UF-Gainesville Beef Cattle News Corner

What are omega-3 fatty acids?

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Beef is nutritious and an important source of bioavailable protein, vitamins, and minerals. Not only does beef contain a good amount of much needed nutrients but beef is also more easily digested, which makes it easier for the human body to absorb the nutrients from beef than from plant foods or nutritional supplements.

Beef, however, is greatly misperceived by a majority of the public. Over the last couple of decades, beef has been publicized as having a high content of unhealthy fat, including saturated fats and trans fats. The truth is that trans fats are rare in nature and are usually created during food processing. Also, not all saturated fats are bad for you. Most of the saturated fat in beef is C18:0, also known as stearic acid; a long chain fatty acid with no positive or negative effects on human health. There is one kind of fat – polyunsaturated fat (PUFA) – which is usually praised for its positive effect on human health. You hear this all this time as we are bombarded with products containing different types of omega-3s.

Omega-3 and omega-6 fatty acids are classes of PUFA. Although PUFA are generally considered healthy, there are key differences between omega-3 and omega-6 fatty acids and their effect on human health. Omega-6 fatty acids are pro-inflammatory where omega-3 fatty acids are anti-inflammatory. Inflammation is a process by which the body's white blood cells and substances they produce protect us from infection with foreign organisms, such as bacteria and viruses. However, in the absence of foreign organisms, inflammation is detrimental as it causes damages to our own tissues. For this reason, omega-3 fatty acids are the beneficial PUFAs everybody should try to acquire from their diet – not only do they have anti-inflammatory properties, but they are also involved in brain development and function.

The recommended omega-6 to omega-3 ratio for a healthy diet is 4:1 or lower. While this ratio in the current typical Western diet is around 20:1, beef has a beneficial ratio of 4:1 or lower. Very few consumers are aware of this and should receive more attention and be publicized more often, as very few products on our current diet have a naturally beneficial omega-6 to omega-3 ratio. Meat, fish, and eggs are important sources of omega-3 fatty acids, however there are concerns over the future sustainability of fish as a food source. Also, concentrated fish oil, such as in the form of omega-3 supplements, are not as easily absorbed by the body even though the supplements are more concentrated.

There is the potential to increase omega-3 content of beef, along with several other nutrients, through genetic selection. Improving the fatty acid content of beef through the diet is less efficient than in non-ruminants due to ruminal biohydrogenation where PUFA become saturated fats. Therefore, in ruminants, it might be more efficient to improve the fatty acid composition of their meat and milk through genetics rather than diet. Few studies have looked at genetic markers for fatty acid composition, but some have calculated the heritability of the concentrations of different fatty acids in cattle's milk and beef and found that omega-3 and omega-6 fatty acids have a moderate heritability.

At the University of Florida, we are working to identify genes related to the nutrient content of beef. With more research we will be able to identify genetic markers for better fatty acid composition. We can then start selecting and breeding cattle for healthier beef production, increasing consumers satisfaction and demand for beef.

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