

Bioactive Supplements for Relief of Milk Fat Depression: Do They Really Exist?

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Summary

- Low milk fat percentage and yield is an important economic issue to dairy farms across North America.
- Available evidence indicates that milk fat depression (MFD) is due to changes in rumen biohydrogenation (BH) of unsaturated fatty acids and the passage of specific intermediates (e.g. *trans*-10, *cis*-12 conjugated linoleic acid) out of the rumen that subsequently reduces fat synthesis in the mammary gland.
- These changes in rumen microbial processes are an essential component for the development of MFD and are centered on both an altered rumen environment and an alteration in the rumen pathways of BH (Figure 1).
- The typical magnitude of decrease in milk fat (e.g. 3.8 to 3.4%) may be caused by 1 to 2 g/day or less of *trans*-10, *cis*-12 conjugated linoleic acid, or a related fatty acid, leaving the rumen and subsequently taken up by the mammary gland.
- Questions remain about the potential use of dietary 'bioactive' supplements for the relief of MFD and whether a single dietary supplement can return BH pathways to 'normal' rather than implementing larger changes to the diet. Maintenance of 'normal' BH pathways to avoid MFD is important.

- Further research is required to better understand the rumen conditions that promote the formation of BH intermediates that trigger MFD, as well as dietary components that may help maintain 'normal' BH pathways. An improved understanding of these events will provide the critical framework with which to reduce the risk of MFD and better troubleshoot reduced milk fat yield.

References

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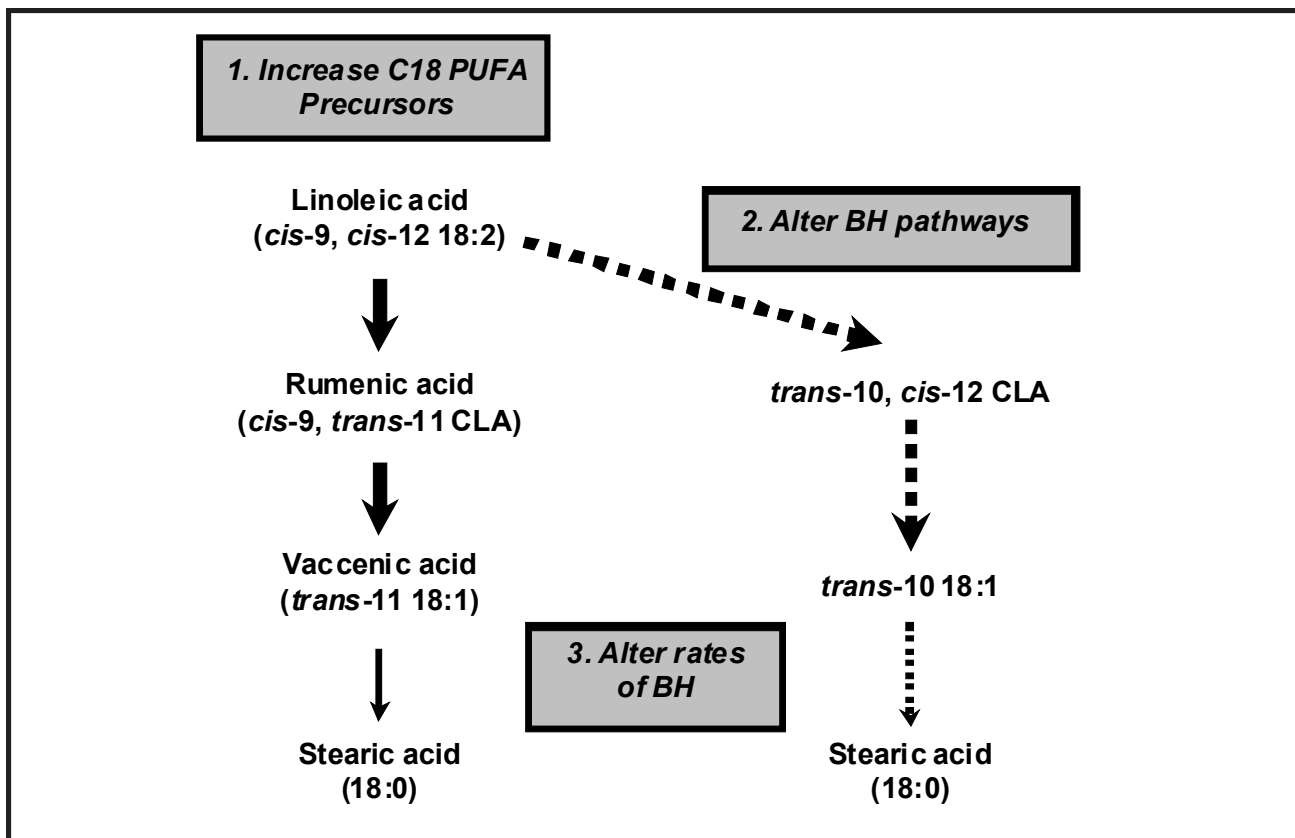


Figure 1. Generalized scheme of ruminal biohydrogenation of linoleic acid under normal conditions (left side) and during diet-induced milk fat depression (dotted lines, right side). The grey boxes highlight 3 potential means by which dietary components can increase the risk of milk fat depression (PUFA = Polyunsaturated fatty acids, BH = biohydrogenation, and CLA = conjugated linoleic acid).