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The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(5): 819-821

www.thepharmajournal.com
Received: 28-02-2023
Accepted: 30-03-2023

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Effect of critical nutrient supplementation (TANUVAS GRAND) on production performance in dairy cattle in Tirunelveli district of Tamil Nadu, India

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Abstract
A field trial was designed to study the effect of TANUVAS GRAND supplementation on production performance, health status and reproduction in dairy cattle in Tirunelveli district of Tamil Nadu. Four villages of Tirunelveli division, four villages of Tenkasi division and two villages of Ambasamudram of Tirunelveli District, Tamil Nadu and a total of 250 respondents of NABARD Farmers Club Members of Tirunelveli District were selected for this project. The awareness programmes on "Importance of TANUVAS-GRAND" supplementation were conducted to the selected respondents of the project in 10 villages. Primary data on feeding practice, production, reproduction and general health status were carried out. TANUVAS-GRAND was provided to the selected farmers for feeding their dairy cattle at the recommended dose for a period of three months by free of cost. Data on productive, reproductive performance and general health status of the experimental dairy cattle was recorded fortnightly to study the impact of TANUAS GRAND supplementation. Data analysis was done. Based on the data collected and observation made and the experienced had by the farmers and the feedback from them about the benefits or impact of giving TANUVAS GRAND Supplementation are Increased in digestibility, solid state dung consistency, regularize the oestrus cycle, improvement in fertility, Milk yield were increased from 0.5 ltrs to 1.25 ltrs, Shinny skin coats and reduction in panting or labored breathing due to SARA.

Keywords: Nutrient supplementation, production performance, dairy cattle

Introduction
Livestock is an important component of Indian agriculture contributing substantially to the agrarian economy of the country. Despite the country achieving white and green revolutions, there is a shortage of green and dry fodder as well as concentrate leading to chronic deficiency of energy and protein in the diet of our livestock.

Since time in memorial dairy farmers of Tamil Nadu, India, belonging to the unorganized sector have been feeding their native cattle breeds having low productive potential with available feed resources, namely, grains of pearl millet, sorghum, maize, broken rice, and agricultural by-products such as rice bran, oil cakes, stovers, and straw. Most of the farmers in the semi-intensive rearing of dairy animals feed crop residues as a major source of roughage with one or two concentrate ingredients, while only a few farmers feed commercial concentrate mixtures to their animals.

In a survey to determine traditional feeding practices for cross-bred dairy cattle reared in Tamil Nadu, it was found that the animals were being fed on gruel based unbalanced feed, the gruel includes kitchen waste, table waste, etc., apart from the decanted gruel on cooking rice (Suresh *et al*., 2016) [8]. Feeding nutrient dense diets could be result in a buildup of organic acids in the rumen and will be reduced rumen buffering (Kleen *et al*., 2003, Stone, 2004, Rustomo *et al*., 2006) [4, 7, 6]. The cumulative effect of these changes can lead to a depression of the rumen pH. When rumen pH is depressed for prolonged periods each day, e.g. <5.6 for >3 h/day, subacute ruminal acidosis (SARA) occurs (Kleen *et al*., 2003, Stone, 2004, Gozho *et al*., 2005) [4, 7, 3]. This disease affects feed intake, milk production, rumen microflora, rumen digestion, and can cause diarrhea, rumen mucosal damage, laminitis, inflammation, and liver abscesses in dairy cows (Kleen *et al*., 2003, Stone, 2004, Alzahal *et al*., 2007) [4, 7, 1].

Since rumen microorganisms play an important role in facilitating the digestion of the feed and fodder and further get digested in the lower gut to provide quality microbial protein to the animal, it is imperative to support the nutritive requirement of these beneficial microorganisms

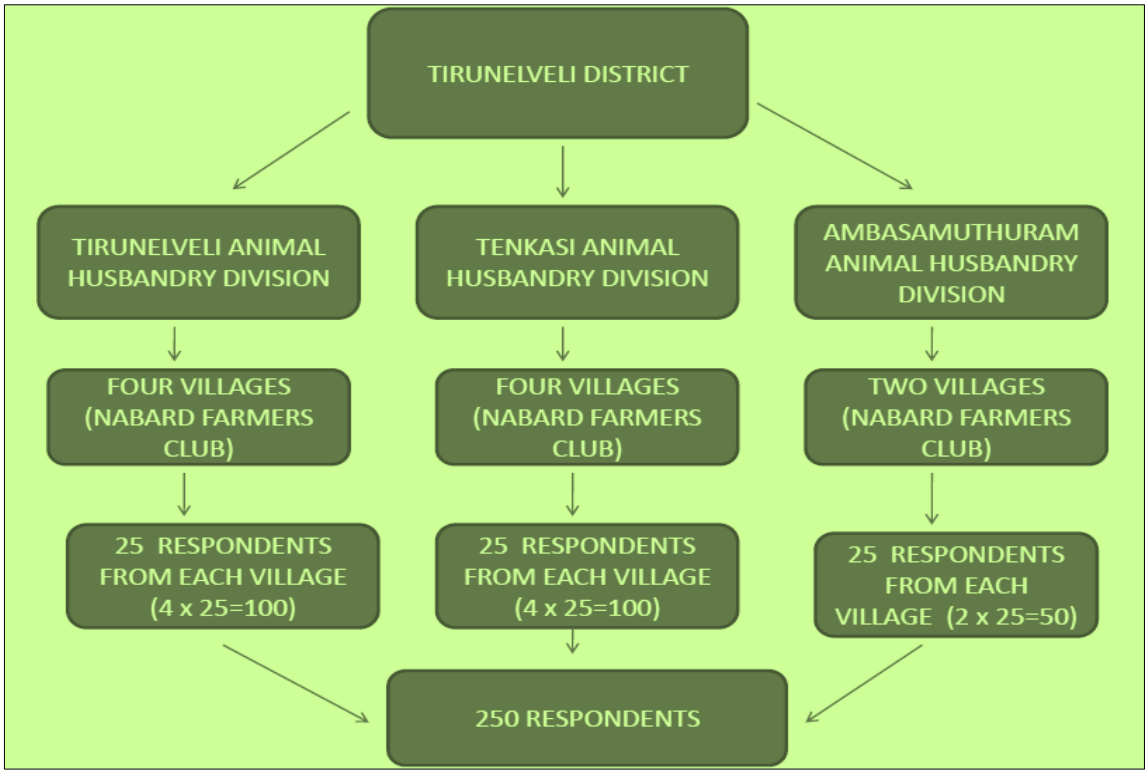
to facilitate digestion of low quality feed and fodder as well as to reap the high quality microbial protein that is provided by them. The department of Animal Nutrition of Madras Veterinary College has done extensive study to assess the nutrient requirement of these beneficial microorganisms and has concluded that these beneficial microorganisms require readily fermentable energy, nitrogen, copper, cobalt and sulphur to flourish. Hence a supplement was developed to selectively support the growth of beneficial microorganisms. The supplement contains required quantity of copper sulphate, cobalt sulphate and urea as a source of copper, cobalt, sulphur and nitrogen. The acronym for this supplement is GRAND in which G stands for Gruel, R stands for rooted, A stands for Additive, N stands for Nourishment and D stands for Drops.

Research on the effect of GRAND supplement in augmenting the apparent digestibility of roughage has shown a threefold increase over unsupplemented basal diet. Increase in digestibility is desirable as it helps the animal to nourish more nutrients from the same quantity of feed or fodder. Similarly, GRAND supplementation increased the percent microbial biomass production three fold over unsupplemented basal diet. Increase in microbial biomass promotes supply of good quality protein to the animal.

Need analysis were carried out among the beneficiaries during these programmes and found that, the farmers are feeding their dairy cattle mainly by fluid containing gruel based diet containing rice washing, kitchen waste, table waste and rice bran / cereals with inadequate protein supplementations. This will lead to sub acute rumen acidosis inturn leads to reduction in microbial protein synthesis, reduction in milk yield, laminitis and digestive disorders and ultimately production loss to the farmers. These problems could be overcome and the milk yield as well as the health status of the animals could be improved by means of feeding with TANUVAS –GRAND supplementation. This lack of awareness on the importance of inclusion of TANUVAS-GRAND supplementation in dairy cattle ration felt needs of farmers. Hence, the present proposal had been framed in such a way that meets their beneficiaries' needs. To popularise low cost feed technology- "TANUVAS – GRAND supplement" and study the technology adoption by dairy farmers To study the efficacy of TANUVAS –GRAND supplementation on production, reproduction and general health status of dairy cattle

Materials and Methods

A field trial was designed to study the effect of TANUVAS GRAND supplementation on production performance, health status and reproduction in dairy cattle in Tirunelveli district of Tamil Nadu. The respondents were selected from the NABARD Farmers Club Members of Tirunelveli District. 250 respondents were selected from Animal Husbandry divisions of Tirunelveli, Tenkasi and Ambasamudram of Tirunelveli district by stratified random sampling technique. Four villages of Tirunelveli division, four villages of Tenkasi division and two villages of Ambasamudram were selected for this project. From each village twenty five NABARD Farmers club members were selected by Stratified Random Sampling Techniques from the identified villages and constituted a sample size of 250.



Health status and reproduction in dairy cattle in Tirunelveli district of Tamil Nadu

The selection of villages and respondents were based on need analysis that was carried out during previous field trials. It was observed that, the farmers were feeding their dairy cattle mainly by the fluids containing gruel based diet containing rice washing, kitchen waste, table waste and rice bran / cereals with inadequate protein supplementations. This was lead to sub acute rumen acidosis inturn lead to reduction in microbial protein synthesis, reduction in milk yield, laminitis and digestive disorders and ultimately production loss to the farmers. The awareness programmes on "Importance of

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Results and Discussion

Based on the data collected and observation made and the experienced had by the farmers and the feedback from them about the benefits or impact of giving TANUVAS GRAND Supplementation are furnished below

- Increased in digestibility noticed and regularize the appetite of the cows were noticed by the farmers with existing feeding regimen.
- Dung consistency is improved to solid state instead of very semi or watery in nature. Improvement in fertility.
- Regularize the oestrus cycle and many cases conceived in one or two artificial inseminations.
- Laminitis were rectified which occurred earlier mainly due to feeding of rice gruel based diet and sub acute rumen acidosis condition.
- Milk yield were increased from 0.5 ltrs to 1.25 ltrs and average without changing their regular feeding practice.
- Feeding of this TANUVAS GARND supplementation lead to Shinny skin coats to the cows.
- During the supplementation TANUVAS GARND Supplementation Panting or labored breathing also rectified in the dairy cows which were caused mainly due to sub acute rumen acidosis condition.

Thus TANUVAS GRAND supplement supported animal productivity by increasing the nutrient availability through increased digestibility as well as increased availability of good quality protein through enhanced production of microbial biomass. It was observed that upon 20 ml of GRAND supplementation per animal per day the milk yield started to increase from seventh to ninth day itself. It was also observed that increase in milk production was more in low producing animals. Though GRAND supplementation results in marginal increase in milk fat which is desirable, it can be concluded that GRAND supplementation does not alter the milk quality as the difference in fat percentage is relatively small.

GRAND supplementation not only improves milk yield without adversely affecting milk composition it has also been proven to prevent SARA, improve the health of the animal and augment reproductive efficiency. GRAND supplement increases the milk yield by 500 ml to 1 litre per day per cow leading to a profitable dairy venture. These observation and data were coincided with the reports given by Balakrishanan and Murgeshwari (2011) and Murgeshwari *et al*., (2018). Since TANUVAS GRAND Supplementation is a unique nutritional supplementation product developed by TANUVAS and the patent of this product is in progress the commercial production the TANUVAS GRAND supplementation will be happened very soon for the benefit of the farming community.

Acknowledgement

The research team submitted its heartfelt thanks to Officers of TANUVAS for permitting to carry out the project in successful manner. A special thanks from the research team and VCRI, Tirunelveli to NABARD for providing funds to carry out the project to transfer the technology invented by TANUVAS to the farmers and for the benefit of the farming community. The team is expressed its whole hearted thanks to Dr. V. Balakrishnan, former Professor and Head of Animal Nutrition, Madras Veterinary College, Chennai for permitting his innovative technology which is very useful to dairy farmers.

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