EVALUATION OF THE TECHNOLOGIES FOR DRYING FEED GRADE CASSAVA GRITS (F.G.C.G.) FOR UTILIZATION IN POULTRY FEEDS

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INTRODUCTION

- Cassava is one of the most important staple food crops grown in tropical Africa.
- Its production system has been developed over the years particularly in Nigeria
- **It is a cheap source of energy that is available all-year-round.**
- It continues to play a significant role in efforts at alleviate the African food crisis.
- **It offers tremendous potentials as a cheap source of feed energy for livestock.**
- This is why there is currently a great deal of interest in the utilization of cassava in the feeding of livestock.

Introduction…..

- The high cost of energy source like maize in the formulation of animal feeds has also necessitated the need to develop other sources of energy.
- The potential of cassava utilization in animal feeds has been widely documented
- Cassava is widely used in most tropical areas for feeding pigs, cattle, sheep and poultry.
- The use of cassava in animal rations in commercial feed milling is limited because of the mode of processing and presentation.

Introduction…….

- It is usually presented as cassava flour which is too powdery and the dusts can actually constitute a fire hazard.
- The adoption of processing methods that reduce the powdery nature of the final product should encourage the usage of cassava in feeds production.

Objectives of the study

Main Objective

- To adapt simple and available drying technologies for industrial scale production of FGCG and evaluate their efficiencies.

Specific Objectives

- To determine the efficiencies of the different drying techniques in the production of FGCG

- To establish the drying technique that can deliver the quality and quantity of FGCG required by the poultry industry

Specific Objectives cont'd

- To develop a template for cassava grits production enterprises to service feed mills across Nigeria
- To develop standards for FGCG that can be utilized in poultry production in Nigeria
- To evaluate the cost per ton of FGCG

METHODOLOGY

Experimental site:

- Agbara in Ogun state (Frying and Sun drying)
- Ikorodu in Lagos state (Oven drying)

Experimental materials

- TME 419 cassava tubers
- TMS 30572 cassava tubers
- Weighing scale
- Bags

Experimental Design:

- Randomized Complete Block Design (RCBD)
  - ✓Treatment 1: Oven drying
  - ✓Treatment 2: Frying
  - ✓Treatment 3: Sun drying(control)
  - ✓Treatment 4: **Aborted**

Plate 1: Delivery of fresh cassava tubers

Plate 2: Hired laborers washing and bagging cassava tubers

Plate 3: Bagged cassava tubers before gritting

Plate 4: Hired laborers cutting cassava stalks before gritting

Plate 5: Gritting of cassava tubers at Garri Factory

Plate 6: Pressing of cassava tubers at Garri Factory

Plate 7: Weighing of pressed cassava grits before drying

Plate 8: Bagged samples of wet grits

Plate 9 : Samples of wet grits for laboratory analysis

Plate 10: Sun drying method of wet grits

Plate 11 : Rain disruption during sun drying

Plate 12 : Oven dryer

Stages of oven drying method of wet FGCG

Plate 13a: Stage A of oven drying

Plate 13b: Stage B of oven drying

Plate 13c: Stage C of oven drying

Plate 13d: Stage D of oven drying

Stages of oven drying method of wet FGCG

Plate 13e: Final stage of oven drying

Plate 14: Frying

Plate 15: Samples of dry FGCG sent for laboratory

Chemical Analysis

•The proximate energy and crude protein compositions were determined according to the methods of AOAC (2006)

•The hydrogen cyanide levels of the FGCG was determined using the modified method of the AOAC (2002).

Data Analysis

- All the data collected were analyzed using simple descriptive statistical tools like:
  - ✓ Frequency tables
  - ✓ Bar charts
  - ✓ Percentages
- Treatment means were tested for significance and significant means were separated using Least Significant Difference (LSD).

Results

Table 1: Recoverable weight of grits after drying of 75kg of compressed cassava with three drying methods

	VAR 1	VAR 2	Average (Kg)	Average %
Oven	18.33[a]	26.17[b]	**22.25[a]**	**29.67%**
Frying	29.33[bc]	34.67[cd]	**32.00[b]**	**42.67%**
Sun-Dry	38.00[de]	43.00[e]	**40.50[c]**	**54.00%**

Plate 18: Samples of final products

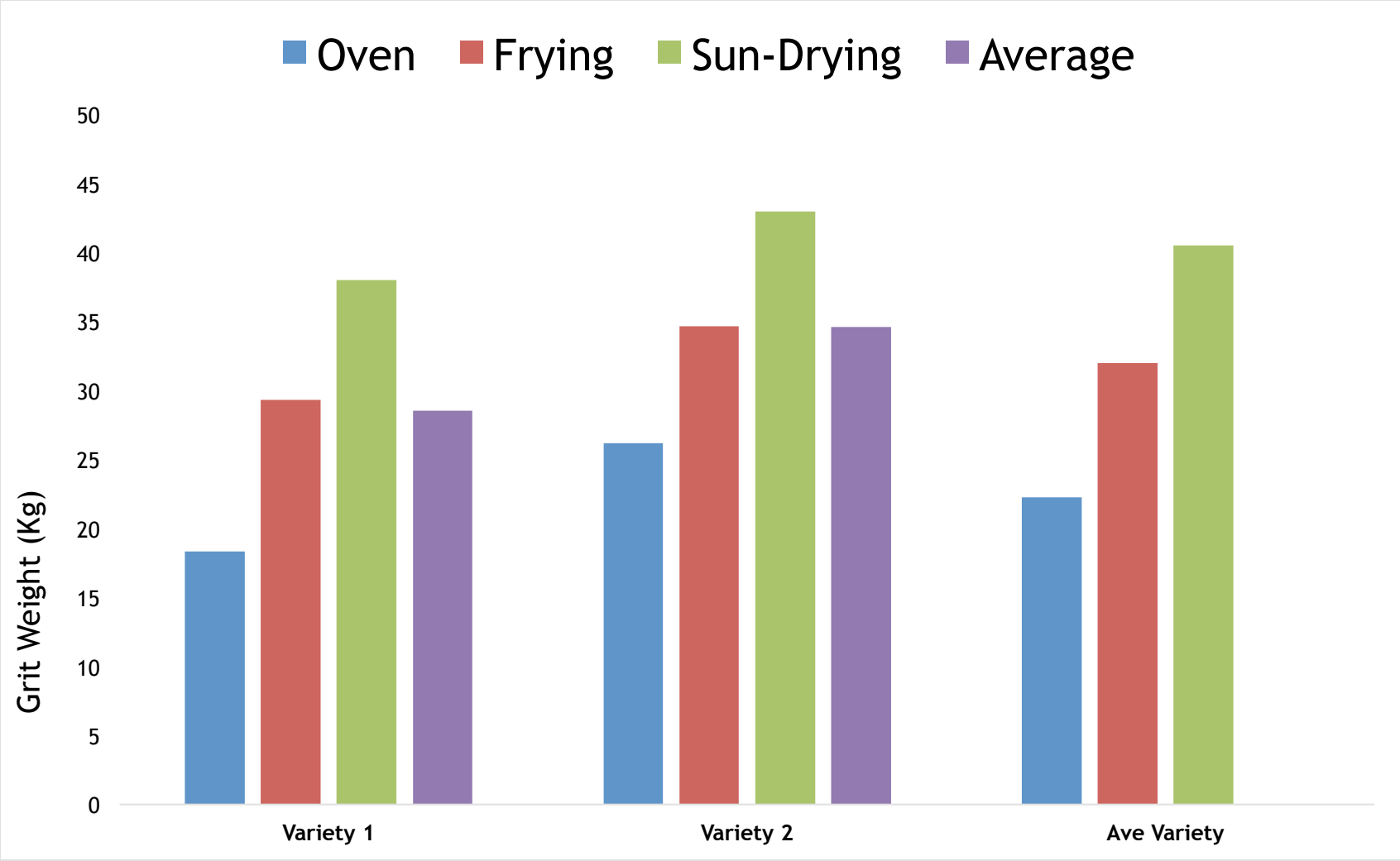

Figure 1: Recovered dried weight of cassava grits

Table 2: Time duration for drying 75kg

	VAR 1	VAR 2	Average (mins)	
Oven	80.00[d]	62.33[c]	71.17[b]	
Frying	36.27[b]	24.75[a]	30.51[a]	
Sun-Drying	435[f]	410[e]	422.50[c]	-

Table 3a: Proximate analysis of cassava grits dried with three methods of driers

	% Moisture Content			% Crude Protein			Energy (kcal/kg)			Cyanide Content(mg/Kg)		
	V1	V2	Ave	V1	V2	Ave	V1	V2	Ave	V1	V2	Ave
Oven	7.96	12.14	10.05[a]	2.13	2.22	2.18	3004	2914	2959	9.18	8.64	8.91[a]
Frying	14.84	12.28	13.56[b]	1.86	2.04	1.95	2730	2900	2815	10.26	11.07	10.67[b]
Sun-Dry	19.62	12.63	16.13[c]	1.33	1.95	1.64	2578	2905	2742	10.80	11.34	11.07[c]

Table 3b: Proximate analysis of cassava grits dried with three methods of driers

Processing Method	% Fat			% Fiber			% Ash		
	V1	V2	Ave	V1	V2	Ave	V1	V2	Ave
Oven	0.28	0.11	0.20	4.31	3.45	3.88	2.40	1.43	1.92
Frying	0.12	0.10	0.11	5.16	3.39	4.28	2.28	1.71	2.00
Sun-Dry	0.24	0.20	0.22	4.80	3.29	4.05	2.32	1.45	1.89

Discussions

- The poultry industry is a highly sensitive one
- The issue of the quality of feed-grade cassava grits (FGCG) must be taken very seriously.
- To drive the acceptability of FGCG in poultry feed milling, the following qualities must be assured

1. Nutrients profile
    - Nutrients profile must be consistent. Variations in ME, CP and fibre must not exceed 5% in the different batches of FGCG
    - Fairly uniform processing procedures will ensure this uniformity of products nutrients

Quality assurance……

2. Moisture content
   - ✓FGCG with at least 88 – 90% dry matter or less than 12% moisture content would be preferred in feed milling
3. Cyanide content
   - ✓the use of improved cassava varieties that is now widely cultivated by cassava farmers across Nigeria can minimize the threat of cyanide toxicity.
4. Sand content
   - ✓Sandy FGCG will kill the product. Washing must thorough to totally remove sand.

5. Particle size
   FGCG must not be powdery or too lumpy. The product must be such that it can go directly into the mixer in feed milling process. Only products with a 2 – 4mm particle size are acceptable.

6. Packaging and Labeling
   Standard 50kg bagging, with appropriate labeling is acceptable.

Conclusion

- The potential for FGCG utilization in feed milling animals (Poultry) is enormous
- Substitution of a percentage of maize in poultry diets can save cost of feeding and make poultry products more affordable
- A Cassava factory in Eruwa, Oyo state has adopted the frying method to produce FGCG and is presently supplying some feed millers
- They cannot meet the demand

Recommendations

- More investment is required in drying innovations for FGCG
- Drying is very critical in FGCG production, as such investments in drying must be such that can deliver between 10 – 20 metric tons (or more) of FGCG per day.
- We need to make FGCG a product that will be readily available to feed millers

THANK YOU

FOR YOUR

ATTENTION