



DIGESTIBILITY OF FATS IN DAIRY COWS

How Are FAD Values Determined?

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How Are FAD Values Determined?

Calculations of Intestinal Fatty Acid Digestibility

- Apparent
 - $(\text{Duo FA} - \text{Feces FA})/\text{Duo FA}$
- Errors
 - Rumen losses and de novo synthesis
 - Endogenous secretions (bile, cell sloughing)
 - Hindgut biohydrogenation

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Calculations of Intestinal Fatty Acid Digestibility

- True
 - Graph g digested FA vs g duodenal flow FA
 - y-intercept is endogenous fatty acids
 - slope is true digestibility
 - straight (digestibility same regardless of amount)
 - curved (digestibility declines as amount increases)



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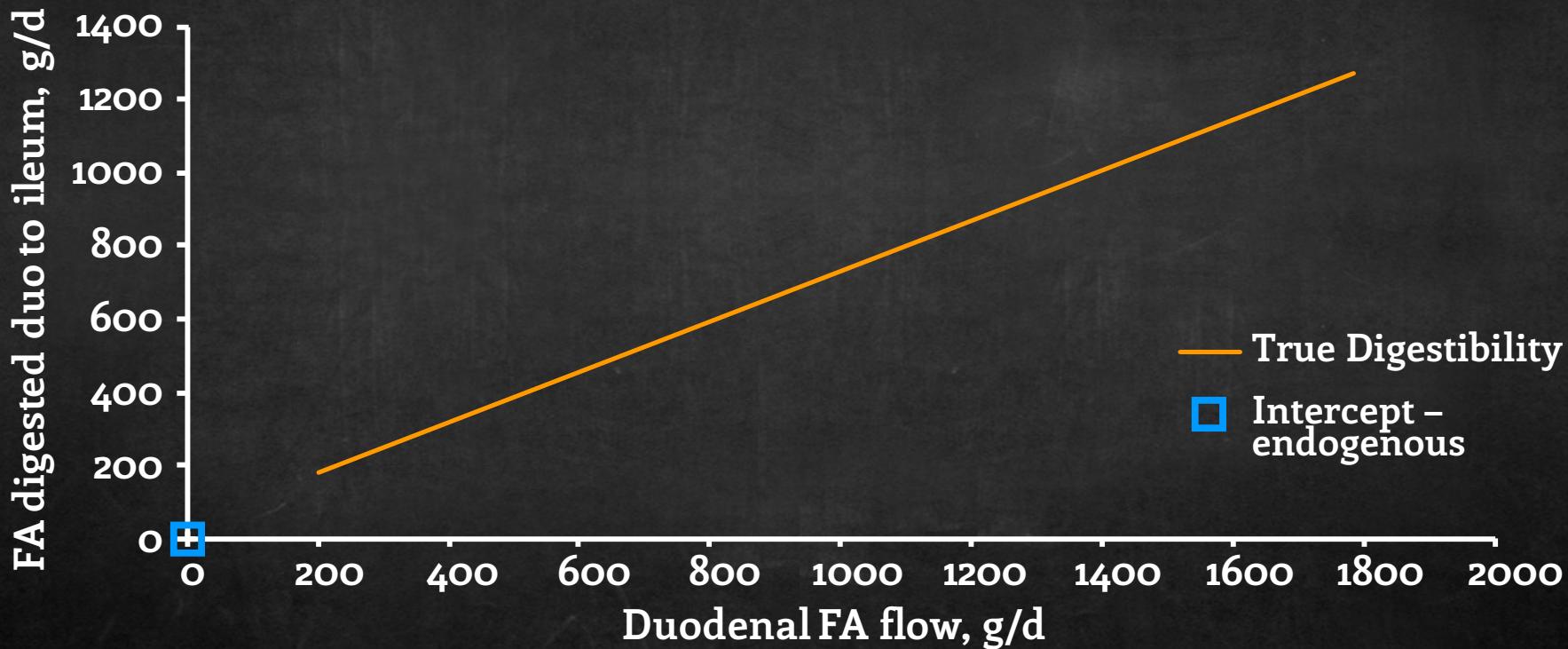
How Are FAD Values Determined?

Strategies to Overcome Errors

- Duodenum to feces
 - Eliminate rumen issues
- Duodenum to ileum
 - Eliminate rumen issues
 - Eliminate hindgut biohydrogenation
- Estimate true digestibility to eliminate endogenous secretions

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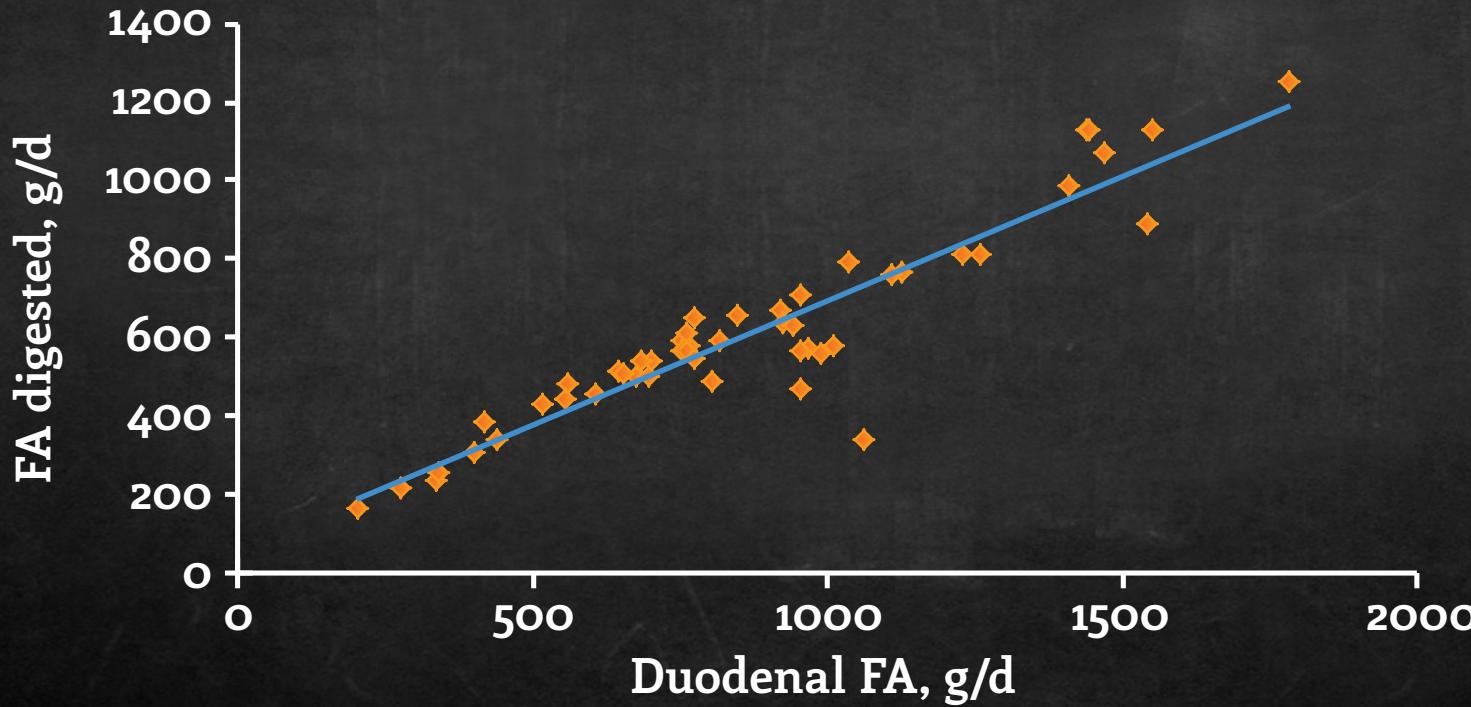
References, fat sources, and number of observations for a data set on intestinal fatty acid digestibilities compiled from studies using lactating dairy cows with duodenal cannulae.

Reference	Fat Sources ¹	n
Christensen et al. (1998)	WSB, T	4
Enjalbert et al. (1997)	CaP, CaR	3
Ferlay et al. (1993)	CaR, Rapeseed oil	3
Kalscheur et al. (1997)	HOSO, HLSO, PHVS	4
Klusmeyer and Clark (1991)	CaP	4
Murphy et al. (1987)	Crushed Rapeseed	3
Pantoja et al. (1996)	PHT, T, AVF	6
Pires et al. (1997)	WCS, GCS	5
Tice et al. (1994)	WSB, WRSB, CRSB, GRSB	5
Weisberg et al. (1992)	T	7
Wu et al. (1991)	CaP, AVF	5

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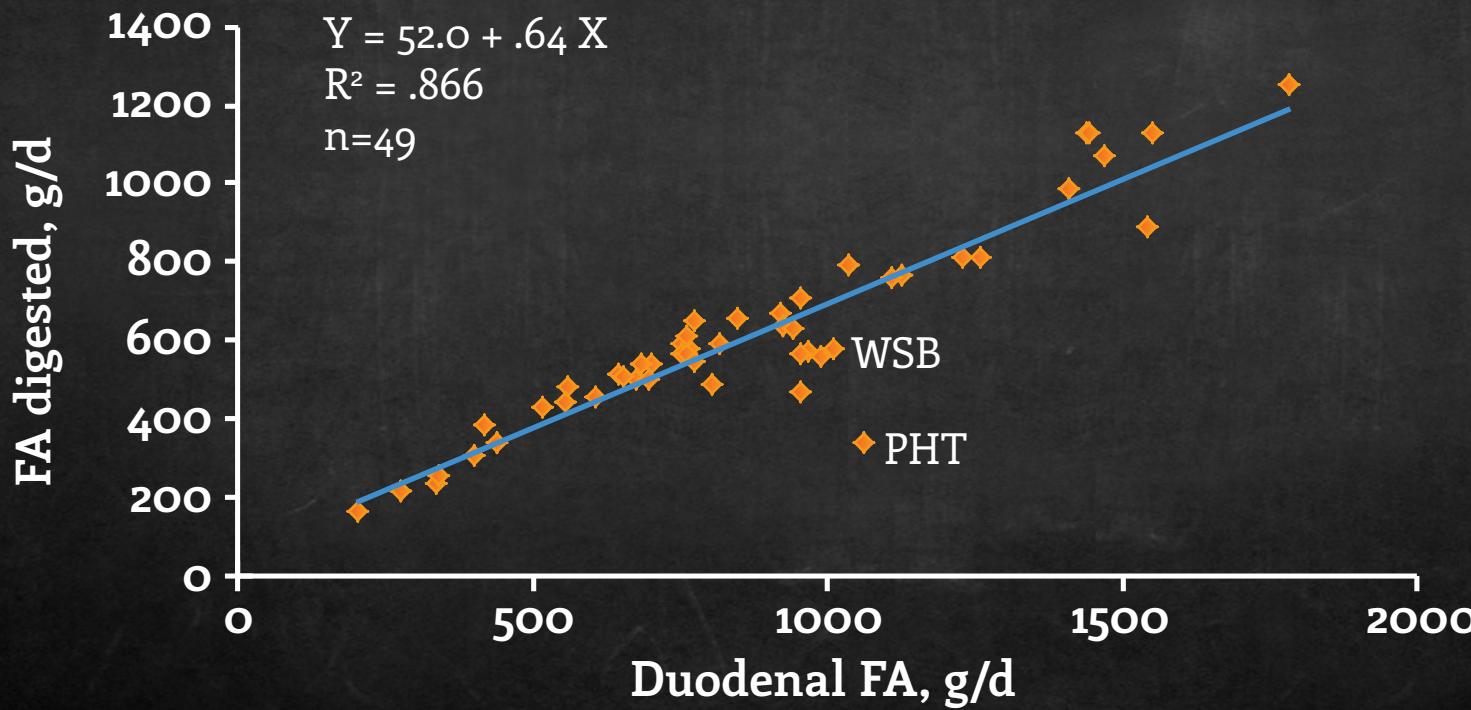
Total Fatty Acids



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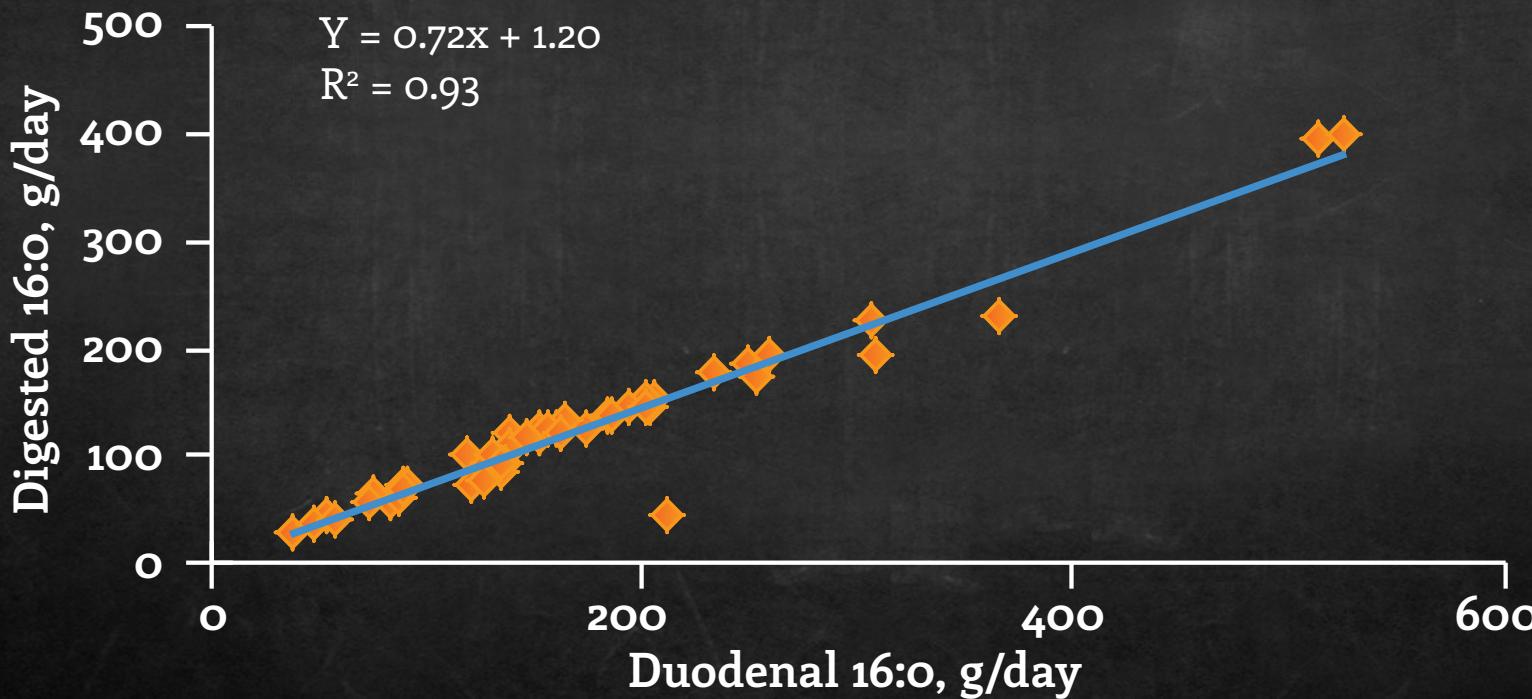
Total Fatty Acids



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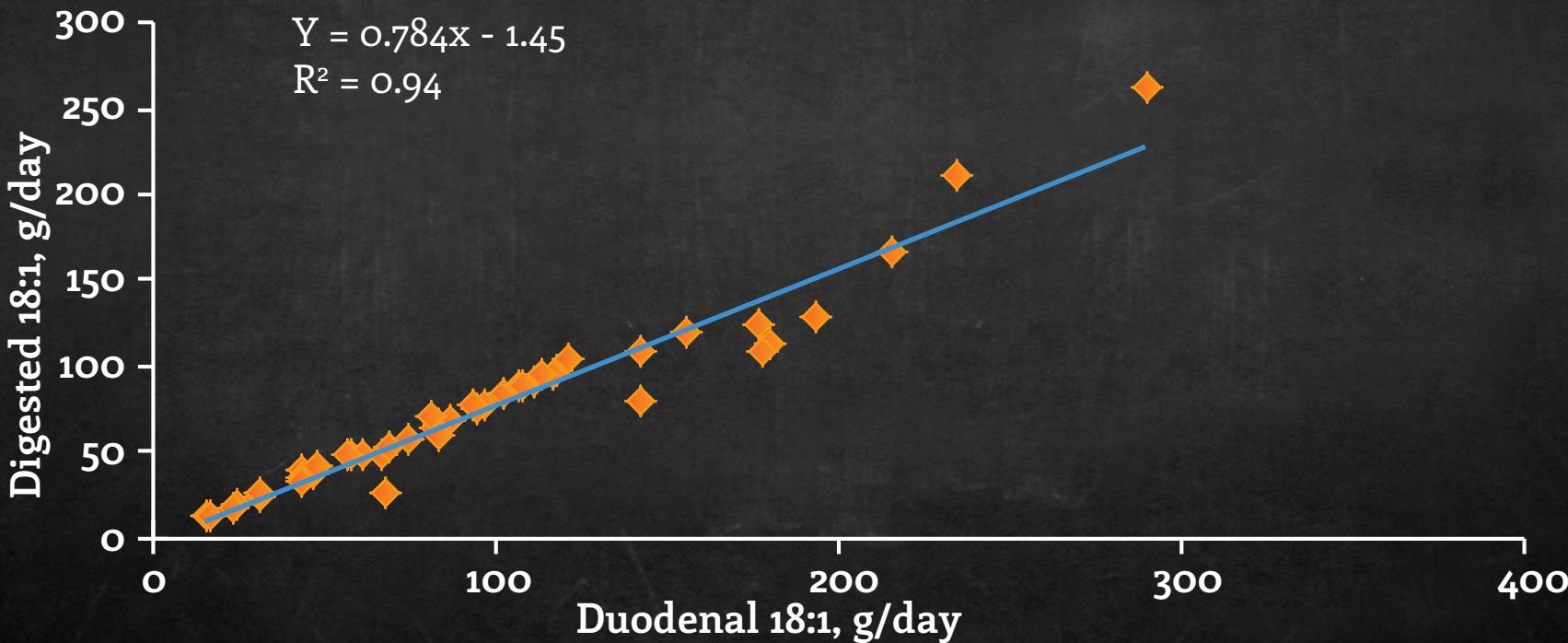
Palmitic Acid (C₁₆:0)



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Oleic Acid (C18:1)



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	Moate et al. 2004	Glasser et al. 2008	Jenkins 1999
16:0	0.725		
18:0	0.728	0.63	0.530
18:1	0.669	0.86	0.781
18:2	0.776	0.80	0.827
18:3	0.775	0.74	0.880
Duo to feces	X (Int BH NS)		X
Duo to ileum		X	
Species	Dairy	Dairy, beef, sheep (NS)	Dairy
N (studies, obs)	8, 36	77,294	11 (49)
Outliers deleted	HT, WS	HT	



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