

# Enhancing Sawdust Utilization in WAD Goat Diets: A Comparative Analysis of Wood Ash, Hot Water, Caustic Soda, and Molasses Pre-treatments

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## Introduction

Traditional livestock feed is becoming increasingly expensive. This study explores sawdust—a common byproduct of the Nigerian timber industry—as a sustainable alternative feed source. By applying various treatments to break down lignin and improve palatability, we can turn waste into a resource for small ruminants.

## Methodology

**Subjects:** 36 Male West African Dwarf (WAD) goats (9–10 kg).  
**Design:** Completely Randomized Design (CRD).  
**Duration:** 8-week feeding trial.  
**Feeding:** 4% of body weight.  
**Dietary Treatments (Sawdust Preparation)**  
 The sawdust was subjected to four specific treatments: before being mixed with other feed ingredients:  
**T1 (Wood Ash):** 10% w/v solution.  
**T2 (Hot Water):** Boiled at 100°C for 2 hours.  
**T3 (Caustic Soda):** 4% w/v NaOH solution.  
**T4 (Molasses):** 1:9 w/w molasses-to-sawdust ratio.  
**Statistical Analysis:** One way ANOVA and DMRT(5%)

## Results

Parameter	T1(wood ash treatment)	T2(hot water treatment)	T3 (caustic soda treatment)	T4 (treated with molasses)	SEM
Crude protein	2.95 <sup>c</sup>	3.10 <sup>ab</sup>	3.05 <sup>b</sup>	3.11 <sup>a</sup>	0.02
NDF	61.10 <sup>b</sup>	60.50 <sup>c</sup>	61.40 <sup>a</sup>	60.50 <sup>c</sup>	0,10
Tannin	0.004	0.005	0.006	0.007	0.01
Dry matter intake (g/day)	491.10 <sup>b</sup>	531.05 <sup>b</sup>	687.46 <sup>a</sup>	664.81 <sup>a</sup>	26.64
TVA (mmole/10 0ml)	87.60 <sup>c</sup>	105.12 <sup>b</sup>	42.34 <sup>d</sup>	11.21 <sup>a</sup>	5.71
TVOC (mg/m <sup>3</sup> )	0.51	0.48	0.52	0.40	0.40
CO <sup>2</sup> (ppm)	3911.50	4231.40	4095.88	4996.67	214.81
HGB (g L <sup>-1</sup> )	10.80 <sup>c</sup>	11.60 <sup>bc</sup>	12.30 <sup>ab</sup>	12.95 <sup>a</sup>	0.20
RBC (× 10 <sup>12</sup> /L)	3.55 <sup>c</sup>	3.90 <sup>b</sup>	4.05 <sup>ab</sup>	4.30 <sup>a</sup>	0.06



## Key findings

T4 (Molasses) emerged as the superior treatment, providing the best protein and tannin contents and volatile fatty acid (VFA) concentrations, which are essential for rumen energy.  
 Environmental Impact: While T4 had higher CO<sub>2</sub>, it had the lowest Total Volatile Organic Compounds (TVOCs), suggesting a cleaner fermentation profile in terms of harmful atmospheric pollutants.  
 Health: All goats maintained healthy blood profiles (HGB and RBC counts), indicating that treated sawdust is non-toxic and safe for consumption.

## Conclusion

Incorporating treated sawdust into goat diets is a **feasible and sustainable** practice. **T4 (Molasses treatment)** is recommended for maximizing nutritional value. **T1 (Wood ash)** is the most accessible, low-cost option for small-scale farmers. **Impact:** This approach reduces feed costs, manages sawmill waste, and maintains the health and productivity of West African Dwarf goats.