ACHIEVING OPTIMUM DRYING EFFICIENCY FOR FLASH DRYER

PRESENTED BY:

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INTRODUCTION

- *Nigeria is the world's largest cassava producer.*
- *In 2011, annual production hits 52.4million tons. These figures are growing in phenomenal rates, due to the active participation of various stakeholders in the entire value-chain.*
- *Effective utilization of local technology is key to maximizing the immense potentials that will accompany these growth, and flash dryers have proven to be of great importance, processing cassava products into finished products such as fufu, flour, starch and livestock feeds.*

NIJI LUKAS FLASH DRYERS

- *Ours is a 26 year success story of innovation, over 50 flash dryers installed and comfortably served the African continent (private and government) with Nigeria as the base.*

FIRST TO NOTE:

- *Flash drying is a process of passing a fairly dry granules through a pressured hot airstream. While the heat is supplied by the heat exchanger, the blower distributes the heat together with the product across for effective drying. The finished product is collected at the outlet after passing through the cyclone that does effective separation.*

VITAL DESIGN CONSIDERATIONS

The following parameters are critical to achieving optimal drying efficiency for flash dryers:

1. *Optimal Temperature Control*
2. *Food Safety & Hygiene Conditions*
3. *Added Operational Efficiency*

NLFD DESIGNS

OPTIMAL TEMPERATURE CONTROL

- *Temperature is one of the most critical parameters in design of food processing equipment.*
- *Excessive temperature can damage the nutrients of the food-product, while inadequate heating can lead to reduced product shelf-life or a product unhealthy for consumption.*
- *Specific to the flash dryer: We change the design. We replaced the black (condemn) oil burner with a diesel burner and optimized the heat efficiency. This was further enhanced with an inbuilt baffles that retains heat losses and the issue of non-uniformity of product weight and moisture content was solved.*

FOOD SAFETY & HYGIENE CONDITIONS

- *Stainless steel is the recommended material for the fabrication.*
- *The black oil that was used in the first models poses a lot of health risk. This was often reported and leads to the decoloration of the product.*
- *Also, due to lack of uniform drying, product produced couldn't withstand the environmental conditions. Thus usually have a very discouraging shelf-life. This is usually accompanied by microbial attacks which increase the rate of aflatoxin, making products unhealthy for consumption after a short time.*

ADDED OPERATIONAL EFFICIENCY

- *Intermittent operations increase production downtime.*
- *Human interventions and efforts in production line must be reduced to the bearest minimal to maximize production time.*
- *In addition to compact design, our introduction of the 3-pass innovation to the heat exchanger and the automatic screw feeder with regulator, greatly enhanced production performance.*

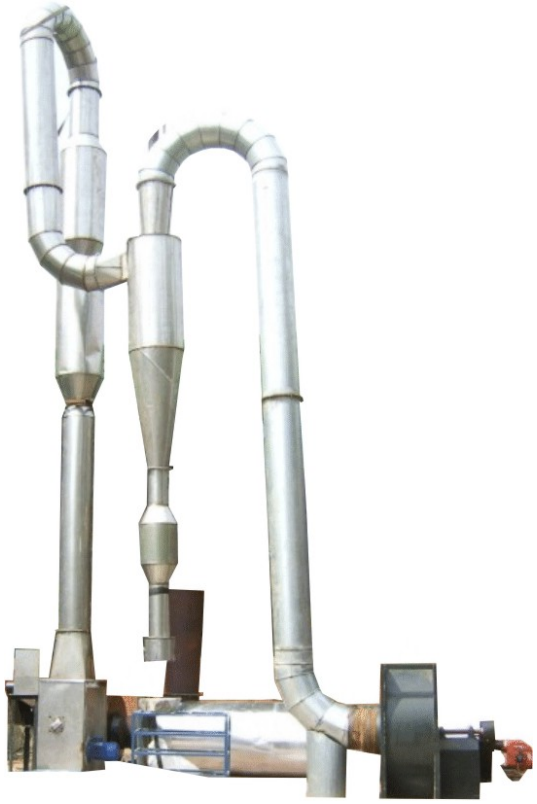
SUMMARILY NLFD INNOVATION REPORT

Component	EXISTING	NLFD 3.1	NLFD 3.2	NLFD 3.3
Description	Negative Pressure	Improved Negative Pressure (INP)	Reinforced Negative/Positive Pressure (RNP)	Modified Positive Pressure (MPP)
Source of Heat Energy	Black (condemn oil)	Diesel	Diesel	Diesel
Temperature Control	Direct heating	Steam Tube with 1-pass	Baffled with 2-pass	3-pass heat exchanger innovation
Hot air stream	Fast drying	Fast drying	Fast drying	Fast drying
Safety and hygiene conditions	Black stains products (contaminated hot airstream). Non-uniform product weight.	Safeguarded heat source (diesel reduced contamination and purified)	Efficient drying achieved and moisture content adequately controlled.	Better and faster drying rate and moisture content adequately controlled.
Added Operational Efficiency	Intermittent operations. 95% human intervention.	75% human interventions.	65% human interventions.	Automatic screw feeder with regulator for optimal temperature control. (20%) human efforts. Integrated cyclone. Compact design.
Production Capacity	80kg/hr	120-130kg/hr.	130-150kg/hr.	180-230kg/hr.
Fuel Consumption	20litres/hr	15litres	13-15litres	12-15litres
Performance efficiency (ratio) (rated in Prod. Capacity and fuel efficiency Compared with existing model)	Production Capacity: 1 Fuel Efficiency: 1	Production Capacity: +150% Fuel Efficiency: - 0.75%	Production Capacity: +163% Fuel Efficiency: - 0.65%	Production Capacity: +225% Fuel Efficiency: -0.55%

NLFD MODELS

NLFD 3.1

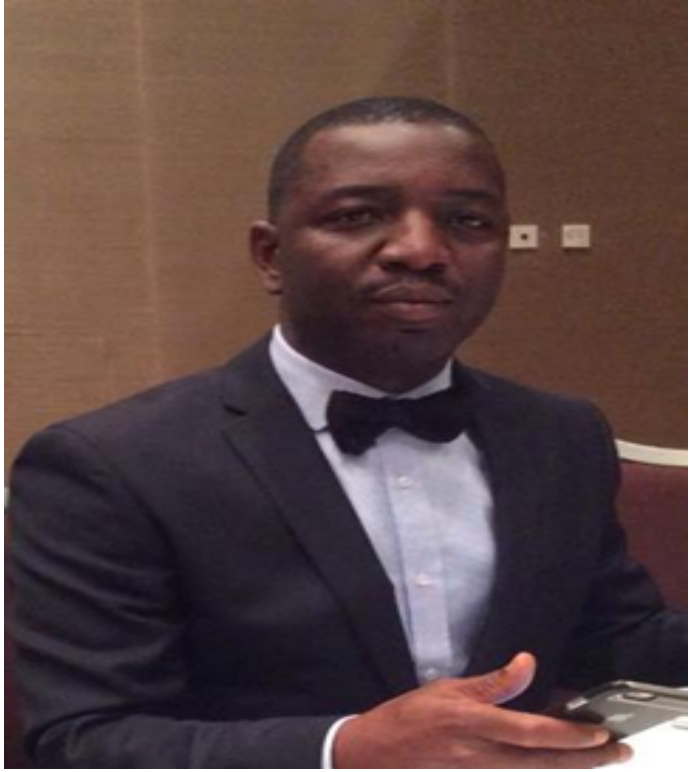
NLFD 3.2



NLFD 3.3

Our Commitment @ Niji Lukas

- *We are still building and we strongly believe the future will witness greater innovations.*



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Thank You

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We will be available to help you out in your next project.