

## Fat Feeding Facts 14.

### Palmitic and Stearic Fatty Acid Blended Before Prilling and Subsequent Cow Performance

The efficacy of palmitic and stearic fatty acids (FA) and their combination has been extensively reviewed (Loften et al., 2014). But what if they are fed as 80% or more singularly? There are numerous studies of high palmitic fatty acid products (>80% palmitic) and their limitations—including decreased dry matter intake (Sellers et al., 2017) as reviewed in *Fat Feeding Facts 11, 12, and 13*. More recently another facet has been explored if such high concentrations of either palmitic or stearic have different physical properties? At such high concentrations, these individual fatty acids do have more crystalline properties which may reduce their digestibility (Shepardson et al., 2020). This leads to the question as to what if these fatty acids are first melted, blended, and then prilled? That was addressed in a study by Shepardson and Harvatine (2021).

Twelve mid-lactation Holsteins were randomly assigned to treatments for 21-day experimental periods with palmitic (PA), stearic (SA) or a blend of both fatty acids (FA). “Treatments were control (CON; no supplemental fat), an enriched PA (HP; 91% C16:0), an enriched SA supplement (HS; 92.5% C18:0), and a blend of PA (45%) and SA (49%) (INT) fed at 1.95% of diet dry matter. All supplements contained oleic acid at approximately 5% of fatty acids.”

“All fat supplements were free FA and were specifically made for the experiment using high purity palmitic (99% PA), stearic (98% SA), and oleic (70% C18:1) acid stocks (KIC Chemicals) originating from palm oil manufacturing. *Fatty acid stocks* (emphasis added) *were melted and blended before prilling in a commercial cooling tower* (Milk Specialties Global, Eden Prairie, MN).” *This is different than other studies physically blending individual dry fatty acid supplements without this production methodology.*

Treatments	Control	Palmitic	Blend	Stearic
DMI, lb/day	63.6	61.2	64.1	65.4
Milk, lb/day	88.3	84.6	89.4	85.9
Milk fat, %	3.54	4.00	3.86	3.68
NEFAs, uEq/L	95.2	126.6	106.0	85.6

The high palmitic FA treatment reduced dry matter intake (DMI), the blend favored milk production, milk fat % was intermediate with the blend, and blood NEFAs were greatest with palmitic, intermediate with the blend, and lowest with high stearic. Based on NEFAs, high palmitic FA mobilized the most body condition in order to maintain milk/fat production. Overall, the blend of palmitic and stearic FAs was the most favorable as might be expected based on the review of Loften et al. (2014).

#### References

- Fat Feeding Facts 11. Fatty Acid Follies.
- Fat Feeding Facts 12. High Palmitic Fed in Early Lactation.
- Fat Feeding Facts 13. Questions About Feeding High Palmitic Fat Supplements.
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- Sellers, M. D., T. L. Harris, and J. R. Loften. 2017. Effects of supplementation with palmitic acid-

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