;
- Ability to deliver nutrients such as phosphorus in highly bioavailable forms.

Functional

- Liquid inclusion (often at 6-10% of the ration) results in a better initial mix, reduced physical separation (i.e., small dense ingredients falling out), and less animal sorting. This can lead to more uniform intake of nutrients and additives, and a resulting reduction in metabolic concerns.
- Minimal shrink. Since liquids are stored in a closed system, there is minimal waste. Feed storage losses overall can be further reduced as additional dry components are eliminated through inclusion of these nutrients or additives in the liquid feed.
- Similarly, use of a 'complete' liquid supplement can improve efficiency in ingredient inventory and feed mixing. Expensive additives and trace nutrients are purchased at the same rate they are being fed in the liquid, and there is no need to store, measure, or add them separately.
- Enhanced palatability. This is especially valuable when starting calves, with changing ingredient availability, or when introducing novel feeds such as silage.
- Reduced dust – a value to people as well as animals.

GETTING STARTED

Equipment systems for handling and adding liquid supplements can be relatively simple to set up, operate and maintain. Your Westway representative will be glad to work with you to help design and source your needs.

PRODUCT OPTIONS

Different operations have different needs, and formulations can be targeted to meet specific nutritional and operational targets. Molasses blends can economically provide sugar energy and ration conditioning. Protein can be raised as needed. More fortified products can meet requirements for minerals and vitamins. And liquid supplements can simplify and enhance additive delivery.

SUPPORTING RESEARCH

South Dakota State University, 1995

Steers were fed a concentrate diet, including the medicated additives monensin (Rumensin®) and tylosin (Tylan®). Treatments received equivalent levels of all nutrients, while comparing use of meal, pelleted, and liquid supplement forms. Animals receiving liquid had higher intakes, greater gains, numerically improved feed efficiency, and showed a 50% reduction in liver abscesses. The author attributed these differences to increased uniformity of the nutrients and additives consumed.

	Dry Matter Intake, lb	Avg. Daily Gain, lb	Liver Abscess Occurrence, %
Dry Supplements	22.4	3.88	17.5
Liquid Supplement	23.4	4.17	8.8
% Improvement	**4.4**	**7.5**	**50**

The Ohio State University, 1994

Heifers were fed a TMR containing silage, hay, wheat midds, and trace nutrients. The control treatment received this diet only, while the rations fed to the two treatment groups also contained either grain (starch) or sugar. The responses to the two energy sources were dramatically different, as the addition of starch to this relatively high-fiber diet significantly reduced digestion of both organic matter and fiber (NDF) in the rumen, while sugar increased both.

Purdue University, 1972

Steers were fed a corn – corncob – urea – mineral diet as a TMR. Treatments consisted of replacing 0, 5, 10, or 15% of the corn with molasses.

	-- % Improvement Over Control --		
Replacement Rate:	**5%**	**10%**	**15%**
Dietary N Retention	*(equal)*	28	15
Dry Matter Digestibility	*(equal)*	4	6

Pennsylvania State University, 2008

Yearling Holstein heifers were given diets that were either 13.5 or 16.4% crude protein. Half of each of these groups had a 32% CP liquid supplement included at 6.5% of the TMR dry matter. All four mixes were balanced to similar levels of soluble and rumen-undegradable protein, ADF, NDF, NSC (non-starch carbohydrates), minerals, vitamins, lasalocid, and predicted concentration of metabolizable energy. Sugar concentrations went from 3.5% for the control diet to 5.6% for low-protein with liquid and 6.7% for high-protein with liquid. **Incorporating the liquid supplement in the ration increased gains by 26%.** Body condition score did not differ between groups, confirming that the additional weight was in the form of frame growth and not fat. The authors emphasized the role of improved microbial fermentation with molasses feeding, resulting in an improved energy yield from the base diet. More uniform and consistent intake of nutrients and ionophore could also have contributed to this response.