

## Palatability and Effect on Dairy Cows Milk Yield and its Constituents of Dried Arecanut Sheath Used as Alternative Fodder

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**Abstract** Palatability checking of the different chopped length of arecanut sheath after shredding operations by arecanut sheath shredder is collected at all the treatment. The collected chopped material obtained with different chopped size that was fed to the five HF deoni cross breed cows which were in same lactation. The experimental trial was conducted for four week control group for five HF deoni cross breed cows and two week adaptation period for another five HF deoni cross breed cows as followed by a two week response period for the same group. The highest milk yield of 9.3 kg day<sup>-1</sup> during control period was recorded but it is gradually decreased during adaption period and response period till 8 kg days<sup>-1</sup>. The highest percentage of milk composition such as Solid Not Fat (SNF), Fat, Lactose, Protein and Density of milk was recorded during control period, but it is gradually decreased during adaption period and response period.

**Keywords** Arecanut sheath, Concentrate feed, Dairy cows.

### Introduction

Arecanut palm (*Areca catechu* Linn) is a tropical crop. Arecanut or Betelnut is the kernel obtained from the fruit of arecanut palm. It has some beneficial parts, such as husk, leaves and sheath which can be used for different purpose. In this, arecanut leaf sheath is one of the important raw materials obtained from the arecanut palm. Leaf sheath obtained from the farm are highly heterogeneous having variations in structure, shape and thickness. The outer surface of the sheath is greenish or brown, waxy and tough, while the inner surface is creamy in color and has a natural glossy finish. The constituents of the leaf sheaths are cellulose - 43%, crude fiber - 33% ash - 5% [1]. The sheath attached to the leaf of arecanut tree is not only used for commercial plate making. But recently the arecanut sheath was found to be need as a dry fodder for cattle, as an alternative to paddy straw [2]. Hence, develop an arecanut sheath shredding machine for making arecanut sheath into suitable fodder size for animals. After chopping of arecanut sheath by shredder used for checking of palatability by feeding of chopped sheath to the selected five HF deoni cross breed cows which were in same lactation. After feeding a chopper sheath to the cattle's twice a daily, recorded a milk yield and its composition during adaption period and response period and also recorded in control period for another five HF deoni cross breed cows without feeding arecanut sheath. The objective of this trial was to determine the effect on milk production and its composition of substituting dried chopped arecanut sheath in the diet of dairy cows with concentrated

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feed mixture. Intake of arecanut sheath fodders was measured and the milk yield and its chemical composition are also assessed.

## Materials and Methods

The research was conducted in order to check the palatability of arecanut sheath and its effect on the milk yield of dairy cows and its composition.

### Palatability

Palatability refers to the relish with which feed is consumed as stimulated by the sensory impulses. For checking of palatability the different chopped length of arecanut sheath was done by arecanut sheath shredding machine was collected at all the treatment. This study was conducted in dairy farm, Main Agricultural Research Station (MARS), UAS, Raichur. The collected chopped material obtained with different chopped size of <40 mm, 40 - 100 mm, and >100 mm at different cylindrical cutterhead speed, feed roller speed and varied numbers of knives used for shredding operation. The above varied chopped length of arecanut sheath was fed to the five HF deoni cross breed cows which were in same lactation. The experimental cows were kept in a shed with free access to dry fodder and water. Concentrate feed of 5 kg was given to each cows twice a daily at 6 AM and 3.30 PM. The arecanut sheath soaked overnight mixed along with soaked concentrate feed mixture containing maize (40%, cotton seed cake (15%), wheat bran (42%), mineral mixture (2%) and which are fed with green fodder at 20 kg per animals twice a daily. The experimental trial was conducted for four week control group with check where there is no any arecanut sheath are fed only concentrate feed, dry fodder and green fodder are fed. In adaptation period which is conducted for two week during which chopped arecanut sheath mixed with daily feed and the amount of mixed arecanut sheath along with daily feed was started from 0.5 kg and it was increased gradually until all animals refused some concentrated feed mixed with arecanut sheath, followed by a two week response period, during which the optimized amount of arecanut sheath mixed with concentrated feed to the cows and also recorded the milk yield of each cows [3].

**Table 1.** Effect of cylindrical cutterhead speed (C), feed roller speed (F) and numbers of knives (K) on palatability.

Sl. No.	Cylindrical cutterhead speed (C), m s <sup>-1</sup>	Feed roller speed (F), m s <sup>-1</sup>	Palatability, per cent		
			2	3	4
1	13.1	0.28	33.28	52.60	74.97
		0.36	26.50	38.00	60.90
		0.45	21.83	32.73	56.67
2	15.7	0.28	39.03	65.13	99.13
		0.36	30.27	49.83	84.77
		0.45	27.60	37.17	75.80
3	18.3	0.28	64.20	80.80	99.53
		0.36	51.00	73.40	97.47
		0.45	45.80	69.20	87.90

### Milk yield and milk composition

After feeding a chopped sheath to the cattle's twice a daily, recorded a milk yield and its composition during adaption period, response period and control period (Without feeding arecanut sheath). The milk composition such as Solid Not Fat (SNF), Fat, lactose, protein and density of milk was determined on zero days and at 5 days interval in control period, adaption period and in response period. The milk composition can be determined using a Lactoscan (Milk analyzer) device.

## Results and Discussion

A three factorial completely randomized block design techniques were used to analyze the palatability of arecanut sheath by feeding different chopped length of arecanut sheath to the dairy cows.

**Table 2.** Analysis of variance for palatability. CV = 7.89, SD = 4.52, \* = Significant at 1% level.

SV	DF	SS	MSS	F
Treatment	26	53000.77	2038.49	99.59*
Cylindrical cutterhead speed (C)	2	13789.74	689.86	336.87*
Feed roller speed (F)	2	3059.49	1529.74	74.74*
Numbers of knives	2	31530.24	15765.12	770.25*
C × F	4	648.75	162.18	7.92*
C × K	4	3109.01	777.25	37.97*
F × C	4	274.50	68.62	3.35*
C × F × K	8	589.01	73.62	3.59*
Error	54	1105.24	20.46	
Total	80	54106.01		

**Table 3.** Effect of feeding of arecanut Sheath on milk yield and its composition.

Sl. No.	Particulars	Five HF Deoni cross breed cows Control period, weeks				Five HF Deoni cross breed cows Adaption period, weeks      Response period, weeks			
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
1	Milk yield, kg day <sup>-1</sup>	9	9.17	9.2	9.3	8.7	8.5	8.25	8
2	SNF, per cent	8.06	8.16	8.28	8.3	7.9	7.81	7.41	7.26
3	Fat, per cent	5.1	5.16	5.18	5.2	4.9	4.86	4.56	4.49
4	Lactose, per cent	4.4	4.5	4.55	4.56	4.33	4.29	4.06	3.9
5	Protein, per cent	2.94	3.02	3.04	3.07	2.9	2.85	2.71	2.67
6	Density, kg m <sup>-3</sup>	27.1	27.43	27.54	27.76	26.82	26.26	25.72	25.4

### Palatability (per cent)

Effects of operational parameters viz., cylindrical cutterhead speed, feed roller speed and number of knives on palatability of arecanut sheath are presented in Table 1 and analysis of variance on palatability in Table 2. The data presented in Table 1 shows that a minimum palatability of 21.83% was observed at a cylindrical cutterhead speed of 13.1 m s<sup>-1</sup> and feed roller speed of 0.45 m s<sup>-1</sup> for 2 number of knives and maximum palatability of 99.53 % at cylindrical cutterhead speed of 18.33 m s<sup>-1</sup> and feed roller speed of 0.28 m s<sup>-1</sup> for 4 number of knives. Table 2 presents that interaction effect (C × F, F × K, K × C and C × F × K) on palatability of arecanut sheath at 1% level of significance. It was observed that, the palatability of arecanut sheath increased as the cylindrical cutterhead speed and number of knives used increased because when cylindrical cutterhead speed and number of knives used were gradually increased, the chopped length of arecanut sheath was gradually decreased, so if chopped length was small the palatability of arecanut sheath fed to the cows increased and as the increased feed roller speed decreased palatability of arecanut sheath because when feed roller speed gradually increased, the chopped length of arecanut sheath was gradually increased, so if chopped length was large the palatability of arecanut sheath was decreased.

### Milk yield and milk composition

After checking palatability of arecanut sheath, the milk yield milk composition of five HF Deoni cross

breed cows was determined. The results obtained after checking of milk yield and milk composition during control period, adaption period and response period was presented in Table 3. Table shows the maximum milk yield, SNF, fat, lactose, protein and density was observed as 9.37 kg day<sup>-1</sup>, 8.3%, 5.2%, 4.56%, 3.07% and 27.76 kg m<sup>-3</sup> during control period and minimum of 7.85 kg day<sup>-1</sup>, 7.13%, 4.4%, 3.9, 2.65% and 25.23 kg m<sup>-3</sup> respectively, as observed during response period. Milk yield and its composition were decreased during adaption period and response period as compared to control period because the fed arecanut sheath had higher percentage of cellulose and fiber content (43 and 33%), due to this reason milk yield and its composition decreases.

### Conclusion

The palatability of chopped arecanut sheath fed to the cows increases when use of chopped material obtained at lower feed roller speed, higher cylindrical cutterhead speed with increased numbers of knives. It was observed that the arecanut sheath fed to the cows shows less beneficially influenced on milk yield, solid not fat, lactose, protein and density of milk during adaption period and response period as compared to control period. Hence, dried arecanut sheath used as a alternative fodder for cattles during summer on dry season.

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