Optimizing Income over Feed Supplement Costs









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OUTLINE









- Introduction
- Justification
- Objective
- Materials and Methods
- Practical Application

INTRODUCTION









- Large fluctuations in milk and supplemental feed prices create anxiety and uncertainties.
- Usually, more than 90% of dairy farm revenue comes from the milk check and more than 40% of the expenses are used on purchased feeds
- It is important that correct decisions are made to maximize return on supplemental feed expenses.



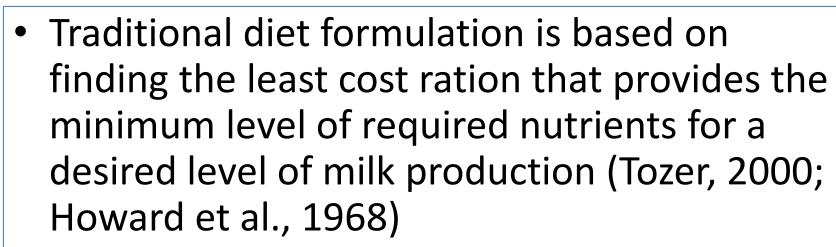




- Analyses from surface responses to income over feed cost for different crude protein (CP) levels have been studied in the past (Roffler et al., 1986)
- the distinction between rumen undegradable protein (RUP) protein and rumen degradable protein (RDP) creates a need to further finetune the formulation of supplements for maximum income over feed cost.







 Typically, diet formulation does not consider changes in milk production due to changes in CP, RUP and RDP that could be fine-tuned to maximize income over feed supplement costs









- Rotz et al. (1999) found that profitability of dairy farms could be improved by decreasing CP intake and adjusting RUP and RDP through a better selection of fed ingredients, which vary according to market prices of feed stuffs
- Lower CP diets decrease N excretion and consequently environmental impacts (Rotz et al., 1999; Broderick, 2003; Wattiaux and Karg, 2004)







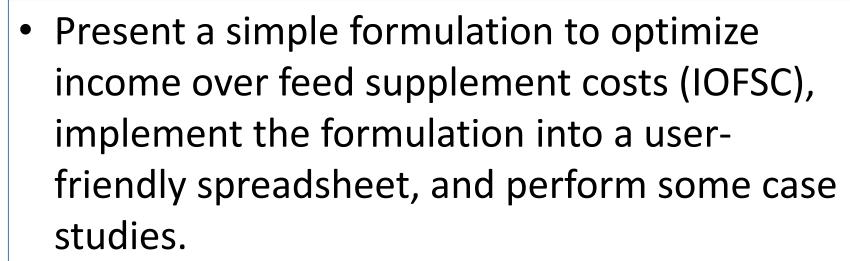
- Rotz et al. (1999) developed the dairy farm model (DAFOSYM) capable to estimate the income over supplement costs, which nowadays has evolved to the integrated farm system model (IFSM) (Rotz et al., 2007)
- Although very complete, IFSM is i) complex and serves the scientific community more than field-based end-users and ii) it does not perform optimization analyses.

OBJECTIVE





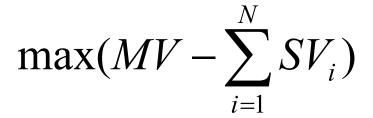












MV = milk value = Mp x MPx SV_i = value of the i supplement = Sp_i x SQ_i

 $DMI = (0.372 * FCM + 0.0968 * BW^{0.75}) * (1 - e^{(-0.192*(WOL + 3.67))})$

 $MPx = -55.61 + 1.15 * DMI + 8.79 * RDP - 0.36 * RDP^2 + 1.85 * RUP$

NRC (2001)









$$\sum_{i=1}^{N} SQ_i = DMI$$

$$SQ_i \leq \max SQ_i...for...i = 1toN$$

 $RUP \leq \max RUP$

 $RDP \leq \max RDP$

 $CP \leq \max CP$







					Calculated			
Feed Stuff	A	В	C	Kd	Kp	RUP	RDP	CP
	(%)	(%)	(%)			(%)	(%)	(%)
Forages								
35-Corn silage	51.00	30.20	18.80	4.40	5.93	3.15	5.62	8.80
74-Mixed silage	58.10	34.20	7.70	10.40	5.93	3.82	15.18	19.00
83-Alfalfa silage	57.30	35.30	7.40	12.20	5.93	4.15	17.75	21.90
Energy Supplements								
27-Corn grain	23.90	72.5	3.60	4.90	8.34	4.63	4.77	9.40
8-Barley grain	30.20	61.20	8.60	22.70	8.34	3.11	9.29	12.40
Protein Supplements								
106-Soybean meal	22.50	76.80	0.70	9.40	8.34	18.37	31.53	49.90
25-Corn gluten meal	3.90	90.90	5.20	2.30	8.34	49.69	15.31	65.00
23-Corn distiller grains	28.50	63.30	8.20	3.60	8.34	15.57	14.13	29.70
104-Soybean meal expellers	8.70	91.30	0.00	2.40	8.34	32.83	13.47	46.30







INPUT		OUTPUT							
ENERGY	PROTEIN	RUP	RDP	СР	MILK	IOFSC			
20.42	7.656	5.5%	9.7%	15.1%	77.43	4.75			
18.29	9.783	5.9%	10.0%	15.9%	80.43	4.78			
 16.16	11.91	6.3%	10.4%	16.7%	83.22	4.79			
 14.46	13.61	6.6%	10.7%	17.3%	85.3	4.78			
13.61	14.46	6.7%	10.8%	17.6%	86.29	4.76			
 12.76	15.31	6.9%	11.0%	17.9%	87.25	4.75			

PRACTICAL APPLICATION







