In This Issue

- THE NUTRITIONAL SIGNIFICANCE OF ESSENTIAL FATTY ACIDS FOR CATTLE
- EFFECTS OF ALPHA-LINOLENIC ACID ON REPRODUCTION
- EFFECT OF FLAXLIC ON BULL PERFORMANCE
In This Issue

- Essential Fatty Acids for Cattle

Fatty acids, like amino acids, minerals and vitamins are nutrients required by the animal for maintenance and growth. Fatty acids are used by animals for energy, cell membrane structure and integrity. Essential fatty acids cannot be synthesized by the animal in adequate amounts for specific physiological processes such as growth and reproduction and must be included in the animal’s diet. Cattle, sheep, and horses, like most mammals, cannot synthesize the essential polyunsaturated fatty acids, linoleic and alpha-linolenic acid. Linoleic acid is classified as an omega-6 fatty acid, while alpha-linolenic acid belongs to the omega-3 family of fatty acids. These two fatty acids are vital components of cell membranes and serve as precursors for biologically active metabolites called eicosanoids. Eicosanoids are 20-carbon fatty acids that affect inflammation and thus the immune system plus other essential functions such as reproduction.
Effects of Alpha-linolenic Acid on Reproduction

Research indicates that approximately 40% of all pregnancies fail because of embryonic death that occurs between days 8 and 17 after estrus. This occurs because the corpus luteum is not maintained. Elevated prostaglandin F2-alpha causes regression of corpus luteum, effectively terminating the pregnancy. Decreasing prostaglandin F2-alpha levels will extend the luteal phase, increasing embryo survival and thus maintaining the pregnancy. Feeding alpha-linolenic acid has been found to decrease prostaglandin levels during the late luteal phase of estrus, increasing pregnancy rate (figure 1).

Low levels of prostaglandins during the late luteal phase of estrus increases pregnancy rate. Work by Nadaffy (2006) shows that feeding additional linolenic acid reduced the level of prostaglandins (figure 2). When compared to other dietary fatty acids, animals fed linolenic acid had the lowest level of prostaglandins (figure 3).

Other studies have shown that feeding alpha-linolenic acid increases the levels of progesterone and estrogen resulting in more and higher quality follicles being produced, more eggs being fertilized, more embryos surviving full term resulting in more liveborn calves (figure 4 & 5).

Table 1. Pathways for Linoleic and Alpha-linolenic Acids

<table>
<thead>
<tr>
<th>Fatty Acid</th>
<th>Pathway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linoleic (LA) 18:2</td>
<td>n-6 PUFAs pathway</td>
</tr>
<tr>
<td>Gamma-linolenic acid (GLA) 16:3</td>
<td>Fatty acid desaturase 2</td>
</tr>
<tr>
<td>Diocosenoic acid</td>
<td>DGLA 18:4</td>
</tr>
<tr>
<td>Arachidonic acid (AA) 20:4</td>
<td>Eicosapentaenoic acid (EPA) 20:5</td>
</tr>
</tbody>
</table>

Figure 1. Pathways for Linoleic and Alpha-linolenic Acids

Figure 2. Linolenic Acid Effects on Prostaglandin Secretion

Figure 3. Effects of Different Fatty Acids on Prostaglandin Secretion in Cows

Figure 4. Effect of Alpha-linolenic Acid on Follicles

<table>
<thead>
<tr>
<th>Item</th>
<th>Control</th>
<th>Alpha-linolenic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10 mm follicles on day 3</td>
<td>1.6</td>
<td>1.4</td>
</tr>
<tr>
<td>5-10 mm follicles on day 15</td>
<td>1.8</td>
<td>3.4</td>
</tr>
<tr>
<td>Max diameter of 1st dominant follicle, mm</td>
<td>13.3</td>
<td>15.6</td>
</tr>
<tr>
<td>Max diameter of preovulatory follicle, mm</td>
<td>17.0</td>
<td>18.3</td>
</tr>
</tbody>
</table>

Larger follicles >>> greater estrogen

Effect of Flaxlic with Alpha-linolenic Acid on Bull Performance

Poor sperm motility and presence of abnormalities in sperm morphology are two of the most common causes of poor fertility in males. Fatty Acids are an essential component of sperm. Flaxlic is a high-density, low-moisture block that resists heat and humidity and is manufactured by New Generation Feeds. Research conducted by Kansas State University suggest that the omega-3 fats provided in Flaxlic can lead to improvements in semen quality, bull fertility (figure 6 & 7) PLUS improved daily gain on less total feed resulting in a significant improvement in feed conversion. Flaxseed is an excellent source of omega-3 fatty acids and has been shown to increase tissue concentrations of both alpha-linolenic acid and eicosapentaenoic acid, which are involved in synthesis of important reproductive hormones.

Flaxlic is an excellent source of omega-3 fatty acids, and has been shown to increase tissues concentrations of both alpha-linolenic acid and eicosapentaenoic acid. These omega-3 fatty acids are directly involved in synthesis of reproductive hormones that support fertility.

The Flaxlic Difference

Flaxlic® is an all-natural supplement that contains high levels of omega-3 fatty acids from flaxseed and flaxseed oil. Flaxlic also is highly fortified with essential vitamins and minerals. The supplement is produced using a state-of-the-art manufacturing process that provides a unique 24-hour feeding system. Flaxlic is an exceptionally dense all-weather block that will give you the most for your money.


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