

Meta-analysis of calf starter physical form studies

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Around 2016, I was contacted by an Iranian post-doctorate, Dr. Morteza Ghaffari, in Canada regarding looking at studies using forage for young calves. He was open to critique and questions in this area, and utilized them in shepherding a meta-analysis (Imani et al., 2017). Later, I met him while doing some presentations in Iran in 2017. He is a research associate in the Institute of Animal Science at the University of Bonn in Germany. In 2018, he made a presentation on colostrum at the European Association of Animal Production (EAAP) annual program during which I asked a question at the end. We continued our discussion at the ensuing break. It was after that discussion that a veterinary professor, Georgios E. Valergakis, from the Aristotle University of Thessaloniki in Greece introduced himself to me and boldly confronted and implored me to “not stop publishing my articles” on calves and heifers! That became the catalyst for publishing my book *Dairy Calf and Heifer Feeding and Management—Some Key Concepts and Practices*. Outskirts Press, July 31, 2019,

<https://outskirtspress.com/dairycalfandheiferfeedingandmanagement>

Morteza and I have maintained contact, most recently in person at the International Symposium on Ruminant Physiology held in September 2019 in Leipzig, Germany. Last Fall, Morteza suggested that we collaborate on a calf paper. That led to this meta-analysis (Ghaffari and Kertz 2021). I was astonished how rapidly and expertly Morteza surveyed the published literature in this area and assimilated key data from pertinent studies. As many readers will know, I have a preference for, and recommend, using a well-textured calf starter. But of course, not everyone does that. The calf research arena is full of variation. I once enumerated over 20 major variables (and stopped there!) involved in feeding and managing calves. This makes it difficult to compare across calf studies for some common parameters. There are only a few research places in the US which have similar protocols across calf studies: Provimi Nurture Research Center, University of Minnesota Southern Research and Outreach Center at Waseca, and Jud Heinrich’s group at Pennsylvania State University are the three major ones I follow. That is one reason I have often highlighted their studies in my *Feedstuffs* articles—many of which are featured in my book. And historically too few calves or heifers have been utilized per treatment to pick up meaningful statistically significant differences (Kertz and Chester-Jones 2004). And then too many studies do not report enough of the protocol, measurements, or data (Kertz 2017). Thus, it was with some trepidation that I approached this meta-analysis project.

The initial task was to categorize studies by the physical nature of starters and whether fed with or without forage. A total of 37 full-text articles including 60 trials were used for the Bayesian meta-analysis. Twenty-six studies used a textured starter, but 6 of those studies had less than 45% texture—which I consider to be a minimum texture. Only 28 studies measured the geometric mean of textured starters. The 6 different categories of starter studies were: ground starter fed with or without hay (11 studies), textured starter fed with or without hay (6 studies), textured versus ground starters (7 studies), textured versus pelleted starters (8 studies), pelleted

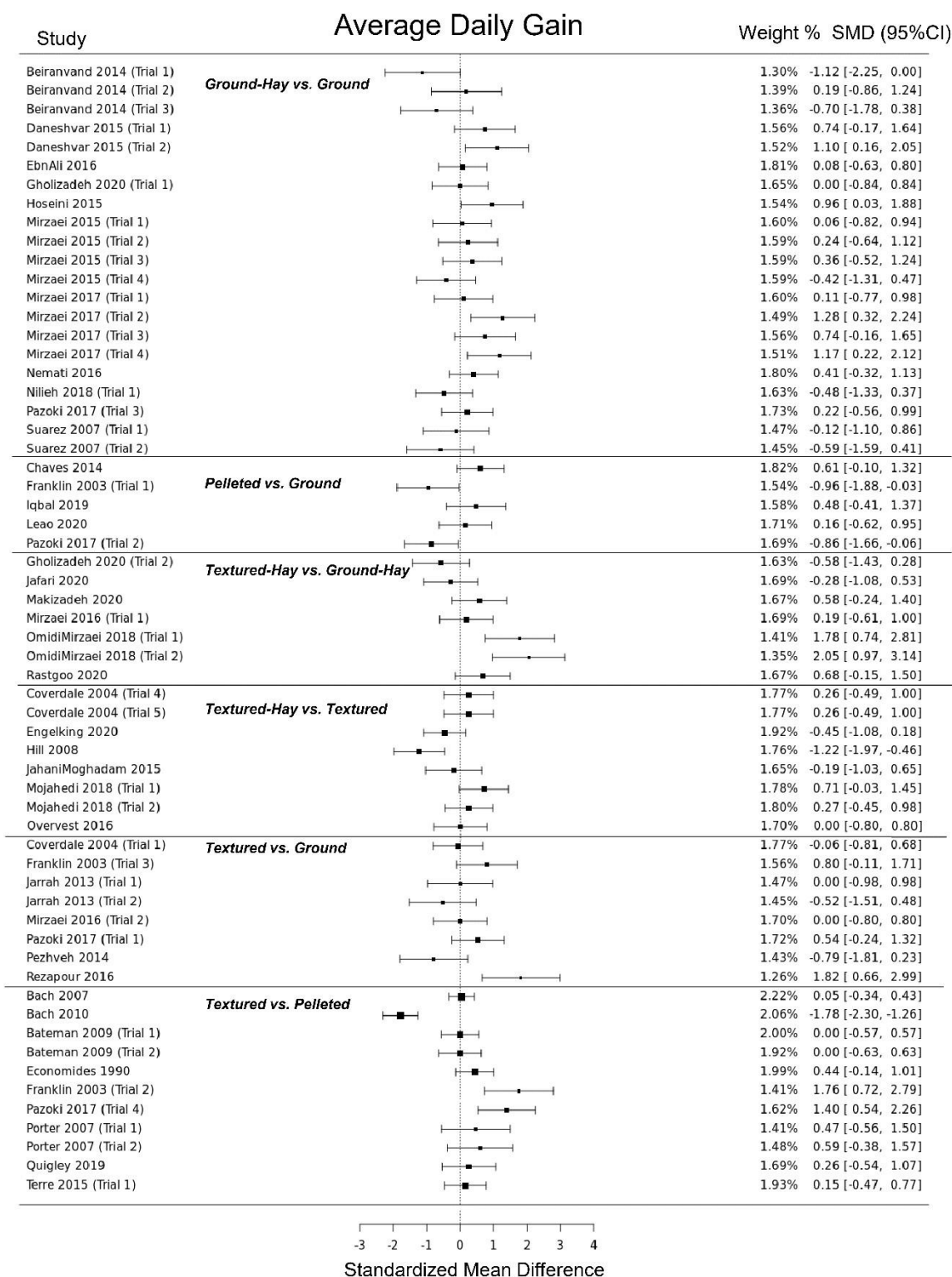
versus ground starters (5 studies), and textured with hay versus ground with hay (6 studies). Look at all these sources of variation, and with not many studies within categories of starters to have meaningful probabilities of picking up statistically significant differences. Average number of calves per treatment within categories were only 10 to 15 with a few exceptions. Yet, the number of calves needed per treatment, based on Figure 1 in Kertz and Chester-Jones (2004) should be 20 or more dependent on variation within treatments. Much of this variation can be seen in the two **figures** showing average daily gain and starter feed intake from this meta-analysis.

The Bottom Line

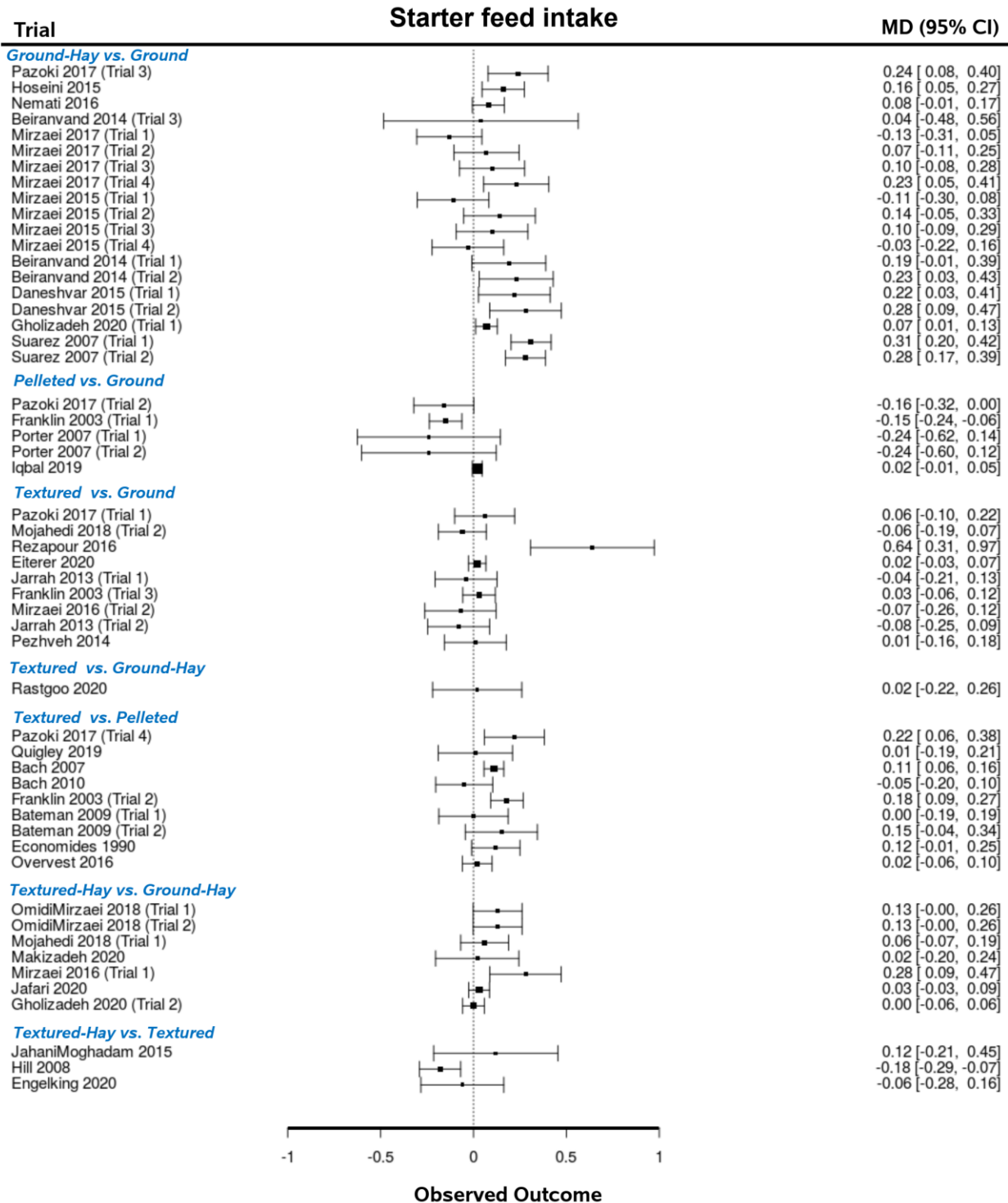
The *Conclusions and Applications* from the Ghaffari and Kertz (2021) paper fit well here: Results of this meta-analysis showed that greater starter intake occurred when hay was supplemented to the finely ground starter (125 g/d) or when calves received textured starters compared with pelleted diets (107 g/d). Because variation is great in calf studies, there was not sufficient evidence for a recommended starter physical form for improving the growth rates of dairy calves. Processing of calf starter diets requires further investigation according to the guidelines for measuring and reporting calf and heifer experimental data.

References

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Individual study results (for all studies) grouped by treatment comparison



Starter feed intake

