

Effects of prepartum dietary protein-to-energy ratio on postpartum lactation performance of dairy cows: a meta-analysis

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INTRODUCTION & AIM

Dietary metabolizable protein (MP) and energy supplies (NE_L) are critical during the transition period of dairy cows. Although prepartum restricted energy has several beneficial effects (Dann et al. 2006; Janovick et al. 2011; Mann et al. 2015;), the supplies of protein and energy vary concurrently and it remains unclear whether it is the effect of prepartum protein and energy supplies independently or it is protein-to-energy ratio that matters.

The objective of this meta-analysis was to observe the effects of prepartum dietary protein-to-NE_L ratio on postpartum performance of dairy cows fed for prepartum restricted or ad libitum intake.

METHODS

Literature Search & Selection

Comprehensive literature search for studies with different prepartum protein and energy supplies were used

as treatments. Key words used: cow, prepartum, postpartum, protein, energy, dry matter intake, transition cow, restricted intake, periparturient cow

Database & Experimental Scope

47 treatments, 14 studies, matching inclusion criteria, 29.4 days prepartum treatments & 68 days postpartum data.

Data Extraction

Prepartum variables

Diet composition
Protein & energy supply
Dry matter intake

Postpartum response

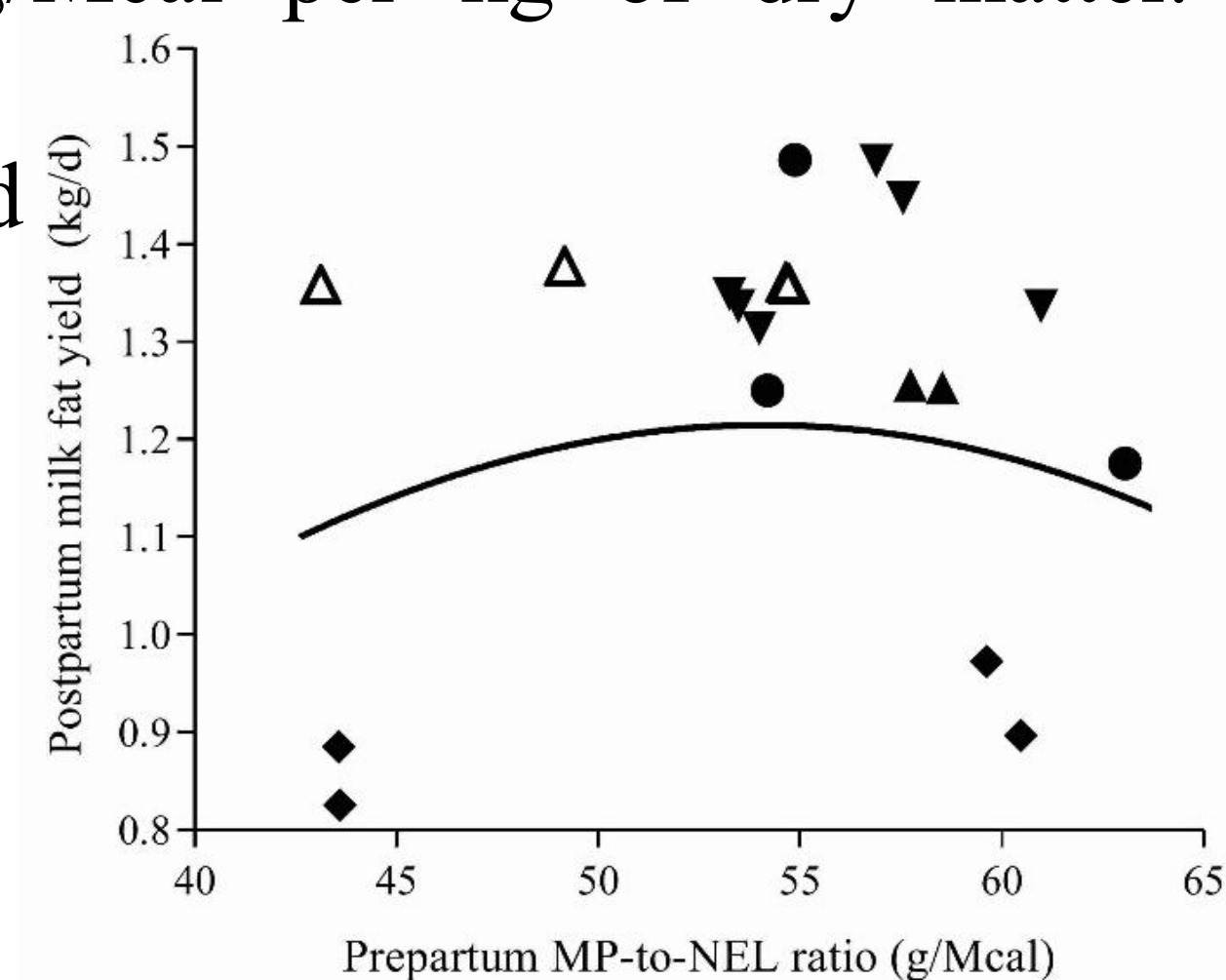
DMI, Milk yield
BCS change
Milk composition

Statistical Analysis

Linear GLM and quadratic Mixed model were used

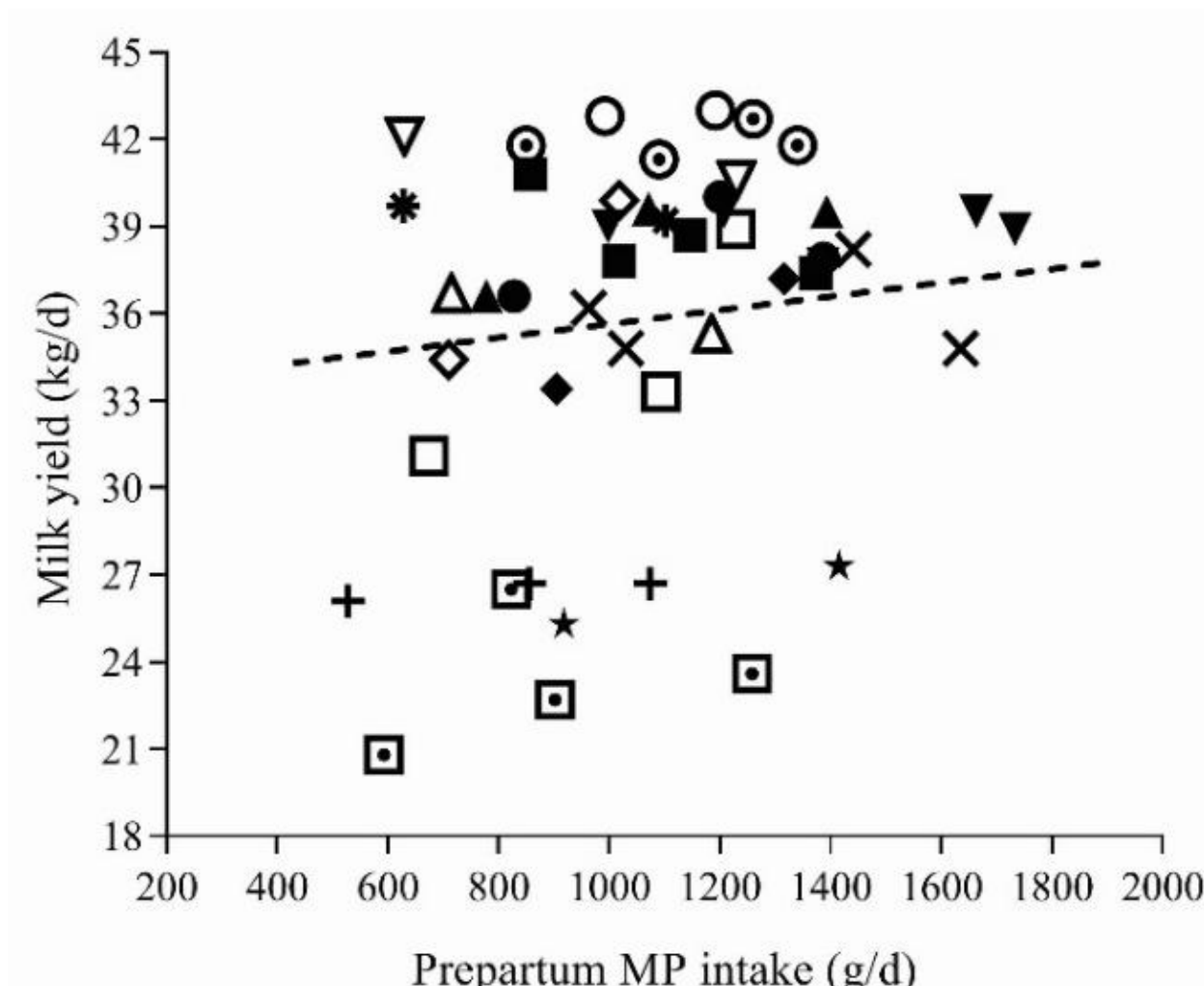
RESULTS & DISCUSSION

Prepartum MP-to-NE_L ratio of the experiments ranged from 40.7 to 84.3 g/Mcal per kg of dry matter. Postpartum milk fat yield increased quadratically with increasing MP-to-NE_L ratio in restricted vs. ad libitum intake (p=0.03).

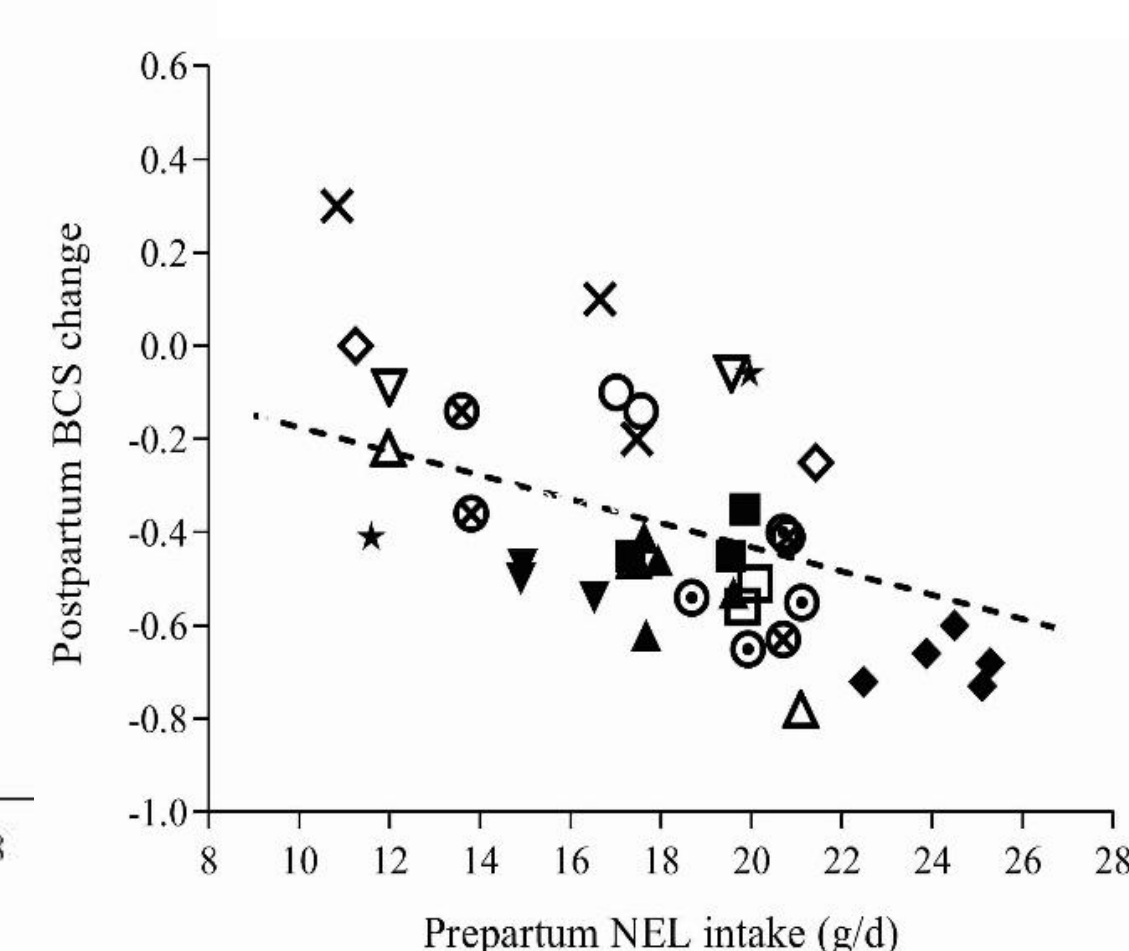
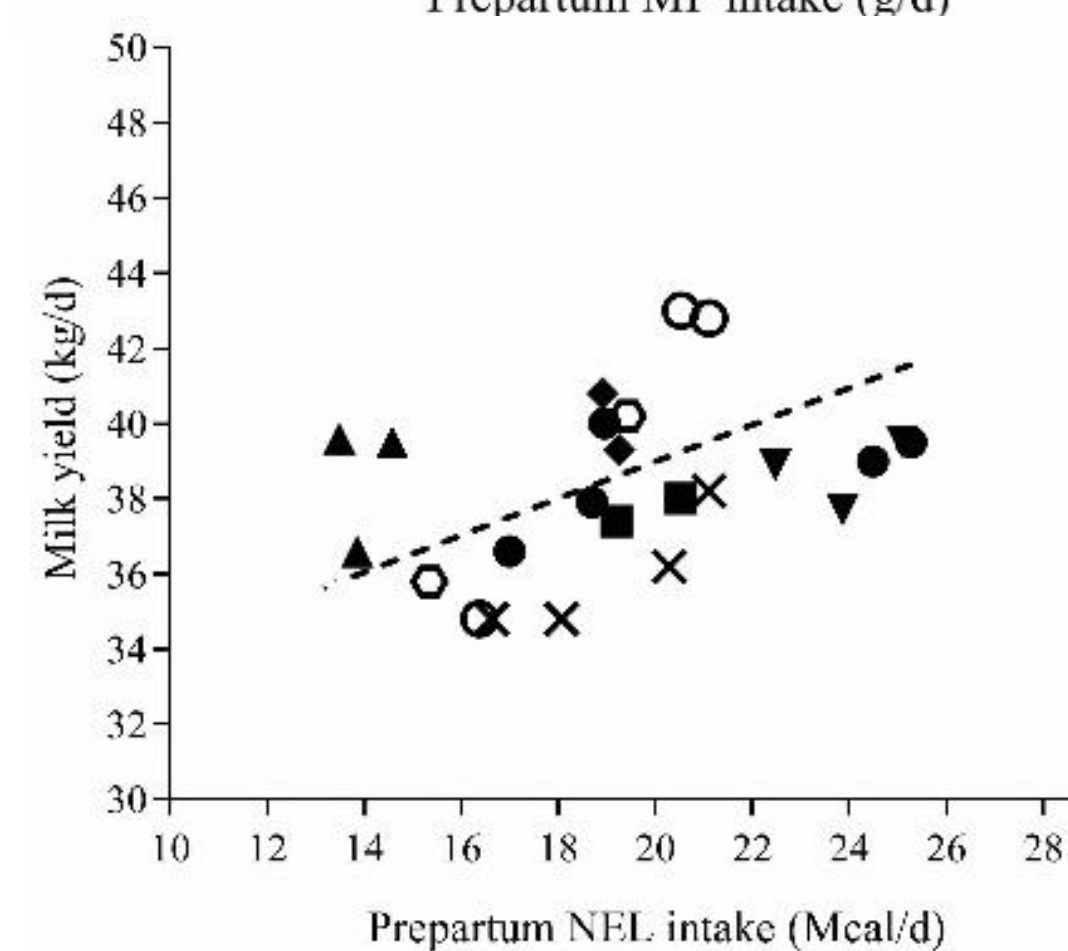


Milk yield & postpartum intake remained unaffected (p>0.05).

Milk yield tended to increase (p=0.09), with higher prepartum MP intake (p=0.02).



Milk yield increased linearly in prepartum ad libitum intake studies at the cost of increased BCS loss (p<0.01).



CONCLUSION

Prepartum protein: energy ratio influences postpartum performance, with feeding strategy (restricted vs. ad libitum) being an important consideration.

REFERENCES

- Dann H, Litherland N, Underwood J, Bionaz M, D'angelo A, McFadden J, Drackley J. 2006. Diets during far-off and close-up dry periods affect periparturient metabolism and lactation in multiparous cows. *J Dairy Sci.* 89(9): 3563-3577.
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Mann S, Yepes FL, Overton T, Wakshlag J, Lock A, Ryan C, Nydam D. 2015. Dry period plane of energy: Effects on feed intake, energy balance, milk production composition in transition dairy cows. *J Dairy Sci.* 98: 3366-3382.