Effectiveness of a Milk Fat and Solids-not-fat Enhancing Feed Supplement in Lactating Dairy Cows: A 24-day Preliminary Field Evidence

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Abstract - Milk fat and solids-not-fat (SNF) strongly influence milk quality and procurement value, creating continued interest in field-ready nutritional supplements that improve these traits without compromising animal health. This field study evaluated polyherbal fat and SNF enhancing powder (FSP) in lactating cows. Twenty multiparous cows were randomized to a control (basal ration) or FSP group (basal ration + 50 g/day/cow) for 24 days. Milk yield was recorded daily, and milk fat, SNF, and protein were assessed at baseline, during, and after supplementation. Feed intake and dung consistency were scored using standard scales. In the FSP group, milk fat increased significantly from 3.19% to 3.87% during and 3.93% after supplementation ($p<0.001$). Milk protein rose from 2.98% to 3.23% and 3.26% ($p<0.001$), while SNF showed a modest numerical increase. Milk yield showed a small, non-significant decline. No adverse effects were observed. Larger, longer, baseline-balanced trials are recommended.

Key-Words - Dairy cows, polyherbal & nutritional feed supplement, milk fat, SNF, protein.

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1. Introduction

Milk fat and SNF are central to the economic and processing value of milk. Strategies that raise these components while maintaining animal well-being and overall yield are therefore relevant to both producers and processors. Nutritional modifiers- such as rumen buffers, acetate precursors, essential minerals/vitamins-and selected herbal ingredients have been reported to influence rumen fermentation, nutrient partitioning, and, in turn, milk composition [5-7]. However, field evidence under commercial-like conditions remains limited [2,6].

The present study evaluated a polyherbal nutritional feed supplement formulated to support ruminal buffering and energy metabolism, and to aid digestive efficiency through botanicals traditionally used in ruminant diets [7]. FSP its effects on milk fat, SNF, and protein, along with daily milk yield and simple health indicators, in a 24-day field trial assessed in multiparous cows.

2. Materials and Methods

Ethical approval

All procedures complied with national guidelines. The protocol was approved by the Committee for the Control and Supervision of Experiments on Animals (CCSEA): AHP/LA/19/24.

Investigational product

The investigational veterinary feed supplement was Milkmajic™ Powder, a fat and SNF enhancing powder (FSP) comprising nutritional constituents—calcium, methionine, magnesium, sodium acetate, vitamin E, trisodium citrate, sodium bicarbonate—and herbal ingredients including Asparagus racemosus (Shatavari), Zingiber officinale (Ginger), and Foeniculum vulgare (Fennel). The recommended use is 50 g per cow per day mixed into the concentrate ration immediately prior to feeding. No other herbal/nutritional supplements were co-administered during the study.

Study setting and animals

The trial was conducted at Kshirabdi Godhama Dairy Farm (Sondekoppa, Bengaluru Rural, Karnataka, India) over 24 days. Twenty client-owned, multiparous lactating cows (HF cross and Jersey cross) in similar

lactation stages and with consistent production history were enrolled. Animals with major clinical conditions (e.g., FMD, metritis, tuberculosis, severe systemic disease) were excluded. Routine farm management and feeding practices were maintained for all animals.

Design and interventions

Cows were randomly allocated (n=10/group) to: Control (G1): baseline ration (concentrate + forages); and FSP (G2): baseline ration + FSP 50 g/day/cow. FSP was mixed thoroughly with concentrate and sufficient water for uniform distribution and fed immediately.

Outcomes and assessments

Primary outcomes were milk fat (%) and SNF (%) measured at baseline, during supplementation, and after supplementation. Secondary outcomes included milk protein (%) at the same time-points and milk yield (L), recorded daily. Tolerability/health indicators comprised feed intake (4-point scale) and dung consistency (3-point scale). User-reported metrics included product safety (2-point; higher = safer) and performance/satisfaction (4-point). The assessment parameter scoring system is presented in Table 1

Table 1: Assessment parameter scoring system

Parameter	Description	Score
Feed Intake	Normal – Takes full feed	4
	Mild Anorexia – Takes 50% feed	3
	Moderate Anorexia – Takes 25% feed	2
	Severe Anorexia – Takes no feed	1
Dung Consistency	Normal – Semi-solid, porridge-like with well-formed stools	3
	Sub normal – Loose stools	2
	Poor – Watery stools (diarrhea) / Very solid and hard	1
Product Safety	No adverse effects	2
	Adverse effects observed	1
Performance/ Satisfaction	Highly Satisfied	4
	Moderately Satisfied	3
	Neither satisfied nor dissatisfied (Ambiguity)	2
	Not Satisfied (No relief)	1

Statistical analysis

Data are reported as mean ± SD. Repeated-measures one-way ANOVA with Dunnett's multiple comparison post-hoc test evaluated within-group changes versus baseline ($p \leq 0.05$). Given baseline differences between groups (e.g., milk fat), between-group inferential comparisons were not emphasized; descriptive contrasts are provided with appropriate caution. Analyses followed the priori plan specified in the field protocol.

3. Results

In G2 (FSP), milk fat increased from 3.19 ± 0.44% at baseline to 3.87 ± 0.60% during and 3.93 ± 0.54% after supplementation ($p<0.001$ for both vs baseline). Milk protein rose from 2.98 ± 0.37% to 3.23 ± 0.19% and 3.26 ± 0.17% ($p<0.001$). SNF changed modestly (8.49 ± 0.19% → 8.56 ± 0.15% → 8.57 ± 0.10%, not significant). In G1 (control), fat and protein were broadly stable; SNF decreased slightly during supplementation and increased after (8.68 ± 0.04% → 8.64 ± 0.07% → 8.79 ± 0.09%, $p<0.01$ after vs baseline). Milk yield in G2 showed a small, non-significant decline (14.64 ± 4.15 L → 14.28 ± 4.20 L → 13.82 ± 5.62 L), while G1 remained stable [Table 2].

Table 2. Effect of FSP on milk composition and production (mean ± SD)

Parameters	Group	Baseline	During Supplementation	After Supplementation
Milk Fat (%)	G1-Control	4.68 ± 0.09	4.62 ± 0.04	4.68 ± 0.05
Milk Fat (%)	G2-FSP	3.19 ± 0.44	3.87 ± 0.60***	3.93 ± 0.54***
Milk SNF (%)	G1-Control	8.68 ± 0.04	8.64 ± 0.07	8.79 ± 0.09**
Milk SNF (%)	G2-FSP	8.49 ± 0.19	8.56 ± 0.15	8.57 ± 0.10
Milk Protein (%)	G1-Control	3.46 ± 0.06	3.57 ± 0.27	3.42 ± 0.07
Milk Protein (%)	G2-FSP	2.98 ± 0.37	3.23 ± 0.19***	3.26 ± 0.17***
Milk Yield (L)	G1-Control	14.38 ± 2.17	14.31 ± 2.26	14.39 ± 1.92
Milk Yield (L)	G2-FSP	14.64 ± 4.15	14.28 ± 4.20	13.82 ± 5.62

Notes: ***$p<0.001$ vs baseline; **$p<0.01$ vs baseline (RM-ANOVA, Dunnett's). "During" and "After" denote measurement windows during supplementation and immediately post-

supplementation. Tests evaluate within-group changes.

Health indicators and user-reported metrics showed stable feed intake and dung consistency across periods [Table 3]. Safety was rated 2.00/2 (no adverse effects) and performance/satisfaction 3.00/4 in the supplemented group [Table 4].

Table 3. Effect of FSP on health indicators (mean ± SD)

Parameter	Group	Baseline	During Supplementation	After Supplementation
Feed Intake Score (1–4)	G1-Control	4.00 ± 0.00	4.00 ± 0.00	4.00 ± 0.00
Feed Intake Score (1–4)	G2-FSP	3.97 ± 0.12	3.98 ± 0.09	3.99 ± 0.03
Dung Consistency Score (1–3)	G1-Control	2.91 ± 0.15	2.92 ± 0.09	2.89 ± 0.19
Dung Consistency Score (1–3)	G2-FSP	3.00 ± 0.00	3.00 ± 0.00	2.98 ± 0.09

Table 4. Safety and performance scores (supplemented group)

Group	Product Safety Score (1–2)	Product Performance Score (1–4)
G2-FSP	2.00 ± 0.00	3.00 ± 0.00

4. Discussion

This 24-day field study indicated that daily supplementation of 50 g of a polyherbal-nutritional feed supplement in multiparous cows was associated with improvements in milk fat and protein percentages. SNF showed marginal numerical gains, while milk yield remained broadly unchanged, with only a minor, non-significant decline. These findings indicate a preferential enhancement of milk quality parameters without adversely affecting overall milk production. The direction of effects is biologically plausible: buffering agents and acetate precursors can favor lipogenic pathways in the mammary gland [5], while methionine and mineral support may promote milk protein synthesis [8-10]. The botanical constituents included- *Asparagus racemosus*, *Zingiber officinale*, and *Foeniculum vulgare*- have been associated with digestive support and stable rumen function in ruminants [7,18,19], consistent with the normal feed intake and dung scores observed here.

Two considerations temper interpretation. First, baseline milk fat differed between groups (control higher than FSP), a common challenge in small field trials; therefore, we emphasized within-group changes and avoided strong between-group inference. Future studies should stratify or match by baseline composition and lactation stage and consider baseline-adjusted models (e.g., ANCOVA) to isolate treatment effects more precisely [6]. Second, the sample size (n=20) and short duration (24 days) limit generalizability and preclude robust conclusions on long-term yield dynamics [2,6]. Nevertheless, stability of health indicators and absence of adverse events are reassuring for short-term field use.

From a practical standpoint, producers operating under fat/SNF-based pricing may view increased component percentages as beneficial, particularly if yield remains broadly stable. Economic evaluation should consider any yield trade-offs alongside fat/SNF premiums in specific procurement systems [13,17].

5. Conclusions

Supplementation of lactating multiparous cows with 50 g/day of a polyherbal nutritional powder improved milk fat and protein percentages, with modest gains in SNF, while milk yield remained largely stable, showing only a minor, statistically non-significant decline. The observed trend suggests a preferential enhancement of milk compositional quality rather than volume. Larger, longer-term, and baseline-balanced studies are recommended to optimize usage strategies and evaluate economic benefits.

Application of research: Nutritional feed supplements fortified with herbal actives for milk Fat, SNF and protein improvement in lactating dairy cows.

Research category: Dairy science

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Study area / Sample collection: Himalaya Wellness Company, Makali, Bengaluru, 562162, India

Cultivar / Variety / Breed name: Dairy cows

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Contribution of individual authors to the creation of a scientific article

The authors equally contributed in the present research, at all stages from the formulation of the problem to the final findings and solutions.

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Conflict of interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.