

OBAFEMI AWOLowo UNIVERSITY, ILE-IFE

CURRICULUM VITAE

A. PERSONAL DATA

1. Name: **OPABODE** Jelili Titilola
2. Date of Birth: 29th June, 1972
3. Contact Details
 - (a) Physical Address: Department of Crop Production and Protection, Obafemi Awolowo University, Ile-Ife, Nigeria
 - (b) E-mail Addresses: jopabode@yahoo.com, jopabode@gmail.com
 - (c) Mobile Phone Number: +2348034172865; +2347081747849
4. Nationality: Nigerian
5. State of Origin: Oyo
6. Present position: Senior Lecturer

B. ACADEMIC AND PROFESSIONAL QUALIFICATION

- (a) B.Agric. (Plant Science) First Class Honours, Ife 1997
- (b) M.Phil. (Plant Science), Ife 2004
- (c) Ph.D (Plant Science), Ife 2010

Certificate Training Course Attended

- (a) NAU/EU Advanced Course on Quality and Safety of Agro-and- Biotech Products, 10 – 26th November 2010, Egerton University, Republic of Kenya

C. AWARDS/GRANTS:

- (a) Fellowships:
 - (i) Visiting Research Fellowship, IITA, Ibadan 2000
 - (ii) Nigeria Agricultural Biotechnology Project/USAID Fellowship for Plant Genetic Transformation 2005
 - (iii) Doctoral Research Fellowship, Central Biotechnology Lab, IITA, Ibadan. 2006 - 2010
- (b) Research Grants:
 - (i) N2,500,000 National Biotechnology Development Agency (NABDA), Abuja 2009
Project :Agrobacterium-mediated transformation of cassava – Principal Investigator
 - (ii) N2,500,000 OAU Research Council Grant No.11812AXP 2010
Project: Development of glyphosate tolerance cassava varieties by transgenic approaches - Co-Investigator
 - (iii) N2, 000,000 National Biotechnology Development Agency (NABDA), Abuja 2011
Project: Production of low amylose cassava varieties by transgenic approach – Principal Investigator
 - (iv) N250,000 Open Forum for Agricultural Biotechnology (OFAB)/NABDA 2016
Project: Public Awareness on Genetically Modified Organisms - Co-Investigator

- (v) \$5,000 Programme for Biosafety System (PBS) /USAID/OFAB 2017
Project: Southwest Agro-ecological Biosafety Awareness Programme- Co-Investigator
- (vi) \$7,500 Programme for Biosafety System (PBS) /USAID/OFAB 2018
Project: Southwest Agro-ecological Biosafety Awareness Programme- Co-Investigator

(d) National Awards:

- (i) National Biosafety Management Agency, Abuja/ National Biotechnology Development Agency, Abuja to participate at the National Agricultural Biotechnology and Biosafety Training, 16-19th March, 2016

D. PUBLISHED ARTICLES

- (i) Adebooye O. C., Oloyede F. M, **Opabode J. T.** and Onagoruwa O. O. (2005). Fruit characteristics and nutrient composition of landrace morphotypes of snake tomato. *Journal of Vegetable Science* 11(4): 5-16 (USA). DOI:10.1300/J484v11n04_02
- (ii) **Opabode J. T.** and Akinyemiju O. A. (2006). Nodulation, chlorophyll content and nitrogen yield of two woody legumes at Ile-Ife, Southwestern Nigeria. *Moor Journal of Agricultural Research* 7 (2): 76-84 (Nigeria). <http://dx.doi.org/10.4314/mjar.v7i1.31844>
- (iii) **Opabode J. T.** and Akinyemiju O. A. (2007). Comparative growth analysis of two woody legumes at a rainforest location in Nigeria. *Ife Journal of Agriculture* 22 (1): 20 - 31 (Nigeria).
- (iv) Amujoyegbe B. J., **Opabode J. T.** and Olayinka A. (2007). Effect of organic and inorganic fertilizer on yield and chlorophyll content of maize (*Zea mays* L.) and sorghum (*Sorghum bicolor* (L.) Moench). *African Journal of Biotechnology* 6 (16): 1869-1873 (Kenya). <http://dx.doi.org/10.5897/AJB2007.000-2278>
- (v) Akinyemiju O. A., Laogun A. E. and **Opabode J. T.** (2009). Banana and plantain production in Southwest Nigeria. *Ife Journal of Agriculture* 24: 132 - 150 (Nigeria).
- (vi) **Opabode J. T.**, Oyelakin O. O., Akinyemiju O. A. and Ingelbrecht I. L. (2011). Isolation of genomic clones encoding granule-bound starch synthase (GBSS I) in cassava (*Manihot esculenta* Crantz). *Journal of Plant Sciences* 6 (4):174-181 (USA). DOI: 10.3923/jps.2011.174.181
- (vii) **Opabode J. T.**, Akinyemiju O. A. and Ayeni O. O. (2011). Plant regeneration via somatic embryogenesis from immature leaves of *Tetrapleura tetraptera* (Schum. & Thonn.) Taub. *Archives of Biological Sciences* 63 (4):1135 -1145 (Belgrade). DOI:10.2298/ABS1104135O
- (viii) **Opabode J. T.**, Oyelakin O. O. Akinyemiju O. A. and Ingelbrecht I. L. (2012). Starch branching enzyme I from cassava (*Manihot esculenta* Crantz):genomic organization, intron identification and phylogenetic analysis. *Global Journal of Biotechnology and Biochemistry* 7: 79-85 (UAE). DOI: 10.5829/idosi.gjbb.2012.7.3.1103
- (ix) **Opabode J. T.**, Akinkunmi J. A. and Akinyemiju O. A. (2013). Influence of marker genes on physicochemical properties of starch produced by transgenic cassava (*Manihot esculenta* Crantz) plants. *Journal of Agriculture Science* 5 (1): 201-209 (Canada). doi:10.5539/jas.v5n1p201
- (x) **Opabode J. T.**, Oyelakin O. O., Akinkunmi J. A., Akinyemiju O. A. and Ingelbrecht I. L. (2013). Occurrence of two isoforms of granule-bound starch synthase II (GBSS II) gene in Cassava (*Manihot*

esculenta Crantz). *Annals of Biological Research* 4 (2): 104-115 (**China**).

- (xi) **Opabode J. T.**, Oyelakin O. O. Akinyemiju O. A. and Ingelbrecht I. L. (2013). Primary somatic embryos from axillary meristems and immature leaf lobes of selected African cassava varieties. *British Biotechnology Journal* 3(3): 263-273 (**United Kingdom**). DOI : 10.9734/BBJ/2013/3088
- (xii) **Opabode J. T.**, Oyelakin O. O., Akinyemiju O. A and Ingelbrecht I. L. (2013). Distribution, abundance and properties of restriction enzymes on genomic DNA of granule-bound starch synthase I and II from cassava (*Manihot esculenta* Crantz). *Ife Journal of Science* 15(1): 145-157 (**Nigeria**).
- (xiii) **Opabode J. T.**, Oyelakin O. O. Akinyemiju O. A. and Ingelbrecht I. L. (2013). Cloning and sequence analysis of the nucleotide-binding domain of an α -glucan, water dikinase gene from cassava (*Manihot esculenta* Crantz). *Journal of Agricultural Science* 5(12): 56-64 (**Canada**). DOI:10.5539/jas.v5n12p56
- (xiv) Oyelakin O. O., Gedil M., Kulakow P., Rabbi .I, Olufowote O., Amusa N. A., Onasanya A. **Opabode J.T.**, Adetumbi J. A., Olawale A., Onasanya R. O. and Adewale O. B. (2013). Genetic linkage map of cassava (*Manihot esculenta* Crantz) based on SSR and SNP Markers. *International Journal of Applied Research and Technology*. 2(5): 105 – 113 (**USA**). <http://www.esxpublishers.com>
- (xv) **Opabode J. T.**, Oyelakin O. O., Akinyemiju O. A. and Ingelbrecht I. L. (2014). Influence of type and age of primary somatic embryo on secondary and cyclic somatic embryogenesis of cassava (*Manihot esculenta* Crantz). *British Biotechnology Journal* 4 (3): 254-269 (**United Kingdom**). DOI : 10.9734/BBJ/2014/3624
- (xvi) **Opabode J. T.**, Akinyemiju O. A. and Lamidi T. (2014) Evaluation of gene structure predicting computational programmes using short genomic DNA sequences of starch biosynthesis enzymes from cassava (*Manihot esculenta* Crantz). *Moor Journal of Agricultural Research* 15:57 -67 (**Nigeria**).
- (xvii) **Opabode J. T.**, Akinyemiju O. A. and Lamidi T. (2014). Molecular cloning and sequence analysis of DNA-binding domain of a novel gene encoding dehydration responsive element binding (DREB) protein from cassava (*Manihot esculenta* Crantz). *Moor Journal of Agricultural Research* 15: 1-12 (**Nigeria**).
- (xviii) Oyelakin O. O., **Opabode J. T.**, Raji A. A. and Ingelbrecht I. L. (2015). A cassava vein mosaic virus promoter cassette induces high and stable gene expression in clonally propagated transgenic cassava (*Manihot esculenta* Crantz). *South African Journal of Botany* 97: 184-190 (**South Africa**). <http://dx.doi.org/10.1016/j.sajb.2014.11.011>
- (xix) Oyelakin O. O., **Opabode J. T.** and Idehen E. O. (2015). Comparative effect of two promoters on cassava somatic embryo at transient GUS assay level. *British Biotechnology Journal* 7 (2): 79-84 (**United Kingdom**).DOI : 10.9734/BBJ/2015/170
- (xx) **Opabode J. T.**, Ajibola O. V. and Akinyemiju O. A. (2015). Shoot induction from axillary bud of β -carotene enriched *Manihot esculenta* and molecular stability of regenerants. *Agricultura Tropica et Subtropica* 48(3-4): 53-58 (**Czech Republic**). DOI: 10.1515/ats-2015-0008
- (xxi) **Opabode J. T.** and Akinyemiju O. A. (2015). Tissue- and organ-specific promoters for expression of heterologous genes in transgenic cassava (*Manihot esculenta* Crantz) plants. *Gene Technology* 4: 3 (**USA**). DOI:10.4172/2329-6682.1000125

- (xxii) **Opabode J. T.**, Ajibola, O. V., Oyelakin O. O. and Akinyemiju O. A. (2015). Somatic embryogenesis and genetic uniformity of regenerated cassava plants from low-temperature preserved secondary somatic cotyledons. *Biotechnologia* 96 (3): 246 -258 (**Poland**). DOI: 10.5114/bta.2015.56574
- (xxiii) **Opabode J. T.**, Ajibola O. V., Oyelakin O.O. and Akinyemiju O. A. (2016). Somatic embryogenesis and genetic uniformity of cassava plants regenerated from secondary somatic cotyledons preserved in osmotic agents. *Plant Tissue Culture and Biotechnology* 26 (1): 47- 54 (**Bangladesh**). DOI: <http://dx.doi.org/10.3329/ptcb.v26i1.29766>
- (xxiv) **Opabode J.** and Akinyemiju O. (2016). *In vitro* propagation of *Solanecio biafrae* and determination of genetic stability of plantlets using RAPD and ISSR markers. *Journal of Horticultural Research* 24 (1): 29 -36 (**Poland**). DOI: 10.1515/johr-2016-0004
- (xxv) **Opabode J. T.** and Akinyemiju O. A. (2016). Faithful transmission and expression of transgenes via somatic embryos of transgenic cassava plants at the sixth cycle of vegetative propagation. *Biotechnologia: 97*(2): 65-77 (**Poland**). DOI: 10.5114/bta.2016.60777
- (xxvi) **Opabode J. T.**, Ajibola O. V. and Lamidi T. (2017). *In vitro* propagation of *Crassocephalum crepidioides* – an endangered African traditional leaf vegetable and molecular analysis of micropropagated plants. *International Journal of Vegetable Science* 23 (1):18-30 (USA). DOI: 10.1080/19315260.2016.1164785
- * (xxvii) **Opabode J. T.** and Akinyemiju O. A. (2017). Somatic embryogenesis and regeneration of five multipurpose cassava landraces extensively integrated in African cropping system. *Journal of Crop Improvement* 31(1): 56-71 (USA). DOI:10.1080/15427528.2016.1256846
- * (xxviii) **Opabode J. T.** (2017). Sustainable mass production, improvement, and conservation of African indigenous vegetables: The role of plant tissue culture, a review. *International Journal of Vegetable Science* 23 (5): 438-455 (USA). DOI: 10.1080/19315260.2017.1319006
- * (xxix) **Opabode J. T.** (2017). Enhanced mass regeneration of pro-vitamin A cassava (*Manihot esculenta* Crantz) varieties through multiple shoot induction from enlarged axillary buds. *Biotechnologia* 98(4) 305-314. (Poland). <http://doi.org/10.5114/bta.2017.72291>
- * (xxx) Jolayemi O. L. and **Opabode J. T.** (2018) Responses of cassava (*Manihot esculenta* Crantz) varieties to *in vitro* mannitol-induced drought stress. *Journal of Crop Improvement* 32 (4) 566-578 (USA). DOI: 10.1080/15427528.2018.1471431
- * (xxxii) Adejoju O. M. and **Opabode J. T.** (2018). *In vitro* screening of cassava (*Manihot esculenta* Crantz) varieties to drought and phosphorus stresses. *Agricultural Research and Technology: Open Access Journal* 17(4): 1 -6 (USA). DOI: 10.19080/ARTOAJ.2018.17.556031
- * (xxxiii) **Opabode J. T.** (2018). Growth analysis of genetically modified cassava (*Manihot esculenta* Crantz) plants expressing NPT II marker and GUS reporter genes. *Agricultural Research and Technology: Open Access Journal* 14(3): 1-8 (USA). DOI: 10.19080/ARTOAJ.2018.14.555921
- * (xxxiiii) **Opabode J. T.** and Raji I. B. (2018) Influence of exogenous 6-benzylaminopurine on growth, physiological parameters, proximate content and mineral element composition of pot-grown

Solanecio biafrae. *Advances in Crop Science and Technology* 6:5 (USA). DOI: 10.4172/2329-8863.1000398

- * (xxxiv) Jolayemi O. L and **Opabode J. T.** and Badara G. (2018). *In vitro* response of three contrasting cassava (*Manihot esculenta* Crantz) varieties to mannitol-induced drought stress. *Agricultura Tropica et Subtropica* 51(3): 125–131 (Czech Republic). DOI: 10.1515/ats-2018-0014

- * (xxxvi) **Opabode J. T.** and Raji I. B. (2019). Exogenously applied gibberellic acid affects shoot regeneration, growth, physiological parameters, and proximate and mineral contents of pot-grown *Solanecio biafrae*. *International Journal of Vegetable Science* 25:1, 73-86 (USA). DOI:10.1080/19315260.2018.1473543

- * (xxxvii) **Opabode J. T.** and Raji I. B. (2019). Evaluation of genomic DNA extraction methods for molecular analysis of *Solanecio biafrae*. *International Journal of Vegetable Science* 25: (2)111-123 (USA). DOI: 10.1080/19315260.2018.1482394

- * (xxxviii) Balogun, H. M. and **Opabode, J. T.** (2019). Responses of cassava (*Manihot esculenta* Crantz) cultivars to *in vitro*-induced phosphorus stress. *Journal of Crop Improvement* 33(1):53-66.(USA) DOI: 10.1080/15427528.2018.1542365

- * (xxxix) **Opabode J. T.**, Ibrahim, O. R. and Dosumu A. F. (2019). Assessment of growth, lipid peroxidation and reactive oxygen species scavenging capacity of ten elite cassava cultivars subjected to heat stress. *Agricultural Research and Technology: Open Access Journal* 21(1): 1-7 (USA). DOI: 10.19080/ARTOAJ.2019.21.556151

Published Refereed Conference Proceedings

- (xL) **Opabode J. T.** and Akinyemiju O. A. (2008). Growth performance and grain yield of a quality protein maize (*Zea mays* L.) hybrid alley-cropped with two woody legumes at Ile-Ife, Southwestern Nigeria. Pp 397-407. In: Adebooye, O. C., Taiwo K. A. and Fatufe, A. A. (Eds) *Food, health and environmental issues in developing countries: The Nigerian situation*. Proceedings of Alexander Humboldt International Conference, 3-7th August, 2008, Obafemi Awolowo, University, Ile-Ife. (Cuvillier Verlag Gottingen, Germany)

- (xLii) Akanbi L. A., Odejebi O. A., **Opabode J. T.** and Adeyemo A.A. (2009). A web-based expert system for management of pests and diseases of cassava. Pp 1-8. In: Adagunodo E. R., Adeyanju J. O. and Aderounmu G. A. (Eds). *Application of information communication technologies to teaching, research and Administration*, volume IV. Proceedings of 4th International Conference on ICT applications, 28-30th September, 2009, Obafemi Awolowo University, Ile-Ife. (Nigeria)

- (xLiii) **Opabode J. T.** and Akinyemiju O. A. (2010). Analysis of sequence homology and divergence of drought tolerant genes in plants. Pp.201-207. In: Adebooye, O. C., Taiwo, K. A. and Fatufe, A. A. (Eds). *Biotechnology development and threat of climate change in Africa: The case of Nigeria volume 1*. Proceedings of Alexander Humboldt International Conference, 6-7th September, 2009, Obafemi Awolowo University, Ile- Ife. (Cuvillier Verlag Gottingen, Germany)

- (*xLiiii) **Opabode J. T.**, Okewale, M. O., Ibrahim O. R. and Dosumu A.F. (2019). Growth, biochemical

and physiological responses of water-stressed African eggplant seedlings to exogenous salicylic acid. *Asian Journal of Biological Sciences*. DOI: 10.3923/ajbs.2019.

(*XLIV) **Opabode, J. T.** and Owojori S. (2019). Response of African eggplant (*Solanum macrocarpon* L.) to foliar application of 6-benzyl aminopurine and gibberellic acid. *Journal of Horticultural Research*.

***Published after the last promotion**

PAPERS AND WORKS IN PREPARATION:

- (a) Surface sterilization and response of *Thaumatococcus danielli* to *in vitro* propagation.
- (b) *In vitro* propagation, somatic embryogenesis and conservation of *Solanecio bialfrae*
- (c) Mitigation of water stress in cassava using exogenous Ascorbic and Salicylic acids
- (d) Molecular characterization of regulatory elements of some starch biosynthesis genes.
- (e) Physiological and molecular responses of cassava to drought and heat stresses.

CONFERENCES, SEMINARS AND WORKSHOPS ATTENDED WITH DATES:

1. Humboldt International Conference, Osun State University, Osogbo, August 3 – 7th 2015.
Papers presented: (i) Enhancing food security and health status with mass production of pro-vitamin A enriched cassava (*Manihot esculenta* Crantz) varieties through multiple shoot induction.
(ii) Towards improving cassava multiplication for attaining food security: regeneration of cassava through post-decapitation recovery and external application of benzylaminopurine on axillary buds.
2. Agricultural biotechnology and biosafety workshop, Ladi Kwali Hall, Sheraton Hotels and Towers, Abuja. 17th -18th March, 2016.
3. Delkalb hybrid maize launch by Mosanto Agricultural Nigeria Limited, Bolton White Hotels, Abuja, 17 May 2016.
4. Southwest agroecological biosafety awareness workshop, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife. 5th September, 2016
Paper Presented: GM crop development cycle
5. USAID-PBS Hands-on training in Molecular Techniques workshop, Obafemi Awolowo University, Ile-Ife. 18 - 20 September, 2017
6. Southwest Agroecological Biosafety Awareness workshop, Obafemi Awolowo University, Ile-Ife. 20 - 22 September, 2017.
7. Training workshop on Breeding Management System by Integrated Breeding Platform, Faculty of Agriculture, Obafemi Awolowo University, Ile-Ife. 29 November-1st December, 2017
8. USAID-PBS Hands-on training in Molecular Techniques workshop, Obafemi Awolowo University, Ile-Ife. 24 – 26 September, 2018. Paper presented: Molecular cloning, PCR, sequencing and genetic modifications in plants.
9. Southwest Agroecological Biosafety Awareness workshop, Obafemi Awolowo University, Ile-Ife. 26 - 27 September, 2018.
Paper Presented: Prospect of new GM crop for addressing specific needs associated with economic recession in Nigeria.
10. Sasakawa Agricultural Fund for Extension Enterprise (SAFE) workshop on supervised enterprise project and module development, Camerons Hotels, Ile-Ife, 28th February - 1st March, 2019

- 11 First Feedback Scientific conference, ACE conference Hall, Obafemi Awolowo University, Ile-Ife. 12 -13 March, 2019.

CURRENT RESEARCH ACTIVITIES:

1. Propagation, somatic embryogenesis and conservation of *Solanecio biafrae*
2. Influence of Phosphorus nutrition on starch phosphorylation and properties
3. Molecular diversity of some starch biosynthesis genes in cassava genome using computation techniques
4. Assessment of public awareness, perception and acceptance of GM food and crops in selected African countries.
5. Mitigation of combine drought and heat stress in cassava using antioxidants agents

CONTRIBUTION TO KNOWLEDGE:

My research interest is Molecular Physiology of Crops with a strong emphasis on application of techniques in Molecular Biology and Biotechnology for understanding of crop metabolism, particularly genomics of starch biosynthesis, somatic embryogenesis and genetic engineering of crops. I have made the following contributions to knowledge in these areas:

(i) Physiology of woody legumes and alley cropping: A major limitation to adoption of alley cropping technology by farmers in southern Nigeria is wrong choice of woody legumes for inclusion in alley cropping. Our investigations have provided data to establish the superior potential of *Gliricidia sepium* as a better woody legume than *Leucaena leucocephala* in terms of growth rate, photosynthetic efficiency, biomass production, nodulation, chlorophyll content, nitrogen yield for alley cropping in a sustainable low-external input cropping system in tropical rainforest location (papers ii, iii and xL).

(ii) Isolation, molecular cloning and characterization of starch biosynthesis genes: For the first time, our works have made available the nucleotide and amino acid sequences of genes encoding four key enzymes that play major roles in cassava starch biosynthesis in the International public database, *GenBank* under these accession numbers: HM038439, HM038440, HM046981, HM046982, HM046983, HM046984, HM046985, HM046986 and HM046987. Our work on granule-bound starch synthase I and II, starch branching enzyme I and II genes (papers vi, viii, ix, xi, x and xii) described the genomic organization of the genes, revealed the locations of three introns in the gene and showed phylogenetic relationships with other plants.

(iii) Discovery of new genes in cassava: We applied bioinformatics tools and analysis on molecular data from arabidopsis and rice genomes to discover, isolate and sequenced a new gene encoding glucan water dikinase, which is responsible for phosphorylation activities in cassava (paper viii) and a gene controlling water stress tolerance from a drought-tolerant cassava variety (paper xvii).

(iv) Somatic embryogenesis, *in vitro* regeneration and genetic modification of cassava: For the first time, our investigation has produced primary and secondary embryos from axillary meristem of some cassava cultivars (papers xi, xvi). Moreover, our investigations have revealed that secondary somatic embryos could be stored temporarily for up to one year under low temperature and in osmotic agents without losing regeneration ability and molecular stability (papers xxii and xxiii). We have created a transgenic cassava plant TME 12-2010 from TME 12 as an intermediate bio-engineered plant towards the final development of genetically modified cassava plants with ability to produce modified (low-amylose) starch with a wide industrial application (papers ix, xviii, xix, xxi, xxv, xxxii). Mass propagation of vitamin A cassava was achieved (papers xx and xxix)

(v) ***In vitro* regeneration of beneficial indigenous plants:** Our investigations have led to development of *in vitro* techniques for somatic embryogenesis and regenerations in *Tetrapleura tetraptera* because of its nutritional and medicinal values (papers vii). Similarly, we developed *in vitro* propagation procedures for two indigenous vegetables: *Crassocephalum crepidioides* and *Solanecio bialfrae* (papers xxiv and xxvi). The *in vitro* procedures will facilitate mass production, germplasm exchange, conservation and genetic improvement of the indigenous vegetables.

(vi) ***In vitro* screening of cassava for water and phosphorus stress tolerance:** Rapid and *in vitro* procedures for identification of drought and phosphorus stress tolerant cassava plants were established and tested (papers xxx, xxxi, xxxiv, xxxviii)

(vii) **Enhancement of vegetable growth using growth regulators:** External application of growth regulators were used to boost vegetative growth and quality of indigenous vegetables (papers xxxiii, xxxvi and xlv)

Signature:



Date: 10th October , 2019

