

Effect of Dietary Replacement of Maize with Tapioca Thippi on Dairy Animals

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ABSTRACT: Tapioca thippi is one of the unconventional feed stuff used for dairy cattle. The objective of this study was to determine inclusion level of tapioca thippi for dairy animals. The Front Line Demonstration (FLDs) was conducted with jersey cross in a latin square experimental design with 4 animals for each treatment at Naraikinaru village of Namagiripettai block of Namakkal district. The treatments were replacement of different levels of corn (0, 25 and 50) with tapioca thippi. Dairy animal diet replaced maize with tapioca thippi at 50 % significantly ($P < 0.01$) decreased dry matter intake compared to replacement at 25 % and diet without tapioca thippi. In this study decreasing linear effect was observed in milk yield and no change in milk production efficiency, milk fat and SNF with replacement maize of tapioca thippi. The results of this study indicated that tapioca thippi can be included up to 25 % in the diet.

Keywords: Tapioca, Unconventional, Thippi, Fat and SNF.

INTRODUCTION

India is the largest milk producer in the world with the milk production of 221.06 million tones and the registered annual growth rate of 5 % in the year of 2021-2022 (BAHS, 2022). India occupies 2.29 % of land in the world and maintaining 10.7% of world livestock population creates high demand for fodder, feed, water and other resources. The feeding of dairy animal is a combination of green fodder, dry fodder and concentrate in varying proportion. In India there is deficit of 11.24% for green fodder, 23.4% for dry fodder and 28.9% for concentrates (Roy *et al.*, 2019). The high demand for concentrate feed increases the cost of milk production. Dairy farmers search for alternate feed resources to reduce the cost of milk production. To overcome this problem unconventional feed resources used in animal feeding. Tapioca processing industry generates large amount of by-products such as tapioca thippi, tapioca rind and tapioca milk residue during production of starch from tapioca roots. Tapioca thippi

is one of the unconventional feed resources to replace the maize in concentrate feed. Hence, the objective of this experiment was to determine inclusion level of tapioca thippi for dairy animals

MATERIALS AND METHODS

The FLDs was conducted at Naraikinaru village of Namagiripettai block of Namakkal district. The animals (Jersey cross) were distributed in a latin square experimental design with 4 animals for each treatment. The experiment period consist of 14 days adaptation period with 60 days of data collection. The treatments were replacement of different levels of corn (0, 25 and 50) with tapioca thippi. Proximate analysis of tapioca thippi was done according to the methodology described by AOAC (1990). The experimental diet formulated to meet the requirement of dairy animal. Sorghum stover used as roughage with 50% and concentrate feed with 50 %. The milk yield was recorded both morning and evening.

Table 1: Composition of experimental diet replaced maize with dried tapioca thippi.

| Feed Ingredients | Replacement levels | | |
|--------------------|--------------------|------------|------------|
| | 0 % | 25 % | 50 % |
| Sorghum stover | 50 | 50 | 50 |
| Tapioca thippi | 0 | 3.75 | 7.5 |
| Maize | 15 | 11.25 | 7.5 |
| Rice bran | 15 | 14 | 13 |
| Groundnut oil cake | 10 | 11 | 12 |
| Cotton seed cake | 8.5 | 8.5 | 8.5 |
| Mineral mixture | 1 | 1 | 1 |
| Salt | 0.5 | 0.5 | 0.5 |
| Total | 100 | 100 | 100 |
| Nutrients | | | |
| DM (g/kg of diet) | 921 | 910 | 917 |
| CP (g/kg of diet) | 1294 | 1335 | 1308 |
| TDN (g/kg of diet) | 5360 | 5518 | 5251 |

The data were subjected to analysis of variance and subsequent polynomial regression analysis, considering the levels of tapioca thippi (0 25 & 50) at the 5% level of probability. The data were subjected to analysis of variance and subsequent polynomial regression analysis, considering the levels of tapioca thippi (0, 25 & 50) at the 5% level of probability.

RESULTS AND DISCUSSION

Dairy animal diet replaced maize with tapioca thippi at the level of 50 % significantly ($P < 0.01$) decreased dry matter intake compared to replacement at 25 % and diet without tapioca thippi. Similar to results of the present

study, (Fernandes *et al.*, 2015) reported that dried waste of cassava starch extraction decreased drymatter intake. The drymatter intake in dairy animals was decreased due to fast degradation of tapioca starch compare to corn starch (Sommart *et al.*, 2000) results in high VFA which send signal to the satiety (Forbes, 2007). The intake of crude protein and TDN linearly decreased with increasing replacement of maize with dried tapioca thippi. The results are in agreement with the finding of (Fernandes *et al.*, 2015) who reported that feeding of dried waste of cassava starch extraction linearly increased crude protein and TDN intake.

Table 2: Daily intake of dry matter and nutrients of jersey cows, receiving diets replaced maize with dried tapioca thippi.

| Nutrient intake | Replacement levels | | | P Value | | |
|--|--------------------|-------------------|-------------------|------------|------------|-----------|
| | 0 % | 25 % | 50 % | Treatment | Linear | Quadratic |
| Drymatter intake (kg/day) | 9.42 ^b | 9.18 ^b | 8.76 ^a | $P < 0.01$ | $P < 0.01$ | 0.552 |
| Digestible Crude protein intake(Kg/day) | 1.22 ^b | 1.21 ^b | 1.19 ^a | $P < 0.01$ | $P < 0.01$ | 0.447 |
| Total digestible nutrient intake(Kg/day) | 5.22 ^b | 5.21 ^b | 5.18 ^a | $P < 0.01$ | $P < 0.01$ | 0.017 |

Table 3: Milk production and its composition of jersey cows, receiving diets replaced maize with dried tapioca thippi.

| Attributes | Replacement levels | | | P Value | | |
|--------------------------------|--------------------|-------------------|-------------------|------------|------------|-----------|
| | 0 % | 25 % | 50 % | Treatment | Linear | Quadratic |
| Milk yield (Litter/day/animal) | 8.87 ^c | 8.56 ^b | 8.41 ^a | $P < 0.01$ | $P < 0.01$ | 0.13 |
| Milk production efficiency | 0.94 | 0.93 | 0.96 | 0.28 | 0.29 | 0.23 |
| Milk fat (%) | 4.21 | 4.23 | 4.19 | $P < 0.01$ | $P < 0.01$ | 0.40 |
| Milk SNF (%) | 8.01 | 8.02 | 8.01 | 0.12 | 0.47 | 0.05 |

In this study decreasing linear effect was observed in milk yield with increased maize replacement of tapioca thippi. However, no change in milk production efficiency, milk fat and SNF in group of animals with replacement maize of with tapioca thippi. The decreased milk production observed in this study due to decreased drymatter intake, differences in the digestion, absorption and metabolism of starch derived from the maize and tapioca thippi and associative effects of

maize and tapioca thippi with other feedstuffs in the diet (Fernandes *et al.*, 2015).

Similar to the results of the present study, Ramalho *et al.* (2006) reported that cattle fed with tapioca processing by products and their composition similar to dried waste of cassava starch extraction decreasing linear effect on milk yield. Javorski (2012) reported that no change in production efficiency. Fernandes *et al.* (2015) also found no significant change in milk fat in lactating animal fed with tapioca by products.

Table 4: Effect of diet replaced maize with dried tapioca thippi on Net Return and B:C ratio of dairy animals.

| Replacement levels | Cost of production (Rs.) | Net Return (Rs.) | B:C ratio |
|--------------------|--------------------------|------------------|-----------|
| 0 % | 1552 | 2173 | 1.40 |
| 25 % | 1438 | 2097 | 1.45 |
| 50 % | 1354 | 2060 | 1.52 |

Diet replaced maize with tapioca thippi increased B:C ratio as compared to farmers practice. The high B:C ratio due to low cost of milk production.

CONCLUSIONS

The results of this study showed that the tapioca thippi can be included up to 25 % in dairy ration without affecting dry matter intake. However, feeding of tapioca thippi decreased milk production with decreased dry matter intake and no change in the composition of milk. In future, effect of processed tapioca thippi in dairy animals may be evaluated.

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Conflict of Interest. None.

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