



**Palmitic Acid, Milk Fat, and Hard Butter – What’s All of the Fuss About?**

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Recently, various media outlets and social media sources have been discussing that Canadian butter has recently become harder at room temperature than it was previously, and the reports have focused blame on dietary fat sources derived from palm oil. The purpose of this fact sheet is to provide information on how milk fat is synthesized and to provide additional context for the consumer and those involved in the discussion.

- Milk fat is made up of fatty acids coming from three major sources:
  - De novo – fatty acids made in the mammary gland itself and incorporated into milk fat
  - Pre-formed – fatty acids mostly absorbed from what the cow eats and incorporated into milk fat
  - Mixed – fatty acids both made in the mammary gland and absorbed from the diet
- Palmitic acid is in the “mixed” category, which means that it is both made by the cow herself and absorbed from the diet. Generally, palmitic acid comprises 28 to 40% of the fatty acids in milk fat produced by Holstein cows, even when cows are not fed added dietary fat sources.
- The fatty acid profile of milk fat can be influenced by what the cow consumes and the metabolism of fatty acids in her rumen. The fatty acid profile of milk fat normally undergoes relatively large systematic changes from the beginning to end of lactation with or without supplemental dietary fat feeding.
- Dietary fat sources with predominantly (~ 50%) palmitic acid have been fed as energy supplements to cows for decades. Fat sources are part of a healthy diet for cows and support milk production as well as fertility. During the past 10 to 15 years, fat supplements with higher content of palmitic acid (>85%) have been available for feeding to cows, and feeding these sources of dietary fat commonly boosts overall milk fat production by the cow.
- Even though feeding these high palmitic acid fat supplements boosts overall milk fat production and increases the concentration of palmitic acid in milk fat, the concentration is still within the normal range encountered in cows’ milk fat. Cows fed the high palmitic acid fat supplements also commonly have slightly lower de novo fatty acid concentration in milk fat.
- Although experiments have not been conducted to determine this, these changes in fatty acid profile could lead toward increased melting point of milk fat and hence slight changes in physical characteristics in products like butter produced from milk fat (i.e., more solid at room temperature) at the cow or herd level. However, milk used for processing is typically commingled from many herds with many different characteristics in terms diets, feeds, and management, and so there would have to be an unusual level of conformity in feeding practices to meaningfully change the fatty acid composition of commingled milk.

- One overall effect that could be responsible for perceived changes in butter is season of the year, in that milk fat typically would be harder during the winter months and softer in the summer months. There are also effects of stage of lactation (early lactation shortly after calving compared with later lactation), but the overall milk supply is a mixture of milk from many herds that have cows at different stages of lactation and therefore this blending tends to even out this effect on milk fat composition.
- Given that there have been no recent (< 5 to 8 years) changes in terms of how dairy cattle are fed and managed, we believe that it is unlikely that any recent widespread changes in dairy product characteristics are linked to feeding and management practices, particularly for larger processors to whom milk is supplied from many herds.

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