High yielding disease resistant cassava for processing white granulated Gari for Nigeria

Olaoye, Omotola Dorcas

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Design target

Delivery of high yielding, disease resistant (CMD & CBB) varieties with improved processed product

Olaoye, Omotola Dorcas is a doctoral student, research fellow, and lecturer who has dedicated her career to plant breeding. Currently pursuing her Ph.D. at the West Africa Centre for Crop Improvement, University of Ghana. Her research is focused on breeding for cassava product quality traits using Nested Association Mapping (NAM) population to identify the quantitative trait loci (QTL) associated with these traits. Her work is driven by the aim of improving cassava varieties that target the cassava food product industry.

Dorcas is also a research fellow at the International Institute of Tropical Agriculture (IITA) and a lecturer at the University of Port Harcourt, Rivers state, Nigeria. Her broad academic and professional experience has given her a strong foundation in quantitative genetics, which she applies in her research to improve quality traits in cassava. Her research has the potential to have a significant impact on the cassava industry. Olaoye, Omotola Dorcas is a rising star in the field of plant breeding, and her work promises to have a lasting impact on the cassava industry in West Africa and beyond.

Contact

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Product Profile design team

Step 1

PP Design Team Lead/Champion	Olaoye, Omotola Dorcas
	University of Port Harcourt

PP Design Team		
Person	**Area of Expertise**	**Name of organization**
Olaoye, Omotola Dorcas	Plant Breeding	University of Port Harcourt
Dr. Rabbi Ismail	Molecular genetics	International Institute of Tropical Agriculture
Agbogho, Cynthia	Plant Breeding	
Prof. Kwame Offei	Molecular plant virology	University of Ghana, WACCI

Step 2

Product profile descriptors	
Product profile name	Processing white granulated cassava
Crop	Cassava (Manihot esculenta Crantz)
Country	Nigeria
Geographic regions	Derived Savanna, Southern Guinea Savanna, and Rain forest
Market segment and positioning	Processing white granulated cassava for human consumption
Name of target variety to be replaced	TMS 30572 and TME 419 **Strength**: TMS 30572 has good food product quality while TME419- adapted for mechanization **Weaknesses**: TMS 30572 has branching stem and intermediate resistance to CMD while TME 419 is susceptible to root rot and lodging
Date PP created	25/04/2023

Target client and use	
Value chain primary clients/customers	Farmers, seed companies, processors, transporters, and consumers are the main beneficiaries of stem cuttings, cassava-based products, and by-products
Market scale	Households, local, regional, national and international markets
Use	Food
Type of processing	Fresh, Fermentation, Drying, Roasting and Cooking
Market class	Cassava stem, Fresh root, Gari, Fufu

Target crop producers and production system	
Number of farmers	80,000-100,000 cassava farmers
% ratio: male to female farmers	60 - 70% males and 40 - 30% females
Production system	Open field
Area of production system	4.7 million (ha)
Growth habit	Prefer Erect stems
Expected level of inputs	Low (fertilizers, herbicides, crop and seed chemicals)
Typical yield range of target system	10-12tons/ha
Cropping system	Sole, and intercropping
Mechanization	Can adapt to mechanized agronomic practices
Agroecological zone(s)	Rainforest, Derived savanna, and Southern Guinea Savanna
Total vegetative propagation material market	0.5 million bundles at 70 bundles per hectare

Variety technical specification

Step 3

Client/ customer	Driver	Trait category	Preference group: Women (W) Men (M) Youth (Y) W+M+Y (All)	Trait demand classification: *1. Essential/ "must have" 2. Niche opportunity 3. Added-value 4. Winning trait*	Target traits	Trait description (Quantitative measures)	Name of benchmark variety	Performance required compared to benchmark variety <, =, > etc.
Farmer	Productivity	Yield	All	1	Fresh root yield	Metric tons/ha	UMUCASS 49(>40)	>
			All	1	Dry yield	Metric tons/ha	UMUCASS 49 (>4.5)	=
			All	1	Dry matter	Percentage	UMUCASS 50 >32	>
			All	1	Root size	Conical-Cylindrical	TME 419 (Conical-Cylindrical)	=
		Biotic stress resistance	All	1	*Cassava Mosaic Disease (CMD)*	Scale (1-5)	UMUCASS 46 (<=2)	=
			All	1	*Cassava Bacterial Blight (CBB)*	Scale (1-5)	UMUCASS 46 (<=2)	<=
			All	1	*Cassava Green Mite*	Scale (1-5)	UMUCASS 40<=2	<=
	Crop management and harvesting	Production/multiplication trait	All	1	Sprouting	Percentage	UMUCASS 46 (>90)	=
			All	3	Early bulking	Months after planting (06 months)	UMUCASS 40 = 06	<=
			All	1	Stem longevity	Days	UMUCASS 50 >14	>
			All	1	Plant Architecture	Scale (1-5)	TME419<=3	<=
			All	1	lodging	Percentage	UMUCASS 49<10	<
	Post-harvest storage	Storage life	All	3	Post-harvest deterioration	Score 1 (10% deterioration at 7 DAH)	IITA-TMS-IBA011797	=
Transporter	Ease of packaging during transportation	Uniformity of root size and erect stem	All	4	Erect stem and conical-cylindrical size of roots	Erect stem and conical-cylindrical size of roots	TME 419	<
Processor	Processing	colour	All	1	Fresh root color	Scale (1-3);1=white, 2=cream,3=yellow	UMUCASS 48 (score =1)	>
		Product yield	All	1	Product conversion rate	Percentage	TMS14F1285P0006>=20	>=
			All	1	Peel loss	Percentage	TMS14F1285P0006<=25	<=
			All	1	Food product yield	Percentage	TMS 30572 >=4	>=

A

A cassava field

B

B: Conical cylindrical cassava roots .

C

C: Granulated Gari processed from white-flesh cassava roots

''Demand-led breeding unlocks the curiosity of early career African cassava breeders to develop varieties with farmer and consumer preferences, adaptable to climate change and with high adoption. Granulated Gari is one of the preferred cassava-based products in Nigeria"