

Improving the efficiency of inefficient lactating cows by increasing dietary forage to concentrate ratio.

Yehoshav A. Ben Meir^{1,2}, Moshe Nikbachat¹, Yuri Portnik¹, Shamai Jacoby¹, Harel Levit^{2,3}, Daniel Bikel^{1,2}, Gabriel Adin⁴, Uzi Moallem¹, Ilan Halachmi³, Joshua Miron¹, and Sameer J. Mabweesh^{2*}

¹ Department of Ruminant Science, Agricultural Research Organization (ARO), Rishon Lezion 7528809, Israel

² Department of Animal Sciences, The Robert H. Smith Faculty of Agriculture, Food, and Environment, The Hebrew University of Jerusalem, Rehovot, Israel

³ Precision Livestock Farming (PLF) Laboratory, Institute of Agricultural Engineering, ARO, Rishon Lezion 7528809, Israel

⁴ Department of Animal Production, Extension Service, Ministry of Agriculture, Bet-Dagan, Israel

Short title: **Forage to concentrate ratio effect on efficiency**

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*Correspondence: Sameer J Mabweesh

Department of Animal Science

The Robert H. Smith Faculty of Agriculture, Food, and Environment

The Hebrew University of Jerusalem

Rehovot

76100

Israel

Phone +972-8-9489314

Fax +972-8-9489879

E-mail: sameer.mabweesh@mail.huji.ac.il

Summery

The aim of this study was to improve feed efficiency of inefficient (INE) cows through a moderate increase in diet's forages /concentrate ratio. We studied the effects of replacing 8.2% corn grains of the control low fiber diet (LF) that contained 17.5% forage NDF by 7.5% wheat straw plus 0.7% soybean meal in the high fiber diet (HF) that contained 23.4% forage NDF. Based on efficiency data of individual cows from the ARO herd measured in our previous study, 15 pairs of pre-classified INE multiparous mid-lactating Israeli Holstein dairy cows, were selected and paired, after two weeks on LF diet in the individual dairy barn, into 2 groups with similar performance, intake, and efficiency data that were then adapted for additional 2 weeks to the 2 dietary treatment. Traits examined during 5 week of the experiment were: eating behavior, milk production, *in vivo* digestibility, and estimation of feed efficiency [residual feed intake, energy-corrected milk (ECM)/DMI and energy balance]. INE cows fed the HF diet showed slower eating rate, smaller visit size, longer daily eating time, higher visit frequency, compared to cows fed the LF diet. Intake of cows fed the HF diet was 9.1% lower, their dry matter digestibility reduced from 65.7 to 62.2%, and their ECM yield was 7.0% lower, compared to the cows fed the LF diet. Feed efficiency, measured as residual feed intake, ECM/DMI and net energy captured /digestible energy intake, were improved in the INE cows fed the HF compared with cows fed the LF diet. Our results thus show the potential of improving feed efficiency for milk production of INE cows by an increase in forage/concentrate ratio.