Effects of feeding human-inedible feedstuffs to lactating cows on nutrient conversion efficiency

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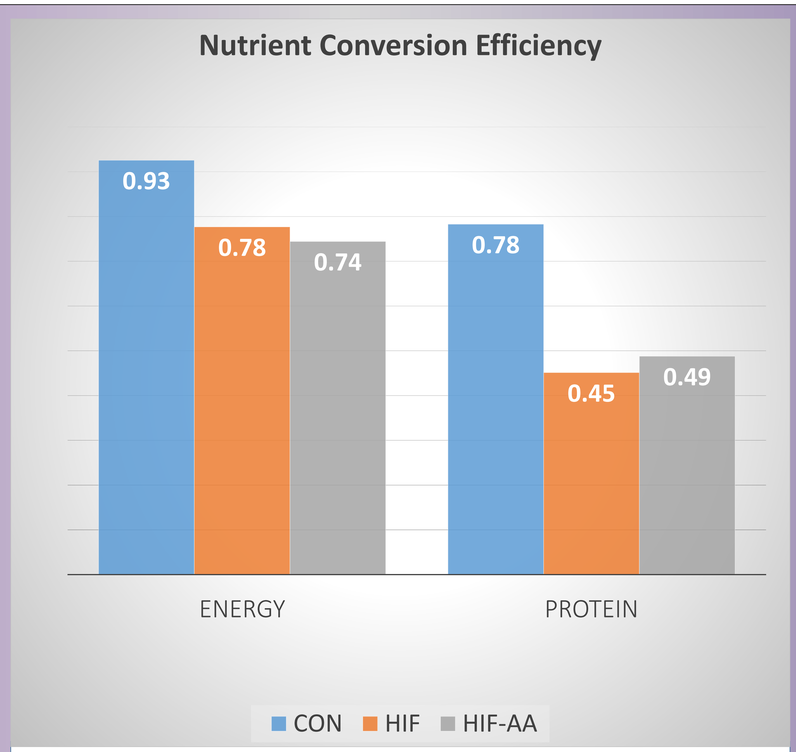
Introduction

- Dairy cattle can utilize feeds that are of little nutritional value for humans and other monogastrics.
- Cattle can convert these ingredients into a valuable human-edible product: milk.
- Inclusion of such feed ingredients in dairy rations can improve the human-edible production efficiency of milk

Objective: Evaluate a diet composed only of feedstuffs that are inedible or mostly inedible to humans with the goal of improving nutrient conversion efficiency

Methods

- 12 multiparous Holstein cows
- 231±40 days in milk and 34.4±7.2 kg/d of milk yield at start
- 3×3 Latin square
- 3 periods (21 days each)
- Treatment Diets
  1) Normal total mixed ration (TMR) for a lactating cow (CON)
  2) TMR composed of human inedible feedstuffs (HIF)
  3) HIF with top-dressed rumen-protected amino acids (HIF-AA)



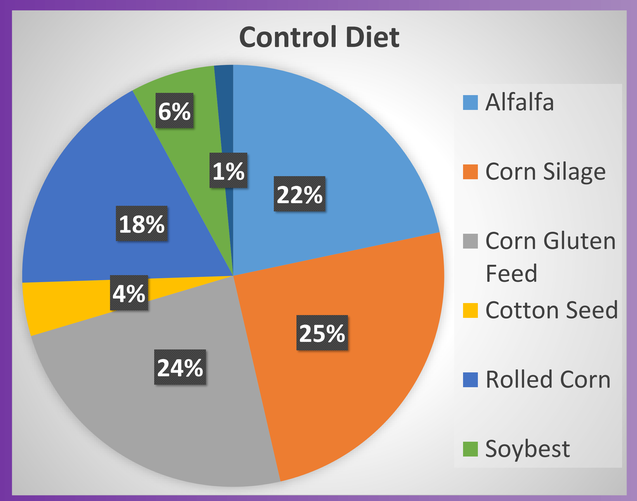
Conversion efficiency = $\frac{\text{human-edible output (milk)}}{\text{human-edible inputs (feed)}}$

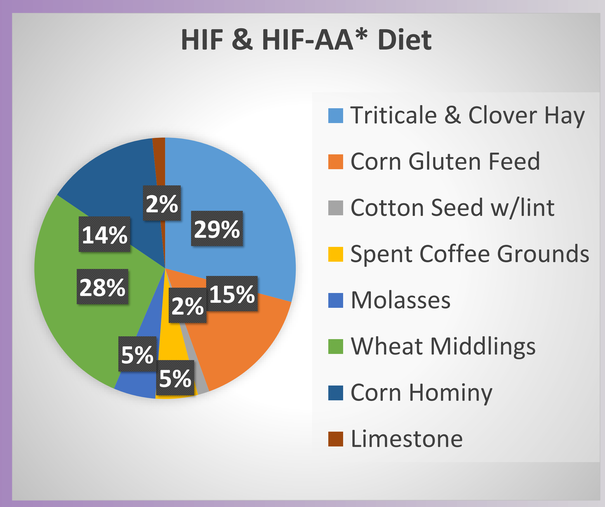
Control Diet

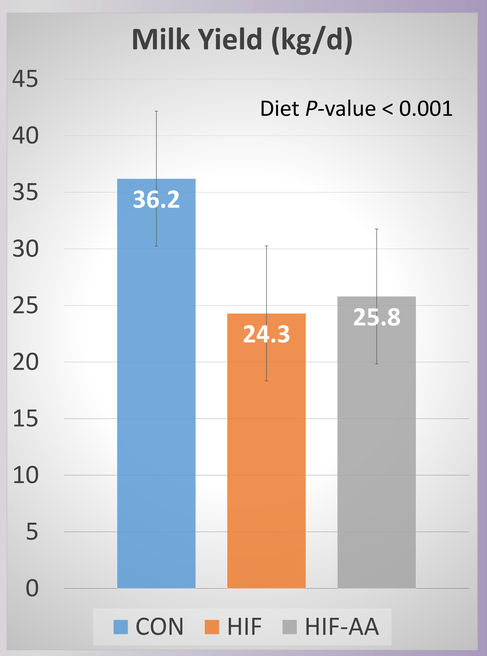
Non-Human –Edible	Human -Edible	Potentially Utilizable Nutrients
Alfalfa	Corn Silage	30% corn grain
Corn Gluten Feed	Corn Grain	73% starch 10% protein
Cottonseed	Soybest	7% fat 49% protein
Limestone		

HIF & HIF-AA Diets

Non-Human -Edible	Human -Edible	Potentially Utilizable Nutrients
Triticale/Clover Hay	Wheat Middlings	20% starch
Corn Gluten Feed	Hominy Feed	46% starch 9% protein
Coffee	Molasses	79% sugar 6% protein
Cottonseed		
Limestone		







*Top-dressed with 77g/d Aji-pro-L (Ajinomoto, Chicago, IL) & 45g/d MetaSmart (Adisseo, Antony, France)

Conclusion

- Conversion efficiency of both energy and protein were not improved with either of the HIF diets, likely because of the substantial drop in milk yield.
- Although avoiding human-edible feedstuffs can in some cases improve human-edible production efficiency, this is not the case when the resulting diet dramatically reduces milk yield.

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