FEDERAL UNIVERSITY OYE-EKITI

8th INAUGURAL LECTURE

TITLED:

THE SEEDS AND SEEDLINGS:

THE HOMES AND OCCUPANTS, THE RECIPES FOR AN AGGRESSIVE AGRO-REVOLUTION IN NIGERIA

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Seeds and Seedlings: The Homes and Occupants, the Recipes for an Aggressive Agro-Revolution in Nigeria

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Students of the Federal University Oye-Ekiti.

Preamble: It is with great pleasure and to the glory of the Almighty God who is the giver of life and all good things to stand before this august audience to deliver the Eight Inaugural lecture in the University, and the first of its kind in the Department of Plant Science and Biotechnology, and the third in the Faculty of Science.

Mr. Vice-Chancellor Sir, the University has successfully organized some inaugural lectures among which include the following great scholars: Prof (Mrs.) Cecilia Olufunke Akintayo, Prof Rasaki Ojo Bakare, Prof. Jeremiah Shola Omotola, Prof (Mrs.) Mojisola Adenike

Oyarekua, Prof. Emmanuel Gbenga Olumayede, Prof Olugenga Amu and Prof. Tajudeen Bolanle Opoola.

I am most grateful to the indefatigable and action Vice-Chancellor for allowing me to deliver this lecture today, being the highly respected academic exercise in this 21st century. You are like a biblical city placed on hill that cannot be hidden. Your landmark achievements in space of time will forever speak for you sir, even after your tenure as the Vice-Chancellor of this great University.

Mr. Vice-Chancellor Sir, permit me to state here the full meaning of an Inaugural Lecture in an academic environment like ours: "It is a lecture that provides an opportunity for a newly promoted academic to the rank of full Professor, not only to showcase research experience in his or her chosen fields, but to also update colleagues on current research trends in their academic endeavours".

Mr. Vice-Chancellor Sir, the above statement will allow me to enlighten members of this academic community on my research exploits to mark my recognition to attain the status of a full Professor of Botany with a bias in Plant Physiology.

Mr. Vice-Chancellor Sir, the title of my Inaugural lecture today is **"SEEDS AND SEEDLINGS: THE HOMES AND OCCUPANTS, THE RECIPES FOR AN AGGRESSIVE AGRO-REVOLUTION IN NIGERIA.**

1.0 INTRODUCTION

Within the context of my analysis in this Inaugural Lecture, the home is the seed, that invariably contains the embryo, which is regarded as the occupant, that naturally transform into a miniature seedling.

A **recipe** is a set of conditions and parameters of an industrial process to obtain a given result. **Agro-Revolution** is the sudden or vast change in the pattern of practicing agriculture or a periodic agricultural change that occurs in a season over the year in a country. Throughout my academic sojourn in the field of Botany with a specialization in Plant physiology, I have been working on the Savanna and Forest tree seeds and seedling as a recipe for an aggressive agro-revolution in Nigeria. The audience here will agree with me that the mono-economy in Nigeria is solely around petroleum and this has been bastardised due to corruption and non-diversification to other sectors such as Agriculture; to achieve this, we need good seeds and seedlings for an aggressive agro-revolution in Nigeria.

1.1 What is a Seed?

From the biblical perspective, the word 'seed' is associated with creating new life within a family. The seed of Abraham refers to all his descendants; hence the act of sowing a seed has a biblical meaning.

In the botanical sense, the seed is a matured ovule. A seed is an embryonic plant enclosed in a protective outer covering. Seed formation is part of the reproduction process in seed plants, and spermatophytes, including the gymnosperm and angiosperm plants.

Seeds are the product of the ripened ovule, after fertilization by pollen and some growth within the mother plant. The embryo develops from the zygote and the seed coat from the integuments of the ovule.

Seeds have been an important development in the reproduction and success of gymnosperm and angiosperm plants, relative to more primitive plants such as ferns, mosses, and liverworts, which do not have seeds and use water-dependent means to propagate themselves. Seed plants now dominate biological niches on land, from forests to grasslands both in hot and cold climates. A seed (home) is made up of a seed coat and an embryo (Occupant). The embryonic axis may contain one or two cotyledons. A seed is mostly found in fruit.

The seed is primarily of two types: Monocotyledonous and Dicotyledonous seeds. The seed has the following parts: Seed coat, hilum, micropyle, embryo, cotyledons, radicle, plumule, and endosperm.

Seeds formed during the life cycle of plants play an important role in which genetic information is successively passed down through the generations.

Plate 1: Emerging seedlings from seed's embryo (Ajiboye, 2009).

1.2 Viable seed

Viable seed is when the embryo of a seed is in a stable condition that will yield desired seedling result. If the embryo of a seed is not in a good state, there is a possibility that the seed will not yield the desired result of germination. A Seed with a high percentage of viability will give a very high productive result on germination, provided all conditions necessary for germination are present. These include: warmth, temperature, air, water, sunlight and enzymes required for germination.

1.2.1 Seed germination

Germination incorporates the events that commence with the uptake of water by quiescent dry seed and terminate with the elongation of the embryonic axis.

Germination of seed is initiated by a process that involves the commencement of the uptake of water and mobilization of food reserves such as lipids fats, carbohydrates etc, embedded in the embryo (occupant). The visible sign that germination is complete is usually the penetration of the structures surrounding the embryo by the radicle, and the result is often called visible germination.

Significantly, cellular and metabolic events that are known to occur before the completion of germination of non-dormant seeds also imbibe dormant seeds. Indeed, the metabolic activities of the latter are frequently subtly different from those of the former.

Plate 2: Seed Germination (Ajiboye, 2009)

1.2.2 Ovule

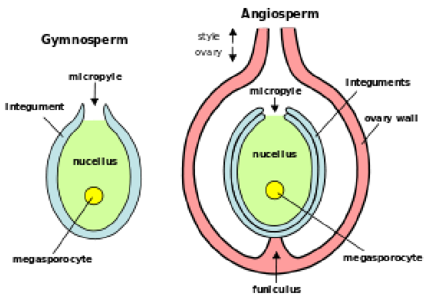


Fig 1: Plant ovules: a) Gymnosperm ovule on left, b) Angiosperm ovule (inside ovary) on right.

After fertilization, the ovules develop into seeds. The *ovule* consists of several components:

The funicle (*funiculus, funiculi*) or seed stalk which attaches the ovule to the *placenta* and hence *ovary* or fruit wall, at the pericarp.

i) The nucellus, the remnant of the *megasporangium* and the main region of the ovule where the megagametophyte develops.
ii) The micropyle, a small pore or opening in the apex of the integument of the ovule where the pollen tube usually enters during the process of fertilization.
iii) The *chalaza*, the base of the ovule opposite the micropyle, where integument and nucellus are joined together.

The shape of the ovules as they develop often affects the final shape of the seeds. Plants generally produce ovules of four shapes: the most common shape is called anatropous, with a curved shape. Orthotropous ovules are straight with all the parts of the ovule lined up in a long row producing an uncurved seed. Campylotropous ovules have a curved megagametophyte often giving the seed a tight "C" shape. The last ovule shape is called amphitropous, where the ovule is partly inverted and turned back 90 degrees on its stalk (the funicle or funiculus).

In the majority of flowering plants, the zygote's first division is transversely oriented regarding the long axis, and this establishes the polarity of the embryo. The upper or chalazal pole becomes the main area of growth of the embryo, while the lower or micropylar pole produces the stalk-like suspensor that attaches to the micropyle. The suspensor absorbs and manufactures nutrients from the endosperm that are used during the embryo's growth.

1.2.3 Seed Dormancy

The failure of an intact viable seed to complete germination under favourable conditions is termed seed dormancy. The seeds of some forest and savanna trees seeds are prevented from complete germination because the embryo is contained by its surrounding structures called the seed coats, this is otherwise known as enhanced seed dormancy. However, the embryo isolated from these seeds is not dormant.

A very similar category of such is found in which the embryo itself is **dorman**t, that is termed **embryo-enhanced dormancy**. However, the study of seed germination may be a very difficult task because the population of seeds does not complete the process.

Synchronous release from dormancy can have more erratic attributes because the threshold stimulus required to promote germination which varies widely among individual seeds. However, in the spirit of research collaboration, a bio-time concept may be introduced to incorporate a mathematical model to characterize and predict seed germination behaviour concerning dormancy and the factors that predict it.

1.2.4 Physiology of Seed Germination

Uptake of water by mature dry seed triphasic with rapid initial uptake (phase 1) followed by a plateau phase (II). A further increase in water uptake occurs only after germination is completed as the embryonic axis elongates as a dormant seed does not complete germination, and therefore cannot enter the third phase.

The influx of water into the cells of dry seeds during this phase results in temporal structural perturbations, particularly to membranes which lead to immediate and rapid leakage of solute and low molecular weight metabolites into the surrounding imbibition solution.

Table 1: The germinative and post germinative processes in seeds

Germination Phase I	Phase II	Post Germinative Phase III
Uptake Water		Store Reserves Mobilized
Respiration and Protein		Radicle Cells elongate cell to divide and DNA synthesized
Commence DNA Required		Protein synthesized using new mRNAs
Protein Synthesized using extant mRNAs mitochondrial repaired		
Solutes leak		Mitochondria Synthesized

Time course of a major event associated with germination and subsequent post-germinative growth (Bewley 1997).

1.2.5 Protein Synthesis in Germinating Seed

All components necessary for the resumption of protein synthesis upon imbibition as present within the cells of mature embryos, although polysomes are absent. However, within minutes of the rehydration, there is a decline in the number of single ribosomes as they become recruited into polynomial protein-synthesized complexes. Initial protein synthesis is dependent on extant ribosomes but newly synthesized ribosomes are produced and used within hours of initial polysomes assembly.

1.2.6 Seedlings

A seedling is a young sporophyte developing out of a plant embryo from a seed. Seedling development starts with the germination of the seeds.

The seedling growth covers the period in the life cycle of green plants, from the emergence of the radicle through the seed coat until the appearance of enough green leaves to make the plant independent of stored energy. The major activity of seedling growth is the establishment of root and shoot.

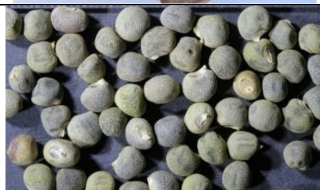
Plate 3: Plant Seedling (Ajiboye, 2010)

Vice-chancellor Sir, I crave your indulgence to highlight some of the tree seeds species that I have mostly used for my research work for almost two decades of my academic exploits in the field of Botany (Plant physiology), which earned me a status of a full professor of Botany in plant physiology in the year 2020. The seeds included but were not limited to: 1) *Tamarindus indica (L), (Fabaceae), 2) Parkia biglobossa, (Jacq), (Fabaceae) 3) Prosopis aficana (Guill* Perr *& Rich.) (Taub) (Mimosaceae) (Ukpehi), 4) Dialium guineense (Wild.), (Awin seed or (black velvet Tamarind) (Leguminosae), 5) Cassia siamea (Lamk) C. (Leguminosae) ,6) Caesalpinia bonduc (L) Roxb (ayo seed) (Fabaceae)., 7) Harungana madagascariensis Lam ex* Poir. (*Hypericaceae*), *8) Tithonia diversifolia (Hemsl) A. Gray, (Astereaceae) (Mexican sunflower), 9) Tectona grandis Lf. (teak* wood*) (Limiaceae), 10) Gmelina arborea Roxb. ex Sm. (Verbenaceae), 11) Irvingea gabonensis Aubrey- lecomte ex O.Rorke) Baill. (Irvigiaceae) (bush mango) (Apon or Ogbono), 12) Triplochiton scleroxylon K. Shum., (Malvaceae) (Arere, obeche or owawa), 13) Milicia excelsa (Welw.) C. Berg. (*I*roko in yoruba or Loko in hausa or Oje in igbo) (Moraceae) Albizia lebbeck (L.) Benth (Fabaceae), Abelmoscus esculentus L (Moench) (Okra) (Malvaceae)*, 14) *Solanum lycopersicun. (L.) (Solanaceae) (Tomato). 15) Vigna subterranean L.Verdc, (Bambara groundnut), (Fabaceae).*

Table 2: SOME FOREST AND SAVANNA SEEDS

S/N	SEED	FAMILY NAME	LOCAL NAME	PLATES OF THE SEEDS
1	*Tamarindus indica*	Fabaceae	Ajagbon	
2	*Parkia biglobossa*	Fabaceae	Iru	
3	*Prosopis Africana*	Mimosa-ceae	Ayan	
4	*Dialium guineense*	Legumi-nosae	Awin seed	
5	*Cassia siamea*	Legumi-nosae	Kasia	
6	*Harungana madasgascariensis*	Hyperi-caceae	Amuje	

7	*Tithonia diversifolia*	Asterea-ceae	Mexican sun-flower	
8	*Tectona grandis*	Limiaceae	Teak wood	
9	*Gmelina arborea*	Verbe-naceae	Melina (Hausa)	
10	*Irvingea gabonensis*	Irvigiaceae	Apon/Ogb ono	
11	*Triplochiton scleroxylon*	Malcaceae	Arere/owa wa	
12	*Nuclea diderichii*	Rubiaceae	Opepe	

13	*Milicia excelsa*	Moraceae	Iroko/ loko/Oje	
14	*Albizia lebbeck*	Fabaceae	Ayinreta	
15	*Abelmoscus esculentus*	Malva-ceae	Ila	
16	*Solanum Lycoper-sicon*	Solana-ceae	Tomati	
17	*Vigna sub-terranean*	Fabaceae	Epa-Roro	

18	*Ficus exasperate*	Moraceae	Epin	
19	*Cesalpinia bonduc*	Fabaceae	Ayo	
20	*Chrysophylium albidum*	Sapota-ceae	Agbalumo	

However, for this lecture, let me dwell on these few ones stated as follows: *Parkia biglobossa* (Jacq), *Prosopis Africana* (Guill, Perr & Taub), *Dialium* guineense, *Albezia lebbeck* (Linn) Beth, Cassia sienna, *Tamarindus* indica (L).

1.3 The Economic Significance of These Tree Seed Species:

a) *Parkia bigblobossa is commonly known as Locust bean, The Parkia tree is used for forest conservation and wind breakers, it serves as bee forage and shelter belt. It fixes atmospheric nitrogen in the soil, thereby increasing soil fertility. The seeds are used as a flavouring and nutritious additive to soup and stews. The tree plays a vital role in savanna nutrient recycling by preventing soil erosion. The trees serve* as windbreaks (Ajiboye, 2009).

b) *Prosopis africana is commonly called Ayan in Yoruba and Kariya in Hausa (RSCU,1915). The wood of this plant is naturally resistant to termites. The seeds can be fermented and used as seasoning like P. biglobossa seeds. Pounded fruits can be used for fish poisoning (Ajiboye, 2006).*

c) *Dialium guineense* (wild) *(it is called awin in the local Yoruba dialect), pulp is rich in vitamin C, and the leaves are used as fodder in feeding livestock. The wood is hard and good for making firewood and charcoal (Ajiboye, 2010).*

d) *Albezia lebbeck (L) Benth: It is a fast-growing nitrogen-fixing heavy shade tree, recommended for reforestation and firewood plantation in the savanna. It is a deciduous tree that is up to 30m tall, with a dense shade-producing crown. This plant belongs to the family Leguminosae and the class Magnohopsida. The name Albezia means women's tongue. The tree is used for feeding the livestock. The leaves serve as insecticides as it repels mosquitoes. The tree yields a reddish-brown gum. The bark is used for fish poisoning.*

e) *Tamarindus indica (L) is associated with various socio-economic benefits, especially in the savanna region. These benefits have made it known as multipurpose tree species (MPTS). It has been exported to some countries, though it is consumed locally in Nigeria, adding flavour to the local drink called "Kunnu" in most parts of* Northern *and Southern Nigeria (Ajiboye, 2010). The wood is used for furniture, firewood and for generating charcoal. The deep root serves as wind break, the wood is also used in making wheels, axles, plough planking for boats, mallets, knife handles, pestles and mortars. The twigs are used as chewing sticks as it contains some anti-bacteria properties (Ajiboye, 2009).*

The barks and leaves, fruits, seeds and roots of the trees are used as pharmaceutical raw materials, food and fodder for livestock. They are useful as cover crops to protect the soil against erosion, excessive evapotranspiration and direct solar radiation. The plants serve as an energy fuel source, including their biomass which helps in soil nutritional advancement and the recycling process. Despite all the aforementioned socio-economic values of these plants, there is no proper research to improve the propagative methods of the seeds to make them available for afforestation and to make available the products of the plants for both local and international demands. Therefore, some of my research works focus on improving the germinability methods of the seedlings at various treatments that induce germination and terminate dormancy within the shortest period. This will in turn promote the propagative culture of these seeds which may assist in the establishment of seedlings for afforestation programs to combat the challenges of global warming (Ajiboye, 2010).

Mr Vice-Chancellor Sir, the following were some of the researches conducted in the wilderness of plant physiology and other plant science-based research concerned with seed germination and seedling establishment in Nigeria:

1) Agboola and Ajiboye (2004), investigated the use of some presowing treatments in the germination of *Albezia lebbeck* (Linn) *Benth* and *Senna siamea* (Lam), two savanna tree legumes which are valuable to the economy of Nigeria. The seeds of the two legumes are found to exhibit physical dormancy due to the hardness of their seed coats. Dormancy in the seeds was terminated by presowing the seeds in concentrated sulphuric acid for 10 and 15 minutes, wet heat at 100^{o}C for 30 and 60 seconds, and dry heat at 80-100^{o}C for 5 to 10 minutes respectively. The total carbohydrate and ethanol soluble sugars were well mobilized.

   Mr. Vice-chancellor Sir, may it interest you and the audience to know that this was my first research paper and publication that was published in the *Journal of Tropical forestry* in the year 2004. This paper has been globally and highly referenced in academic research on forestry tree seed germination.

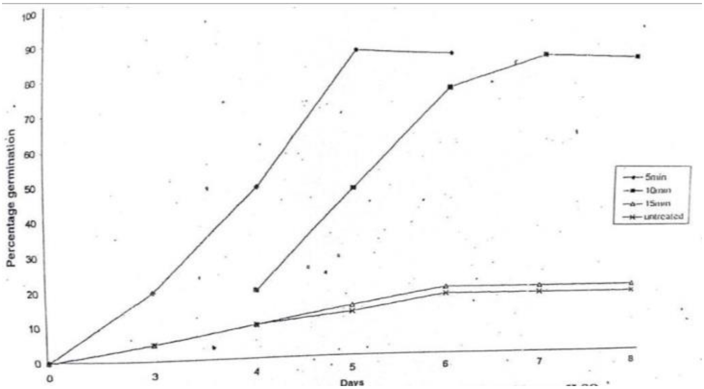


Fig 1: Percentage germination of seeds of *Senna siamea* treated with Sulphuric acid (H_2SO_4)

Table 3: Viability and percentage germination of seed of two savanna tree species before and after planting

Percentage Germination (%)				Percentage Viability (%)	
Tree seed Species	Moisture Content	Untreated	Pre-treated	Untreated	Pretreated
A. lebbeck	9.6 ±2.0	1.5±0.79	100	100	100
S. *siamea*	8.64 ± 5.2	2.5 ±5.2	90 ± 0.82	90 ±5.2	90±0.46

Data are means of 5 replicates.

2) Ajiboye, *et al*, (2005), investigated the dormancy and proximate analysis of *Prosopis africana* (guill &per) Taub and *Dialium guineense* (wild). This is to improve the percentage of germination in the seeds of these species. The hardness of seed coats, seed sizes, and seed dormancy are some of the problems encountered in many tree species, most especially the legumes of savanna which affect the germination of seeds and growth seedlings. The effects of these attributes on seedling procurements and nursery practices have been the major focus in forestry and agroforestry practices. The

tree species is not cultivated, underutilized, neglected and threatened by extinction (Ajiboye, *et al*., 2005). The use of emery cloth treatment gave the best result. The proximate analysis of the seeds was estimated; the total carbohydrate values were 54.19 and 51.88 respectively.

Table 4: Proximate analysis of seeds of *P. africana* and *D. guineense*

Species	MC (%)	DM (%)	Fe (%)	CP (%)	CF (%)	AC (%)	TCHO (%)
P. afticana	8.64	9.36	4.57	78.00	2.43	2.19	54.15
D. guineense	12.62	87.38	8.85	21.61	2.33	4.71	51.88

MC = moisture, D.M = Dry matter, FC = fat content, CP = Crude protein, CF = Crude fibre, AC =Ash content, TCHO = Total Carbohydrate content.

3) Mr. Vice-Chancellor Sir, in my quest to further look for ways of tackling challenges that may come the way of farmers or foresters in handling seeds and enhancing the seedling growth of forest and savanna seeds in the country and to promote an aggressive agro-revolution in Nigeria, we resolved to experiment on the effect of ectomycorrhiza inoculation on seed germination and seedling growth of two multipurpose savanna tree legumes (Ajiboye *et al*., 2006). The experiment on mycorrhiza dependency was also investigated on the biomass of the seedlings of the two multipurpose and economically valuable tree seeds in Nigeria. The ectomycorrhiza enhanced seedling growth for both tree species. The petiole length was greatly enhanced as well as the stem girth and leaf area were significantly increased ($P < 0.05$) in *D. guineense*. It did less enhance the petiole length of *Prosopis africana* seedlings.

The relative mycorrhizal dependency (RFMD) was higher in *P. africana* and was very low in seedlings of *D. guineense*. Where: RMFD = dry weight of inoculated plants over the dry weight of non-inoculated plant divided by non-inoculated plant x 100.

Table 5: Effect of ectomycorrhiza on the growth of *D. guineense* seedlings

Soil Treatment	Plant Height (cm)	Stem Girth (cm)	Stalk Length (cm)	Leaf Number	Leaf Area (cm^2)
M^+SSWM	6.74 ± 1.01	0.12 ± 0.41	3.63 ± 2.19	4.50 ± 0.55	7.64 ± 2.25
M^+SSWS	7.91 ± 4.36	0.13 ± 0.05	6.33 ± 0.51	1.46 ± 27	10.5 ± 4.40
M^+NSWS	9.68 ± 0.68	0.18 ± 0.04	3.85 ± 0.51	3.87 ± 2.36	11.03 ± 0.85
M^+NSWW	7.89 ± 1.19	0.14 ± 0.04	2.82 ± 2.24	3.21 ± 1.62	6.23 ± 2.51
M^-SSWS	8.12 ± 1.12	0.20 ± 0.00	5.83 ± 0.41	2.15 ± 0.08	11.43 ± 2.67
M^-SSWW	9.15 ± 1.32	0.14 ± 0.53	5.00 ± 1.00	1.62 ± 0.69	8.51 ± 3.73
M^-NSWW	6.73 ± 1.41	0.15 ± 0.51	3.09 ± 2.66	3.14 ± 1.56	7.42 ± 3.19
M^-NSWS	8.33 ± 0.28	0.20 ± 0.00	6.50 ± 0.55	1.60 ± 0.42	9.12 ± 2.18

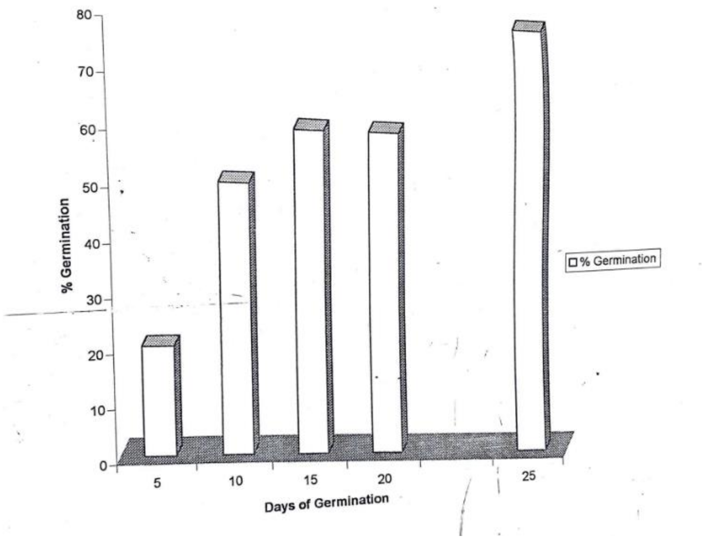


Fig 2: Effect of Emery Cloth Scarification on Germination of *D. guineense* Seeds

4) Ajiboye and Agboola, (2011) carried out investigations on the effect of Coconut milk extract and *Bryophylium pinatum* on the germination of some tree seed species in Nigeria.

A study on the effect of coconut milk and *Bryophyllum pinnatum* milk extracts on four tree seed species namely: *Tamarindus indica*, *Albizia lebbeck*, *Parkia biglobossa* and *Prosopis africana* were investigated. The viability test of the seeds was equally carried out using HACH viability test meter. About 80-100% range of percentage germination was recorded for the seeds. The research revealed how the seeds were favourably disposed to the use of botanicals to enhance their germination by showing a percentage range of 80-100% germination. It was however recorded that the seeds treated as control showed a minimal level (10-20%) of percentage germination under the same experimental conditions. This method of raising seedlings from dormant seeds using botanicals may give raise to raising seedlings to promote afforestation, and also as one of the tools that could be used to combat challenges of global warming. This method could also serve as a replacement for using some corrosive and expensive chemicals such as hydrogen tetraoxosulphate (VI) acid (H_2S0_4) for terminating dormancy in seeds with matured embryos.

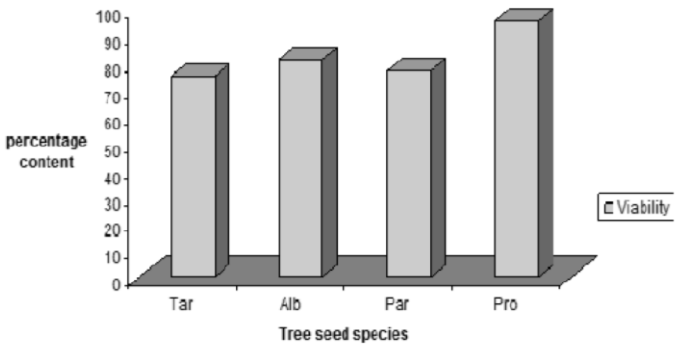


Figure 3: Percentage viability of the seeds

Table 6: Effect of *Bryophyllum pinnatum* extract on the germination of the tree seed species treatment regimes

Species	5min (%)	10min (%)	15min (%)	Control (%)
Tamarindus	60[a]	80[b]	100[a]	10[d]
Albizia	80[b]	100[a]	100[a]	10[e]
Parkia	60[c]	100[a]	100[a]	20[d]
Prosopis	60[c]	80[c]	90[b]	10[d]
LSD	1.22	1.24	1.62	1.00
SEM	0.82	0.61	0.30	0.63

Table 7. showed the effect of coconut milk extract on the germination of the tree seed species treatment regimes

Species	5min (%)	10min (%)	15min (%)	Control (%)
Tamarindus	100[b]	80[c]	100[a]	10[d]
Albizia	80[c]	100[b]	80[b]	10[e]
Parkia	60[c]	100[b]	100[b]	20[d]
Prosopis	100[a]	80[a]	60[c]	10[e]
LSD	1.24	1.44	1.52	1.11
SEM	0.72	0.65	0.60	0.53

5) Ajiboye (2014) screened 14 bacterial isolates using agar well diffusion method at a concentration of 25 mg/ml with streptomycin as control.
   To assess the antibacterial activities of methanolic and aqueous leaf extracts (MLE and ALE) as well as that of methanolic berry extract (MBE) of *Lantana camara* Linn, we screened each for antibacterial effects against 14 bacterial isolates using agar-well diffusion method at a concentration of 25 mg/ml with streptomycin as control antibacterial. Data obtained were analysed with ANOVA and t-test using SPSS 15.0 for Windows. The MLE is

comparable to streptomycin in antibacterial activity as they both showed antibacterial activity against 13 (92.86%) bacterial isolates with inhibition zone diameter (IZD) of 12 mm-20 mm.

The ALE and MBE however, showed inhibitory activities against 3 (21.43%, IZD 10 mm- 11 mm) and 7 (42.86%, IZD 11 mm-17 mm) bacterial isolates respectively. Flavonoids, saponin and alkaloids were present in the three extracts while phlobatannin, cardiac glycoside and steroids were absent. Terpenoids and tannin were only present in the MBE and MLE respectively. Sodium, potassium, calcium, magnesium and zinc were observed in the leaf and berry of *Lantana camara*. Iron, copper and manganese were present in trace amounts with lead (Pb) absent. Though the three extracts showed antibacterial effects against the isolates, the MLE was the most effective. The phytochemical analysis revealed that *Lantana camara* has compounds with antibacterial activities and can be used as an alternative therapy to infections caused by the sensitive studied bacteria. The results are as follows:

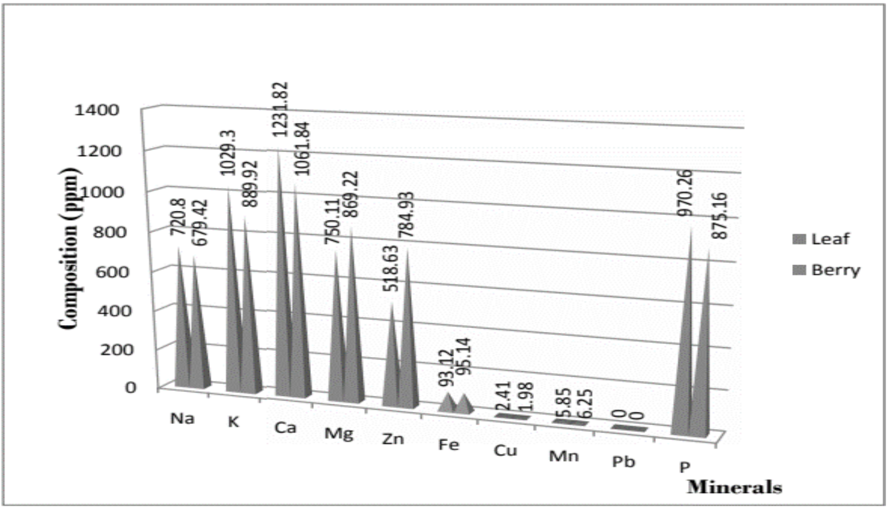


Figure 4: Mineral content of *Lantana camara Linn* leaf and berry

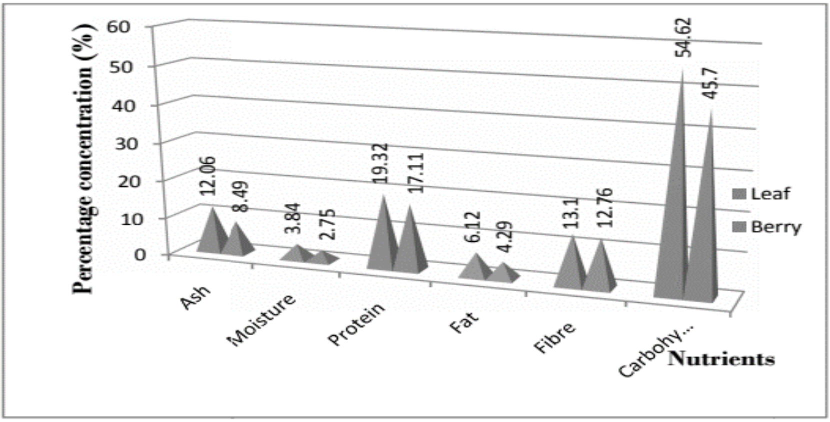


Figure 5: Proximate nutrient analysis of *Lantana camara Linn* leaf and berry

This study showed that the extracts of *L. camara* also possess broad spectrum antibacterial activities. The mineral and proximate analyses also revealed that *L. camara* leaf and berry are of important nutritional value. Pharmacology and toxicology of the *L. camara* should be further studied to determine how it can be utilized to treat bacterial infections.

6) *Ajiboye et al.* (2010) worked on several vegetable species that abound in Nigeria and mostly West African countries where they are used partly as condiments or spices in human diets or as supplementary feeds to livestock. There were ten samples of vegetables used in the study and were analysed for a major source of ascorbic -acid and the mean values ranged from 170 – 425 mg/100 g, *Celosia argentea* "Soko" (425 mg/100 g) and *Amaranthus hydridus* "tete" (408 mg/100 g) both having the highest ascorbic acid while *Corchorous olitorius* "ewedu" (170 mg/100g) had the least ascorbic acid. *Amaranthus hydridus* and *Talinum triangulare* had the highest mineral contents. Carbohydrate contents ranged from 3.9 – 48.2 g/100g, *Ocimum gratissium* "efirin" having 3.9 g/100 g while *Vernonia -amygdalina*

"ewuro" had 48.2 g/100 g. Protein content ranged from 5 –28.2 g/100 g. *Talinum triangulare* "gbure" had the lowest while *Corchorous olitorius* had the highest protein content. Fibre content ranged from 1.0 – 11.5 g/100 g *Vernonia amygdalina* had the lowest fibre content, while *Senecio biafrae* had the highest. The analysis of the samples also showed the presence of flavonoids, alkaloids, saponins, insulins and tannins. This indicates that the vegetables studied contain an appreciable number of bioactive compounds. This research analysed the phytochemical and nutritional values of these vegetables with a view to ascertaining their nutritional composition for an appropriate recommendation.

Table 8: Nutritional values of some of Vegetable samples

Nutritional value of some Vegetable samples (g/100g DM)					
Samples	Ascorbic acid	Carbohydrate	Protein	Moisture	Fiber
Ocimum gratissimum	189[a]	3.9[a]	5.4[c]	32.2[a]	11.5[c]
Corchorous olitorus	170[c]	27.1[c]	28.2[b]	27.5[b]	9.2[a]
Vernonia amygdalina	348[b]	48.2[c]	14.9[c]	21.9[b]	1.0[b]
Solanum macrocarpon	340[a]	6.4[a]	4.6[a]	85.6[a]	1.6[b]
Senecio biafrae	203[c]	30[b]	12.3[b]	28[a]	11.8[a]
Celosia argentea	425[b]	4.0[c]	6.2[a]	84[a]	1.1[c]
Amaranthus hybrids	408[a]	7.0[b]	4.6[b]	86[b]	1.8[c]
Talinum triangulare	284[c]	4.8[a]	5.0[c]	93[a]	1.4[a]
Hisbiscus esculenta	221[a]	10.6[c]	5.2[a]	26.5[a]	2.9[c]
Telfaria occidentalis	345[a]	6.9[a]	4.7[b]	92[a]	2.7[a]

Table 9: Mineral contents of some of Vegetable samples

Mineral contents of the samples (mg/100g)					
Samples	**Ca**	**K**	**Mg**	**Na**	**Fe**
Ocimum gratissimum	1.23^{a}	2.35^{b}	0.4^{a}	0.76^{c}	0.04^{a}
Corchorous olitorus	1.27^{c}	3.84^{c}	0.60^{a}	0.34^{b}	0.05^{b}
Vernonia amygdalina	2.26^{d}	3.76^{a}	0.46^{c}	0.04^{c}	0.03^{a}
Solanum macrocarpon	2.43^{b}	5.67^{a}	1.93^{a}	4.56^{a}	0.07^{c}
Senecio biafrae	2.47^{c}	3.74^{c}	1.32^{b}	4.85^{b}	0.05^{b}
Celosia argentea	2.67^{a}	3.94^{b}	1.42^{b}	5.23^{c}	0.06^{c}
Amaranthus hybrids	2.06^{a}	4.83^{c}	2.54^{c}	6.85^{a}	0.13^{c}
Talinum triangulare	2.45^{c}	6.11^{b}	2.23^{b}	0.29^{b}	0.44^{a}
Hisbiscus esculenta	2.48^{b}	4.75^{a}	1.83^{a}	0.35^{a}	0.07^{c}
Telfaria occidentalis	1.74a	2.46^{c}	0.66^{c}	1.18^{b}	0.04^{c}

Table 10: Phytochemical Screening of some of the vegetable samples

Samples	Alkaloid	Flavonoid	Saponin	Tannin	Inulin
Ocimum gratissimum	+	+	+	+	+
Corchorous olitorius	+	+	+	+	+
Vernonia amygdalina	+	+	+	-	+
Solanum macrocarpon	+	+	+	+	-
Senecio biafrae	+	+	+	+	-
Celosia argentea	+	+	-	+	+
Amaranthus hybrides	+	+	+	+	+

Talinum triangulare	+	+	+	+	-
Hisbiscus esculenta	+	+	+	+	-
Telfaria occidentalis	+	+	-	+	-

+) = positive; (-) = negative

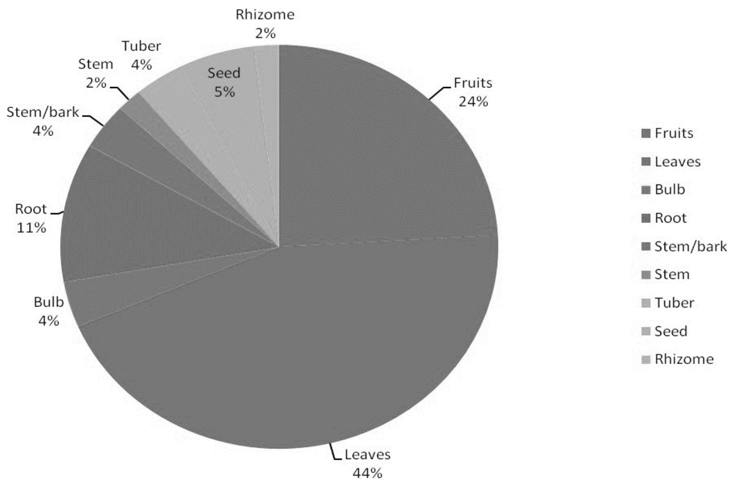


Figure 6: Percentage occurrence of plant parts used for Diabetes treatment

7) Mustafa and Ajiboye (2014) observed that leaves formed the most frequently used part for diabetes (44%), followed by fruits (24%), root (11%), seeds (5%), bulbs, tubers, stem barks (4%) and rhizomes (2%). Plant leaves are important ingredient in the traditional treatment of various diseases as they occurred as components in many herbal preparations.

The families with the highest occurrence of species include Leguminosae with 4 species, followed by *Euphorbiaceae*, *Apocynaceae*, *Curcubitaceae* and *Poaceae* (3 each), which is indicative of their importance in the treatment of diabetes. However, Agavaceae, *Araceae*, *Amaryllidaceae*, *Bromeliaceae*, *Bignoniaceae*, *Solanaceae*, *Tiliaceae*, and *Piperaceae*, among others had the least number of specie. These call for urgent attention to these families before they go into extinction.

Some of the recipes were prepared from a single plant source, for example, *Corchorous olitorius, Euphorbia hirta, and Rauvolfia vomitoria,* while some others are in combinations with other common plants. The method of preparation varies while decoction and grinding are the most frequently used methods.

The practice of traditional medicine has been with us from time immemorial and it is upon it that the rural population depends. The study had shown that some forest plants could be used for the treatment of diabetes in the Irepodun Local Government Area of Osun State.

8) Ajiboye *et al.* (2009) investigated pre-germination treatment and determination of the percentage starch content levels of four savanna tree species in Nigeria, *Tamarindus indica* (L), *Parkia biglobossa* (Jacq.) R. Br. Don, *Albizia lebbeck* (Benth) and *Prosopis africana* (Guill & Perr) were conducted.

Percentage germination of acid alcohol treatments was 100% in *Albizia*, and 80-90% under the 10-15mins times of scarification. The percentage germination of the plier treatments was 70% in *Tamarindus* seeds. About 100% germination was obtained for *Tamarindus* seeds while 60% and 20% were observed for *Albizia* and *Prosopis* respectively. The five week of cold storage treatments at 4^{o}C gave 80% germination in *Albizia* and 70% in

Tamarindus. Untreated seeds served as control. The starch content levels in fresh seeds were 27.2% in *Parkia*, 26.6% in *Prosopis*, 26.4% in *Albizia* and 26.0% in *Tamarindus*. Data were subjected to an Analysis of Variance (ANOVA) using Least significant difference test (LSD^t).

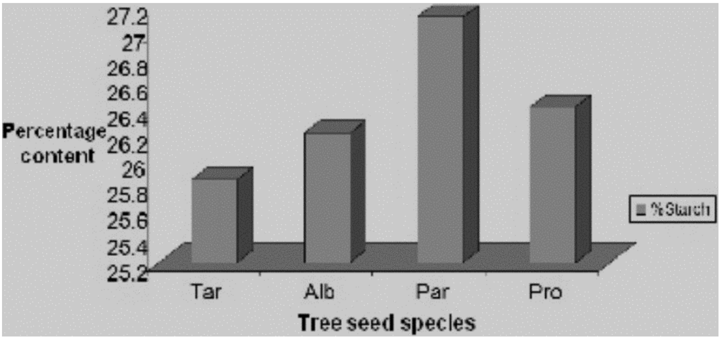


Figure 7: Determination of Starch content of the seeds

9) Ajiboye (2009) investigated the effect of some acid scarification and Arbuscular mycorrhiza (*Glonus mossae*) inoculation on seed germination and seedling growth of *Tamarindus indica* (L).

No doubt the seed of *Tamarindus indica* exhibited dormancy and had a slow rate of seedling growth. Some dormancy terminating methods were employed to release the seeds from its dormant nature,

The *Arbuscular Mycorrhiza* (AM) was incorporated through crude inoculum into the soil to further enhance seedling growth. This treatment greatly increased seedling growth as evidenced by the physiological growth parameters.

1.4 Raising Seedlings in Mycorrhizal Conditioned Soils

The soil was sieved in 1x1cm wire mesh and packed into nursery bags (10 cm diameter 35 cm deep). Before planting some samples of 50 g of mycorrhizal inoculum were added to the surface (0.6 cm-1cm deep) of the soil. The seedlings were raised and watered twice a day in a greenhouse. Some physiological growth parameters were determined.

1.4.1 Multiplication of *Arbuscular mycorrhiza* (AM) (*Glomus mossae*) through crude inoculum

The multiplication was done by planting 50 seeds of maize (*Zea maize*) in 30kg of sterile soil in a greenhouse. About 30 kg of soil containing spores and hyphae of *glomus mossae* inoculated. The potted experiment was watered twice a day to sporulate for 3 months. Thereafter, watering was stopped at the point of cob formation to prevent nutrient diversion. Fertilization was prevented by removing the tarsels and allowing maximum carbon diversion to fungus. Subsequently the dried maize stands were allowed to dry up for 4-5 weeks to promote sporulation. The maize stems were cut at the soil level and other above ground portions were removed completely. The roots and shoots were removed along and chopped into pieces, mixed thoroughly such that the potential inoculum consisting of spores, hyphae and infected root fragments were thoroughly mixed together.

10) Ajiboye *et al*, (2013), determined the antibacterial activities of seed and pod extracts of *Prosopis africana* at 25mg/ml concentration against fifteen bacterial isolates namely: *Klebsiella pneumoniae*, *Bacillus anthracis*, *Bacillus subtilis*, *Bacillus stearothermophilus*, *Bacillus polymyxa*, Methilin-resistant *Staphylococcus aureus (*MRSA*), Proteus vulgaris, Cornybacterium pyogenes, Micrococcus leutus*, *Pseudomonas aeruginosa, Bacillus cereus, Staphylococcus aureus, Pseudomonas fluorescence, Streptococcus fecalis and Escherichia coli.*

    The results showed that all the isolates appeared susceptible to Ciprofloxacin (control), with the zone of inhibition ranging from 25mm-50mm. The pod extract was susceptible to *K. pneumoniae*, *B. anthracis, B. stearothermophilus, B. polymyxa, Clostridium pyogenes, Pseudomonas aeruginosa, B. cereus, Staphyloococcus aureaus, P. fluorescence, Streptoococcus fecalis, E. coli were* having zones of inhibition to be between 8mm-17mm in diameter. For the seed extract, *K. pneumoniae, B. polymyxa, E. coli, S. aureaus, S. fecalis, P. aeruginosa, B. subtilis* were susceptible with the zones of inhibition ranging between 5mm-14mm. The minimum inhibitory concentration (MIC) analysed on the seed extract showed at least 1.562% in the bacterial strains tested. The phytochemical analysis of the seed extract revealed that saponin, alkaloids, steroids, flavonoids, phlabotanin and tannin were present in the extracts of seeds and pods.

However cardiac glucosides were absent in the seed extracts. The proximate composition consists of moisture content (3.3±0.0%), total ash (4.4±0.1%), crude protein (23.6±1.5%), crude fibre (54±0.8%) and carbohydrate (1.9±0.3%). The predominant minerals found in the seed were Potassium, (K) (617.5 mg/100g sample), Magnesium (Mg) (420.1 mg/100g sample). Others were Sodium (Na), Calcium, Phosphorus, Manganese (Mn), Copper (Cu), Zinc (Zn), and iron (Fe) were 110.7, 362.5, 196.4, 36.2, 46.2, 22.4 and 15.5 mg/100 g sample respectively. This study indicates the potential efficacy of *Prosopis africana* in the treatment of various infections caused by the test organisms.

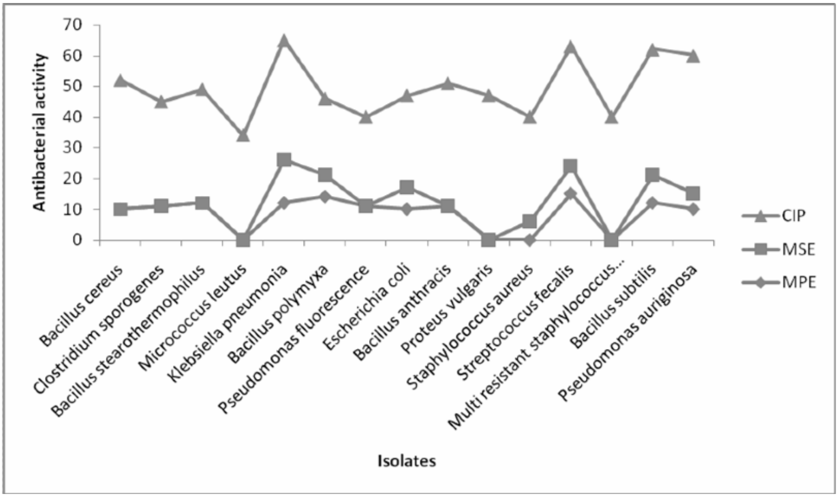


Figure 8: The antibacterial activity of methanol extract of *Prosopis Africana*

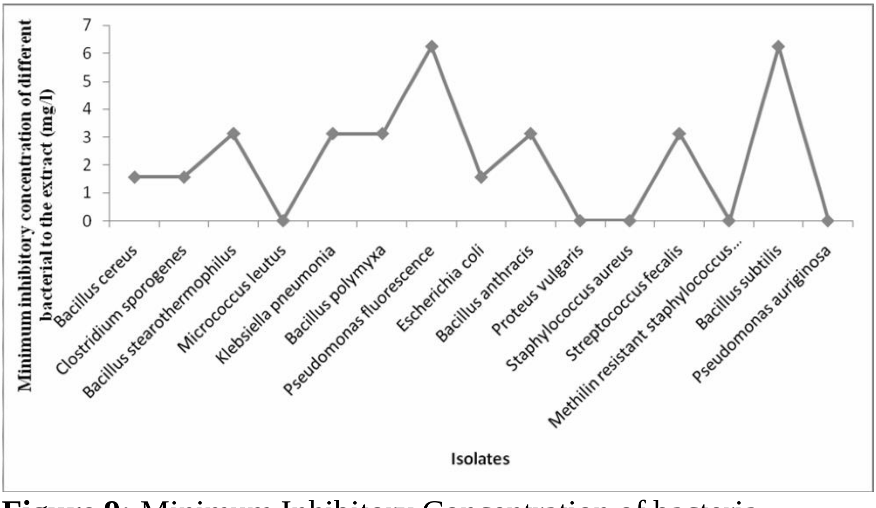


Figure 9: Minimum Inhibitory Concentration of bacteria

Table 11: Phytochemical composition of seed and pod extract of *Prosopis africana*

S/N	Tests	Seed extract	Pod extract
1	Phlobatannin	+	+
2	Flavonoid	+	–
3	Cyanoglycoside	–	+
4	Tannin	+	+
5	Saponin	+	+
6	Steroid	+	+
7	Alkaloid	+	+

Key: + = Present, - = Absent

Table 12: Proximate and Mineral Composition of *Prosopis africana* seed (mg/ml).

S/N	Mineral	Composition	Proximate composition
1	Na	110.7 ± 0.1	Carbohydrate (1.9±0.3)
2	K	617.5 ± 0.1	Crude protein (23.6±1.5)
3	Mg	420.1 ± 0.1	Moisture (3.3±0.0)
4	Ca	362.5 ±0.2	Crude fibre (54.0±0.8)
5	P	196.4 ± 0.1	Ash content (4.4± 0.1)
6	Mn	36.2 ± 0.4	
7	Cu	46.2 ± 0.7	
8	Zn	22.4 ± 0.0	
9	Fe	15.5 ± 0.4	
10	Pb	0.0±0.0	

11) Ajiboye *et al*. (2019), experimented on the assessment of Rhodanase in Cocoa (*Theobroma cacao*). Rhodanese is an enzyme active in all living organisms. The enzyme functions through a double displacement (ping pong) mechanism. The activity of rhodanese in a particular tissue reflects the ability of that tissue to detoxify cyanide.

The residual activity of the enzyme was maximum (100%) for $MnCl_2$, meaning it was not affected by it. The residual activity was 77.80%, 38.94%, 60.23% and 65.67% when treated with $SnCl_2$, NaCl, KCl and $HgCl_2$ respectively. Bradford's method determined protein concentration by using Bovine Serum Albumin (BSA) as the standard, where the protein concentration was extrapolated from the standard curve.

In determining the substrate specificity and kinetics, the kinetic parameters of the individual substrates were estimated and compared relatively with constant KCN and $Na_2S_2O_3$ concentration using the Lineweaver-Burk plot. From the plot, the Michaelis-Menten constant (Km) and the maximum reaction velocities (Vmax) were determined.

Rhodanese, a thiosulphate: cyanide sulphur transferase (EC 2.8.1.1), is an enzyme that catalyses the transfer of the sulphane sulphur from thiosulphate to cyanide, forming the less toxic thiocyanate and sulphite.

$$S_2O_3^{2-} + CN \rightarrow SCN^- + SO_3^{2-}$$

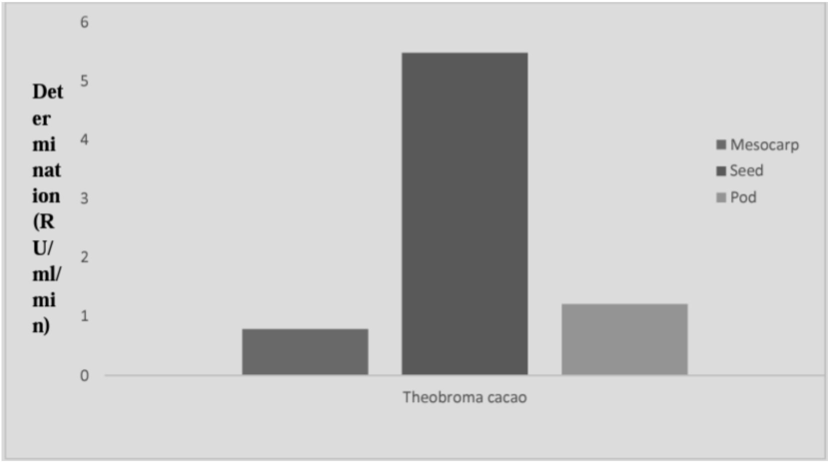


Figure 10: Rhodanese determination in *Theobroma cacao's* mesocarp seed and pod

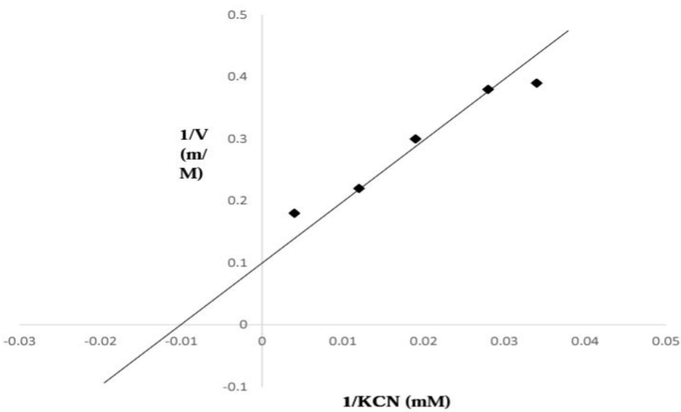


Figure 11: Determination of KCN at fixed concentration of Na_2SO_3 for Cacao's mesocarp

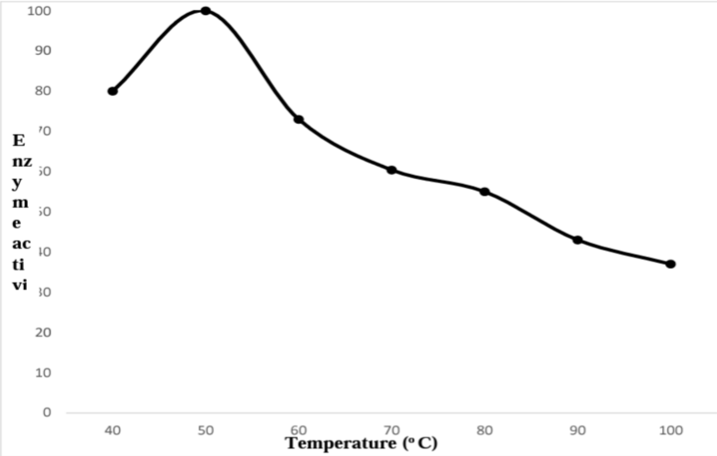


Figure 12: The optimum temperature of rhodanese from the seed of *Theobroma cacao.*

12) My areas of research also cover Ethnobotanical studies of some useful plants in Nigeria Adeogun and Ajiboye (2014), investigated the ethnobotanical survey of plants used traditionally for treating skin diseases in Abeokuta South Local Government of Ogun State, Nigeria. The administration of semi-structured questionnaire and oral interviews methods was employed. Herb sellers, Traditional Medicine Practitioners (TMPs), aged people and local farmers were the target audience. Plant specimens were collected and identified at the forestry herbarium, Federal University of Agriculture, Abeokuta. A total of 80 plant species belonging to 42 families were found to be useful in the treatment of skin diseases such as ezema, pimples, boils, rashes, measles. small pox, wounds and chicken pox. The family F*abaceae* provided the largest number of plant species, followed by *Euphorbiaceae*, *Apocynaceae*, *Compositae*, and *Moraceae*. Some plants in these families include: Rauvolfia vomitoria, *Vernolia amygdalina*, *Senna alata*, *Argemone mexicana* which were found to be very important in the recipes based on their frequency of occurrence in the herbal preparation. The main methods of preparation of these

herbal recipes were infusion. Leaves formed the major plant part used (76.3%) followed by the stem (11.3%). The survey revealed that residents of this area view herbal treatment as more effective and cheaper compared to orthodox medicine. The medicinal plants used by the people in this area form a rich source of indigenous knowledge that can play a role in therapeutic purposes.

Table 13: Common plants that were used for the treatment of skin diseases in Abeokuta Local Govt. Area, Ogun state (Adeogun *et al*, 2014)

Botanical names	Families	Local names (Yoruba)	Common names	Parts used	Habit
Amaranthis spimocus	*Amaranthaceae*	*Tete elegun*	Slender amaranth	Leaves	Herb
Mangifera indica	*Anarcardaceae*	*Mongoro*	Mango	Leaves	Tree
Spondia mombin	*Anarcardaceae*	*Iyeye*	Hog plum	Leaves	Tree
Anarcadium Occidentalis	*Anarcardaceae*	*Kasu*	Cashew	Leaves/tree back	Tree
Xylopia aethopica	*Annonaceae*	*Eeru*	Ethopian pepper seed	Fruits	Tree
Rauvofia vomitoria	*Apocynaceae*	*Asofeyeje*	Serpent wood	Leaves	Tree
Astonia boonei	*Apocynaceae*	*Ahun*	Stool wood	Bark/leaves	Tree
Thevetia neriifolia	*Apocynaceae*	*Olomi ojo*	Yellow oleander	Leaves	Shrub
Alafia barteri	*Apocynaceae*	*Agbari etu*	Guinea fowl's crest	Leaves	Tree
Cocos nucifera	*Araceae*	*Agbon*	Coconut palm	Oil/bark	Tree
Calostropis procera	*Aslepidaceae*	*Bomubomu*	Sodom apple	Leaves	Shrub
Chromolaena odorata	*Asteraceae*	*Akintola*	Siam weed	Leaves	Herb
Ageratum conyzoides	*Asteraceae*	*Imi esuu*	Goat weed	Leaves	Herb
Carica papaya	*Caricaceae*	*Ibepe*	pawpaw	Leaves/seed	Tree
Celastrus indica	*Celastraceae*	*Ponju owiwi*	Bitter sweet	Leaves	Tree

Terminalia superba	*Combretaceae*	*Afara*	White afara	Bark	Tree
Aspilia africana	*Compositae*	*Yunyun*	Wild sunflower	Leaves	Shrub
Vernolia amagdalina	*Compositae*	*Ewuro*	Bitter leaf	Leaves	Shrub
Tridax procumbens	*Compositae*	*Eekule*	tridax	Leaves	Herb
Ipomea batata	*Convolvulaceae*	*Odunkun*	potatoes	Leaves	Climbers
Bryophyllum pinnatum	*Crassulaceae*	*Eru dun*	Resurrection plant	Leaf sap	Herb
Lagenaria breviflorus	*Cucurbitaceae*	*Tagir*		Leaves/fruit	climbers
Memordica charantha	*Cucurbitaceae*	*Ejinrin wewe*	Africa cucumber	Leaves/seed	Climbers
Tertracarpidium conophorum	*Euphorbiaceae*	*Asala*	walnut	Leaves	Tree
Euphorbia hirta	*Euphorbiaceae*	*Emi ile*	Hairy surge	Leaves	Herbs
Acalypha wilkesiana	*Euphorbiaceae*	*Jinwini*	acalypha	Leaves	Shrub
Phylanthus muellerianus	*Euphorbiaceae*	*Egun eja*	phyllanthus	Leaves	Tree
Jatropha curcus	*Euphorbiaceae*	*Botuje pupa*	Wild cassava	Leaves	Shrub
Senna alata	*Fabaceae*	*Asunwon*	Craw-craw plant	Leaves	Shrub
Callianadra haematocephala	*Fabaceae*	*Tude*	calliandra	Leaves	Shrub
Daniella oliveri	*Fabaceae*	Iya	Balsam tree	Bark	Tree

Source: (www.asianpharmatech.com)'

13) Ajiboye *et al.* (2009), investigated the pre germination treatment and the determination of percentage starch content levels in seed germination of four savanna tree series in Nigeria. The savanna in Nigeria covers more than half of the country's land. This is divided into three major zones including the Guinea savanna, Sudan and Sahel savanna from the south to northern Nigeria. The savanna tree species of economic importance in Nigeria include *Terminalia glaucescence*. *Acacia albida*, *Cassia siamea*, *Afzilia africana*, *Terminalia superba*, *Dialium guineense* and *Harugana madasgariensis*.

The Percentage germination of acid alcohol treatments was 100% in A. *lebbeck* and 80-90% under 10-15min time of scarification. The percentage germination of the plier treatments was 70% in T. *indica*. About 100% germination was obtained in *Tamarindus* seeds, while 60% and 20% were observed for *A. lebbeck* and 70% in *T. indica*. Untreated seeds served as control and gave 0% germination. The starch content levels in fresh seeds were 27.2% in P. *biglobossa*,26.6% in P. *africana*.26.4% in *A. lebbeck* and 26.0% in *T. indica*. This experiment had shown that the seed contents in form of food reserves will affect the performance of seed germination and seedling growth.

14) Ajiboye and Agboola (2010) researched the phytohormones (GA_3 and Kinetin) and Biochemical composition of some selected tree species, *Parkia biglobossa* (Jacq). *Dialium quineense* (Wild) and *Prosopis africana* (Gill & Perr Taub). The tree species have multipurpose uses but are not cultivated since they are collected wild, while those that are available for the usage of mankind are recklessly felled. Therefore, there is a need for urgent rescue of the seeds to prevent them from extinction. The germination responses of the seeds were observed for 15 days. Kinetin treatment at 125ppm concentration led to a significant increase ($P<0.05$) in *Parkia biglobossa* and *D. guineense* while there was reduced germination effect in *P. africana*. There was also high significant effect on the seeds treated at 125ppm of GA_3. Untreated seeds served as control and gave 0% in all cases. The biochemical components of the seeds were determined which include nitrogen, sugar, and total lipids at the varying days of 0 (dry seed) 4, 8, and 12 days of germination. The determination of dry seeds was used as control. Experiments were in three replicates. Data were compared using the Duncan's multiple range test (DMRT).

It was observed that P. *biglobossa* seeds seemed to be more active in the mobilization of lipids and protein than D. *guineense* and P *africana*. The gradual depletion of food reserves in the germinating seeds was a result of the gradual utilization of food reserves present in the cotyledons of the germinating seeds. The food reserve may be further mobilized until the seed starts to bring out leaves and experience photosynthesis (Ajiboye 2008). However, the effect of hormones at various concentrations on the rate of depletion of food reserves during germination is a focus for future research.

Table 14: Effect of phytohormones at different concentrations on percentage germination of *Parkia biglobossa* seeds

Phytohormone	25ppm	50ppm	75ppm	100ppm	125ppm
GA_3	60.0[b]	60.0[a]	80.0[d]	40.0[d]	50.0[c]
Kinetin	70.0[a]	40.0[d]	60.0[b]	40.0[d]	100.0[a]

Table 15: Effect of phytohormones at different concentrations on percentage germination of *Dialium guineense* seeds

Phytohormone	25ppm	50ppm	75ppm	100ppm	125ppm
GA_3	70.0[a]	50.0[c]	70.0[a]	80.0[a]	80.0[a]
Kinetin	70.0[a]	60.0[b]	60.0[b]	80.0[a]	100.0[a]

Table 16: Effect of phytohormones at different concentrations on percentage germination of *Prosopis africana* seeds

Phytohormone	25ppm	50ppm	75ppm	100ppm	125ppm
GA_3	10.0[e]	30.0[d]	20.0[d]	30.0[d]	90.0[b]
Kinetin	40.0[c]	50.0[c]	10.0[e]	20.0[d]	100.0[a]

Table 17: Effect of time on nitrogen content levels in the tree seeds

Tree Species	Dry seed (0 day)	4^{th} day	8^{th} day	12^{th} day	16^{th} day
Dialium guineese	1.8mg/ml	24.0mg/ml	2.0mg/ml	2.0mg/ml	2.5mg/ml
Parkia biglobossa	3.5mg/ml	0.8mg/ml	2.9mg/ml	4.0mg/ml	3.0mg/ml
Prosopis africana	3.0mg/ml	3.3mg/ml	2.5mg/ml	3.0mg/ml	3.5mg/ml

Table 18: Effect of time on sugar content levels in the tree seeds

Tree Species	Dry seed (0 day)	4^{th} day	8^{th} day	12^{th} day	16^{th} day
Dialium guineese	2.0mg/ml	1.5mg/ml	1.3mg/ml	1.7mg/ml	0.8mg/ml
Parkia biglobossa	0.2mg/ml	0.8mg/ml	1.5mg/ml	1.7mg/ml	1.4mg/ml
Prosopis africana	1.0mg/ml	1.7mg/ml	0.8mg/ml	1.5mg/ml	1.2mg/ml

Table 19: Effect of time on the total lipid content levels in the tree seeds

Tree Species	Dry seed (0 day)	4^{th} day	8^{th} day	12^{th} day	16^{th} day
Dialium guineese	5.0mg/ml	6.0mg/ml	5.0mg/ml	14.0mg/ml	15.0mg/ml
Parkia biglobossa	15.0mg/ml	15.8mg/ml	8.0mg/ml	30.0mg/ml	28.0mg/ml
Prosopis africana	13.0mg/ml	11.0mg/ml	5.0mg/ml	7.0mg/ml	15.0mg/ml

15) Ajiboye *et al.* (2011) investigated the influence of oven dry heat treatment @ 40°C treatment on the germination of some selected savanna tree seeds species: *Tamarindus* indica (L), *Albizia lebbeck* (Linn) Benth, *Parkia biglobossa* (jacq) R.Br and *Prosopis*

africana (Guill) Perr & Taub in Nigeria. Their selection was made on their importance in nutrient recycling of soils and the role they play in improving the economy of the savanna people in Nigeria. The seeds are used continuously without corresponding afforestation. These seeds are dormant under natural conditions and remain in the state until a favourable condition is attained. This poses a threat to the seedling establishment for an aggressive agro-revolution and forest regeneration in the savanna regions of Nigeria. Viability test 80-90% for the seeds under laboratory examination. However, the germination of the dormant seeds was enhanced under the influence of 40°C oven-dry heat treatments during 1-4hrs durations. The dormancy state was terminated in the seeds giving 60-70% germination in A. *lebbeck* and 80-90% in *T. indica* under 2-3 hours duration. However, the *P. biglobossa* and *P. africana* showed 20-25% germination at 3hrs duration. Experiments were in three replicates with untreated serving as a control and were arranged in a complete block design with 4 tree species subjected to 1 treatment at 3 replicates with a 4x1x3 factorial. Data were subjected to analysis of variance using the least significant difference. This work would improve the germinability of these economically valuable tree seeds in the country and also assist in raising seedlings for afforestation programmes, thereby creating wealth for relevant Agents and Ministries and further improving the economy of the savanna parts of Nigeria (Ajiboye *et al.*, 2011).

16) Ajiboye and Agboola (2011) conducted an experiment to look into the effect of seed sizes and gibberellic acids (GA_3) on seed germination of two savanna tree species: P. *africana* (Gill) and *Dialium guineense* (Wild). The seeds were found to be dormant while the seedlings also have a high mortality rate. The two tree seed species produced two seed types, large and small. The experimental design used was the randomized block type. All treatments were in five triplicates. The Gibberellic acids at

300mg/l had significant effect ($P<0.05$) on seed germination in both *P. africana* and D. *guineense*. The small and large seeds of the two tree seeds species evaluated had up to 80 and 30-50% germination respectively. Termination of hard seed coat was obtained under 10-15 mins treatments and gave up to 70-80% germination in *D. guineense* and *P africana* seeds. The gibberellic acid (GA_3) at 1,000 mg/l-3,000mg/l, gave maximum percentage seed germination of 60-80% while untreated seeds did not germinate. The product of this research work had gone a long way to enhancing seed germination and raising seedlings growth in improving the economic metrics of Nigeria.

17) Ajiboye (2011) carried out research investigation on the vitamin D content of four tree seed species: T. *indica*. *P. africana, P. biglobossa* and *A. lebbeck*. The *P. africana* had the highest content of Vitamin D (0.8 ug/ml). This implied that the seed could be used as an alternative source of Vitamin D in daily diets. Vitamin is good in improving healthy growth and development.

18) Mr Vice-Chancellor sir, I also carried out research work on the effect of Depulping and fermentation treatments on the germination of *Gmelina arborea* (Roxb) seeds.

Fresh fruits were subjected to natural fermentation in the open and enclosed woven basket lined with banana leaves for 7 days. Some fresh fruits were also depulped by hand while seeds were extracted, washed and dried. The seed viability test was done using the floating methods. Seeds were germinated in wooden trays. Maximum percentage germination of 100% was recorded after 34 days, from the seeds that were subjected to open fermentation, washing and drying. Analysis of variance (ANOVA) showed that there were significant differences ($P>0.05$) among treatments. The least germination percentage (56.67%) was recorded from the control seeds that were depulped and immediately sown. It can be concluded that open fermentation, washing and drying treatments enhanced the germination of G. *arborea* for better seedling establishment (Fadimu and Ajiboye, 2013).

Table 20: Fermentation and non-fermentation treatments used for the germination of G. *arborea*

Treatments	Description
C1	Depulping and immediately sowing
C2	Depulping and drying
C3	Depulping, washing and drying
C4	Enclosed fermentation and dry
C5	Open fermentation and drying
C6	Enclosed fermentation, washing
C7	Open fermentation, watching and drying

Table 21: Effect of Fruit fermentation and non-fermentation treatments on percentage seed germination of *G. arborea* after 34 days of sowing

Treatments	Description
C1	56.67[e]
C2	76.67[cd]
C3	93.33[ab]
C4	66.67[dc]
C5	86.67[bc]
C6	83.33[b]
C7	100.00[a]

Mean followed by the same letter(s) are not significantly different at P<0.05. Values represent standard deviation.

19) Comparative Responses of maize (*Zea mays*) and millet (*Pennisetum glaucum* L.) to simulated water stress conditions were also investigated by Iwuala and Ajiboye (2016).

This investigation is to determine the basis of water deficit stress in pearl millet and maize. Crops were grouped into two categories, each representing a treatment and replicated 3 times. Category (1) which served as the control received 100 ml of water every 2 days throughout the experimental period. Category (2) received 100 ml of water every 2 days for 6 weeks before subjecting them to simulated water stress conditions. Parameters evaluated after treatment included: biomass, relative water content (RWC), leaf area and chlorophyll levels. The results showed that water stress caused a decrease in biomass, chlorophyll, RWC and leaf in *Zea mays,* while *Pennisetum glaucum* showed a significant increase in root/shoot ratio and biomass under water stress conditions. Comparatively, *P. glaucum* was superior to Z. *mays* in water stress tolerance.

20) Mr. Vice-Chancellor Sir, the effect of water stress and organic nitrogen on the leaf and mineral contents of tomato (*Lycopersicum esculentum* L) varieties were also investigated. The three varieties of tomatoes used are Beske, Ibadan local and Roma VF sourced from the local market in Ibadan. A 3x3x4 factorial experiment was used in a randomised design. All data were subjected to analysis of variance and the significant means were separated using the least significant difference (LSD) at a 5% probability level. Roma VF had the highest concentrations of nitrogen (2.6%), phosphorus (0.62%), calcium (3.18%) and potassium (2.02%). Ibadan local had the highest manganese (134 ppm) and iron (133.55ppm) while Beske had the highest copper (17.29ppm) and zinc (28.17ppm). These results showed that the increase in organic nitrogen, phosphorus, magnesium, potassium, iron and zinc decreased. The investigation also revealed the concentration of nitrogen (2.86%),

potassium (2.16%), manganese (134.88ppm), copper (17.37ppm) and zinc (31.95ppm) were highest at 25% field capacity, while the concentration of phosphorus (0.54%), calcium (2.92%) and magnesium (0.50%) were highest at 100% field capacity but the concentration of iron (137.59 ppm) was the highest at 50% field capacity. The study showed that water is a limiting factor for proper physiological growth performance of tomato varieties (Sopitan and Ajiboye 2014).

21) Mr. Vice-chancellor Sir, I solely authored a 139-page textbook titled: *Plant Physiology in Retrospect*, published in the year 2014. The book x-rayed various topics and aspects of plant physiology in retrospect. The topics in the book include cell and organization, plant water relation, acid, base as it conveys some physiological roles, water potentials, photosynthesis, mineral elements, respirations, growth and growth regulators in the plant, angiosperm (flowering plant), seed germination, senescence and some objective questions and answers in the field of plant physiology. The textbook is available in some major bookshops in the south-west Nigeria.

22) Ajiboye (2015), researched the effect of *glomus fasciculatum* on seedling growth and production of cowpea (*Vigna unguculata* L.,Walp.). The effect of the fungal organisms greatly influenced the fresh and dry shoots and roots of the widely used economic plant. The *G. fasciculatum* was also found to greatly improve the seed and pod production of the cowpea, when compared with the untreated seedlings. The use of *G. fasciculatum* was found to be another alternative source of biofertilizers for yield improvement in cowpea.

23) Ajiboye (2010), examined the peroxidase and phenolic analysis of four tree seed species. It was observed that the phenolic content of the seeds is greater than that of the peroxidase and polyphenolic

contents. By implication, the phenolic content levels increased germination in the tree seeds as it interferes with water and oxygen uptakes during germination.

24) Ajiboye (2014), investigated some aspects of seed germination and seedling growth as examined on two multipurpose savanna tree seed species. The hydration/dehydration treatments of the seeds yielded positive results on the seedling growth of the seeds.

25) Comparative studies on the phytochemical content of the seeds and fruits of three cucurbits are carried out on *Cucurmis* melo (L), *Cirullus lanatus* (Thumb) and *Lagenaria abreviflora* (Benth), Phytochemicals such as glycosides, tannin, alkaloids, flavonoids, phlobatanin, anthraquinone and saponin were detected in the epicarp, mesocarp of the seeds of *Cucurbits* (Ojo and Ajiboye,2017a). The nutritional contents of the seeds were carried out. The percentage (%) of dry matter, fat, ash and crude protein was significantly (P<0.05) higher in seeds than in the epicarp and mesocarp. The crude fibre was highest in the epicarp for C. *melo* (1.75 0.13), L brevifloa (1.85 0.07) and C. *lanatus* (2.18 0.07) (Ojo and Ajiboye 2017 b).

26) I also undertook evaluation of alpha-amylase inhibitory potentials of *Sida acuta*, *Tithonia diversonia* and *Chromolaena odorata* leaf extracts on the activity of carbohydrate hydrolysing enzymes (α-amylase) and to provide scientific validation of their folk use in diabetes treatment. Cold water, hot water and ethanolic extracts of *Sida acuta*, *Tithonia diversolia* and *Chromolaena odorata* were obtained. The Standard method was employed in the alpha-amylase inhibitory assays (3,5-dinitrosalicylic acid (DNSA) method. The results revealed that the extracts had a dose-dependent prevention of the digestion of carbohydrates by inhibiting α-amylase. Ethanolic extracts of *T. diversifolia*, C. *odorata* and S. *acuta* gave the highest inhibitory activities against

alpha-amylase with 41.72% (IC_{50} 0.604 mg/ml) maximum inhibition at a concentration of 500 ug/ml respectively. The research findings revealed that the extracts of these plants have greater potential against diabetic agents by inhibiting alpha-amylase. These plants hold tremendous potential for pharmaceutical value, since the global tide are changing toward the use of non-toxic plant products for the cure of diabetes (Adewumi and Ajiboye 2017).

27) Mr. Vice-Chancellor Sir, Arginase in seeds and seedlings of five varieties of tomatoes (*Solanum lycopersicum* L.) was evaluated by Ajiboye (2019). The tomatoes used for this research were obtained from Oye market, Oye-Ekiti town in Ekiti state, Nigeria. The fruits were identified at the herbarium section of the Department of Plant Science and Biotechnology Laboratory, Federal University Oye - Ekiti. Samples of *S. lycopersicum* were homogenized, buffered using citrate and centrifuged. Arginase assay protocol was conducted and its concentration was determined at a wavelength of 450 nm. The Roma variety was discovered to have the highest absorbance of arginase, the highest specific activity and the highest yield percentage value in comparison to cherry.
The Roma variety was observed to have a high yield of 73% in comparison to the other four varieties: Cherry variety (54.5%), pear variety (32.4%). The research report also showed that the Roma variety had the longest tap root system.

$$\% \text{ seedling growth} = \frac{\text{No of germinated seeds}}{\text{Total no of seeds sown}} \times \frac{100}{1}$$

Given the above findings, it was discovered that the Roma variety had a good defensive mechanism for pathogenic attacks due to its arginase concentration.

28) Ajiboye (2019) carried out a comparative assessment of Lectin content in the leaves and seeds of two species of Okra,

Abelmoschus esculentus and *Abelmoschus callei*. Okra is an important vegetable crop in Nigeria.

Lectin is a glycoprotein that possesses at least one non-catalysing domain that specifically and reversibly binds to mono and oligosaccharides. The concentration of lectin in these two species of okra was determined using the glycoprotein agglutinating property with carbohydrate coated surface (erythrocytes) that can easily bind with the lectin present in the two okra species. The study revealed that A. *esculentus* has high lectin content in the leaves but the seeds are characterized by low lectin content whereas, A. *callei* has low lectin contents in its leaves while a high level of lectin was found in its seeds. Proteins were detected by Braford methods. The data were subjected to analysis using SAS packaged version 2009. Similarly, A esculentus showed high protein content in its seed (0.61 mg/ml) when compared with leaves (0.09 mg/ml) of the same species. However, *A callei* has high level of protein content in its leaves (0.19 mg/ml) as compared with the low protein content found in seeds (0.58 mg/ml). It was recommended that further studies should be carried out on the genetic compatibility of the two species to explore a viable product that would have an optimum level of lectin and high level of protein contents in species of okra.

A review of plant growth substances: their forms, structures, synthesis and functions were evaluated in one of my research projects. Plant growth substance are compounds either natural or synthetic that modifies or controls through physiological actions, the growth and maturation of plants. If the compounds are produced within the plant, it is called plant hormone or phytohormone. In general, it is accepted that there are five major classes of plant hormones. They include auxin, (IAA), cytokinin, Gibberellin, Ethylene and abscisic acid. However, there are still many plant growth substances that cannot be grouped under these classes, though they also perform similar functions, inhibiting or promoting plant growth. These substances include Brassinosteroids (Brassins), Salicyclic acid, jasmonic acid, fusicossin, batasins, strigolactones,growth stimulants (e.g., hymexazol and paripropanol), adefoliants (e.g., calcium, cyanamide, dimethpin). Researchers are still working on the biosynthesis pathways of some of these substances. Plant growth substances are very useful in Agriculture in both low and high concentrations. They affect seed growth, time of flowering, sex of flowers, senescence of leaves and fruits, leaf formation, stem growth, fruit development and ripening, plant longevity and even plant retardation. Some synthetic regulators are also used as herbicides and pesticides. (Ogunyale 2013).

29) Ajiboye (2011) carried out research work on the influence of oven dry heat at 40°C treatment on germination of some selected savanna tree seeds species (T. *indica* (L), *A. lebbeck* (lin) Benth, *P. biglobossa* (jacq) R.Br and *P. africana* (Guill) Perr and Taub in Nigeria. The seeds were found to be dormant under natural conditions. The selection was based on their importance in the nutrient recycling of soils and the role they play in improving the economy of the savanna people. The tree seed species were among those that were gradually going into extinction due to reckless felling without a corresponding re-afforestation. The seeds are also used continuously without corresponding afforestation. The viability test showed 80-100% for the seeds before the laboratory examination. However, the germination of the dormant seeds was enhanced under the influence of 40°C oven dry heat treatment for 1-4hr durations. The dormancy state was terminated in the seeds giving 60-70% germination in A. *lebbeck* and 80-90% in *T. indica* under 2-3hrs duration. However, *P. biglobossa* and *P. africana* showed 20-25% germination at 3 hrs duration. The experiment was in three replicates with untreated serving as control and was arranged in a complete block design with 4 tree species subjected

to 1 treatment at 3 replicates with 4x1x3! Data were subjected to analysis of variance using the least significant difference ($P<0.05$). The work improved the germinability of these valuable seeds and assist in raising seedlings for afforestation programmes in the savanna parts of Nigeria.

30) A chapter in the book on Advances in Biological Sciences, titled "Tropical Forest Seeds: Germination, Seedling Growth and Economic Importance, was written by Ajiboye in the year (2014). It discussed topics such as seed, seed viability, seed quality, components of seed quality, germination capacity, nutrient storage, seedcoat, phenolic contents in the tropical seeds, the effect of seed sizes on seed germination, seedling establishment, functions and seed dispersal by wind (anemochory), by water (hydrochory), by animals (zoochory), myrmecochory, seed storage, the economic importance of seeds: edible seeds, poison and food safety; seed dormancy, physical dormancy or hard seed coats, hard-seededness and pre-treatment, presowing treatments, chemical dormancy, morphological dormancy, physiological dormancy, drying, combinational dormancy, secondary dormancy, photo-dormancy, thermos-dormancy, seed viability. seed vigor, causes of poor germination of tropical seeds which include i) poor handling of seeds ii) poor soil quality (soil with extremely low or high pH) iii) fungal infection on seed and soil iv) water quality supplied to seed and soil v) quantity of water, vi) quality supply of light vii) avoidance of water logging viii) correct soil for planting seeds ix) inadequate humidity x) improper soil xi) improper depth of seed xii) extremely cool temperature xiii) poor seed viability; mycorrhizal association, mycorrhizal network.

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31) Mr. Vice-Chancellor Sir, in the quest to capture seeds and seedling establishment for an aggressive agro-revolution in Nigeria, Ajiboye (2016) carried out research on the effect of ecto and

endomycorrhizae, on seedling growth for four savanna tree species.

Endomycorrhizae (*Glomus mossae*) and ectomycorrhizae (*Saillus luteus*), were used in crude forms. The relative endomycorrhizal dependency of seedlings were maximum in P. *biglobossa* seedlings by having up to 68%, 41%, *Albizia* 35% in T.*indica* while the least was 21% in *P*. *africana* seedlings. However, *T. indica* seedlings had the highest ectomycorrhizal dependency with about 55%. while 54% was shown in *P. africana*. About 50% and 46% were shown in *A. lebbeck* and *P. biglobossa* seedlings respectively. Ectomycorrhizal inoculation greatly enhanced seedlings ($P<0.5$) in leaf area, stem girth, petiole length and leaf number. The results obtained in this study fostered valuable contributions in the areas of increasing seedling growth through the incorporation of both ecto and endomycorrhizae into the soil. These findings assisted in increasing seedling production for agro-revolution and forestry purposes in Nigeria.

32) The impact of exogenous nitrogen and salinity stress in *Acalypha wilkesiana* L was investigated through the physiological responses of *Acalypha wilkesiana* seedlings to short- term salinity stress and foliar supply of nitrogen. Seedlings were grouped into three, each representing a treatment and replicated 6 times. Group 1(w) which served as the control received 350ml of water every 3 days throughout the experimental period; group 2(N) received 350ml of water every 3 days and a weekly foliar spray of 100ml.0.1M ammonium nitrate solution throughout the study period. Group 3(S) received 350ml of 0.1M NaCl solution every 3 days throughout. Growth and physiological parameters were evaluated after treatments. The results showed that salinity caused a decrease in plant biomass, relative growth rate and relative water content (RWC) and a significant increase in lipid peroxidase, and activities of catalase enzyme. It was observed that foliar application of

nitrogen significantly increased the growth parameters and nitrate reductase activity. The data presented in the work underscored the fact that the foliar nitrogen supply induces a relation to increasing nitrogen supply on the growth of A. *wikesiana* as compared to salinity stress Iwuala and Ajiboye (2016).

My Research findings while working on the germination of savanna tree seeds for an aggressive agro-revolution in Nigeria, can be grouped into the followings; A) Enzymes in savanna seeds B) effect of seed orientation on germination C) Hydration and dehydration treatment on seed germination D) Major and Minor elements contents of the seeds. E) Application of mycorrhizal inoculations and other treatments on seedlings growth.

A) Enzymes in the savanna tree seeds:
Among the enzymes that were discovered in the seeds of each tree species of the savanna tree seeds were xylase, phytase, protease, amylase, bromelaire, alpha-galactose, catalase, cellulase, glucoamylase, hemicellulose, invertase, lactase, lipase, maltase, nittokinase and pectinase. The presence of these enzymes may be responsible for the germinability of the seeds under favourable conditions. Enzymes like amylase, α-galactose, lipase and maltase are essential to the physiology of germination. They are parts of food reserves that assist the seeds in germination. However, enzymes like cellulase and hemicellulose constitute the cell walls.

B) Effect of seed orientation on germination: Orientation and seed placement on seed germination of tree seeds were found to be significantly favoured ($P<0.05$), having obtained up to 100% germination for the seeds of *T .indica* and A. *lebbeck* placed at the inverted position. *T. indica* and *A. lebbeck* seeds placed in a flat position gave up to 80-90% percentage germination. The seeds could have very high-rate germination when placed in such position. However, the vertical position was discovered to favour

A. lebbeck and P. *biglobossa* by giving up to 100% germination. Germination of seeds of *P. biglobossa, A. lebbeck* were favoured when planted in soil depths ranging from 1cm-5cm. It has been known in the savanna region that one of the factors affecting seed germination and seedling establishment is the depth of soil in which the seeds are buried. The seeds that were buried deeply were rightly cut-off from receiving the sunlight for photosynthesis and hence may not germinate even if viable (Ajiboye 2009).

C) Hydration and Dehydration treatments on seed germination
The treatment had a high significant effect (P<0.5) on the germination of savanna tree seeds in Nigeria. The seeds that showed a high germination rate were A. *lebeck* and *P. biglobossa* that had up to about 80-100% percentage germination. This could be a result of absolute reduction of seed coat thickness which pave the way for influx of water molecules into the seed via the seed walls that led to embryo expansion. This also mobilized food reserves which eventually results in germination. The hydration of seeds forms an integral part of processing operation like germination and fermentation. Hydration is aimed at removing the alkaloid which is responsible for the bitter taste of Lupin seeds (Ajiboye 2009). Optimizing the hydration conditions to control and predict the process is vital since hydration governs the subsequent operations and the quality of the final products such as optimization, process control and prediction primarily call for an in-depth understanding and quantification of hydration kinetics of lupin seeds under different soaking conditions (Ajiboye 2009).

D) Major and minor elements that were found in the, chromium, seeds include: calcium, magnesium, iron, copper, lead, cadmium, manganese, cobalt, nickel, selenium, vanadium, molybdenum, arsenic, silver, scandium, tin, titanium, boron, antimony, caesium, lanthanum, tungsten, ruthenium, rhenium, strontium, silicon and gallium. An essential or major element is defined as one whose absence prevents a plant from completing its life cycle, or the ones that perform physiological roles. Essential minerals are usually classified as micro nutrient or macro-nutrient according to their relative concentration in plant tissues. Some researchers have argued that classification into macro and micronutrients is difficult to justify physiologically. However, an inadequate supply of essential element results in nutritional disorders manifested by characteristic deficiency symptoms. These disorders are related to the roles played by essential elements in normal plant metabolism and function. Calcium that was present in the seeds could be used for the synthesis of the new cell wall. It may also be used in the mitotic spindle during cell division. Magnesium in the seeds may have a specific role in the activation of enzymes, respiration and in the synthesis of DNA and RNA. Potassium in the seeds may play important role in the regulation of the osmotic potentials. Iron may have an important role as a component of the enzymes involved in the transfer of electron. The zinc may be required for enzymatic and biosynthesis. Copper may be associated with iron in performing enzymatic activities. Nickel may prevent urea acumination in the seeds. Molybdenum may also be important for enzymatic activities in the seeds. IAA biosynthesis is associated with rapidly dividing and growing tissues especially in shoots. Although, virtually all plant tissues appear capable of producing low level of IAA, shoot apical meristems, young leaves and developing fruits and seeds are primary sites of IAA synthesis. Gibberellic acid promotes seed germination. Seed germination requires gibberellins for the activation of vegetative growth and the mobilization of stored foods of the endosperm. Researches have it that gibberellic acid can overcome the problems of dormancy. Gibberellin application may also stimulate the production of numerous hydrolyses, notably alpha-amylase by the aleurone layer of the germinating tree seeds (Ajiboye 2009).

E) Application of mycorrhizal inoculations and other treatments on seedlings growth: Application of both endomycorrhiza, (VAM) *Glomus mossae*) and ectomycorrhizae enhanced seedling growth in the course of my study. This may be used as alternative fertilizer for plant growth. Conversely, the accumulation of chemical fertilizers has negative environmental impacts. These biofertilizers are readily available in the atmosphere and cheaper than chemical fertilizers. From the results of the research work conducted, seed germination and seedling growth in plants were shown to be enhanced through the inoculation of mycorrhizae.

1.5 My Ongoing Research

I have been engaged in the ecophysiological studies of both savanna and forest tree seed species in Nigeria.

I have also engaged in the use of bioagents to tackle the pathogenic organisms affecting valuable crops in Nigeria. These food crops include but are not limited to Tomatoes (S. *lycopersicum*), pepper (*C. annum*), Okra (A. *esculentus*) and maize (*Z. mays*).

Biofertilizers are used in place of chemical fertilizers to reduce the menace caused by chemicals or synthetic fertilizers that are not eco-friendly in the ecosystem. The use of these bioagents against plant pathogenic organisms will go a long way in combatting the challenge of food insecurity in Nigeria.

I have also been involved in the use of Botanicals to induce seed germination and seedling growth and the establishment of tropical seeds for aggressive agro-revolution in Nigeria.

Conclusions

I have used my knowledge and skills acquired in the course of my training to deal to some extent with the challenges being faced in raising savanna tree seeds for germination and seedling establishment in Nigeria through the use of various methods which include: Chemical /mechanical scarification, hydration and dehydration methods, the use of mycorrhizal inoculum to induce and boost seed germination and seedling establishment for aggressive agro-revolution in Nigeria, as well as the detection of some physiological parameters and bioactive compounds in the seeds and seedlings.

In our research findings, we have been able to use diverse methods to study the biotic and abiotic stress of some plants that are of economic value. Some ethnobotanical surveys of some medicinal plants are identified and used to tackle some identified ailments.

1.6 Recommendations:

1) Mr. Vice-Chancellor Sir, following the acts of indiscriminate felling of the savanna trees and constant annual bush burning without a corresponding increase in the afforestation practices in Nigeria, it is imperative for government officials especially those in charge of natural resource management to sanction those who perpetrate the act of indiscriminate felling of economic valuable trees in Nigeria.
2) The government should make a policy that will promote or encourage planting of trees in the environment for it has great benefits including global warming, aesthetic values and therapeutic values, it also serves as wind breakers; the planting of trees in the environment neutralizes or normalizes pollutant air. The release of exhausts from the vehicles and machines can be neutralized by the plants in the environment. The carbon monoxides can be neutralized with the release of oxygen released by the plant into the atmosphere as a by-product of photosynthesis.
3) The trees that are cut down for one reason or the other should be replaced immediately; the seeds that are dormant should be treated with dormancy-releasing methods addressed in this lecture.

4) The seed researchers or those that are concerned with the germination of tree seeds should take into consideration the position of the micropyle when planting, especially for getting better seedlings establishment for afforestation and aggressive agro-revolutions in Nigeria.

5) The challenge of slow growth rate may be tackled through the induction or incorporation of some mycorrhizal inoculum of some fungal organisms into the soil to fill the gap of shortage of nutrients for the seedling growth and development.

6) The mineral elements identified in some of the tree seeds can stand in the replacement of some important diets, if harnessed by the body concerned to serve as nutrient supplements in our daily diets.

7) However, the high rate of consumption of those seeds or their seed products may have residual effect, because some of the seeds are found to have heavy metals in them.

8) The government is hereby advised to raise seedlings and make them available for both corporate and individuals at no cost. This will promote afforestation programmes and serves as recipe for an aggressive agro-revolutions in Nigeria.

Finally, the present study could widen the scope of plant researchers in the areas of improving the culture of having successful germinations in the nursery before planting in the field. If all the points raised in this lecture could be followed, the challenges of gradual extinctions of the high economic values of the tree seed species would be reduced drastically and the greenish appearance which the savanna is known for in nature will be restored and established.

1.7 Acknowledgement and Appreciation

God of heaven and the earth, I thank you for being at the Centre of my life ever before I started the journey of life till now. I thank God Almighty for making today a reality. May His name be constantly adored, praised and glorified.

I must appreciate the support and encouragement that I received from the Vice- Chancellor of this University, Prof Abayomi Sunday Fasina (aka, “God wins’) for announcing my professorship a month after he assumed office as the 4th substantive Vice-chancellor of this university. This is a man I hold in high esteem; I am delighted to be associated with him, he is a bridge builder, a goal-getter, an achiever, a welfarist, a mover and a shaker of this University in a positive direction. Your mark of achievement is indelible in the annals of the history of this University. I cannot but appreciate you for making me the pioneer Director of the Institute of Part Time Studies.

Mr. Vice-Chancellor Sir, I will continually appreciate you for bringing me to the limelight in this University ever before I became the Dean of the Faculty of Science. Sir, I will eternally be grateful to you for being my leader, mentor and distinguished Vice-Chancellor of this great citadel of learning, Federal University Oye-Ekiti.

Your recommendation that translated to wining a TETFUND grants of over 1.6million naira to travel to US for a plant biology conference in San Francesco in the year 2019 cannot be forgotten in haste.

On this note, I would like to inform this august audience that I was invited by the Indian government to give a talk on Biotechnology at an Indian university in December 2022.

I want to specially appreciate Mr. Vice Chancellor, for approving my recommendation to attend a workshop training on EU-grant and proposal writing in Turku University, Finland, under the Train-The

Trainers (TTT) programme of TETFUND in May 2022. I am most grateful sir for giving me this opportunity to attend the program at Turku University, in the Republic of Finland.

I want to sincerely appreciate the support that I received from the two Deputy Vice Chancellors: Prof Sola Omotola, DVC Administration and Prof Olubunmi Shittu, DVC Academics. I appreciate the Registrar, Mr Ibrahim Mufutau, the Bursar, Mrs Adebolanle Debo-Ajagunna, and the University Librarian, Dr Isaac Busayo,

I would like to appreciate the Chairman of Committee of Deans who also doubles as the Dean of the Post graduate school, Prof Raphael Omolehin. I sincerely appreciate all the Deans in the faculties of our university and the Dean of Students' Affairs, Prof Dosu Malomo. Permit me to single out the Dean of Arts, and the Chairman of Ceremonials Committee, Professor Tajudeen Opoola, for his brotherly roles in my career development.

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I want to appreciate the contributions of my predecessors for the growth of our dear faculty, Prof Akuo, Prof Ogundana, Prof Sylvia Uzochukwu and Prof O.S Lawal for laying a solid foundation for me to consolidate as a current Dean of the Faculty of Science, Federal University Oye-Ekiti, Nigeria.

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Mr. Vice Chancellor Sir, kindly permit me to mention the following people whom God has positioned at a critical point of my life to serve as a destiny helper to my career namely: Late pastor Micheal Adelani Oyebode (Daddy Gabriel), Prof Diran Famurewa (Immediate past VC of King's University), Prof & Prof Mrs Benjamin Oluwole Akinyele (FUTA), Prof Segun Ayodele, Prof. C.O Adedire (FUTA), Prof J.K Oloke, (VC Cornerstone University, Ibadan), Prof Abiodun Ayodele, the immediate past Dean of the Faculty of Science, University of Ibadan and Prof (Mrs) P.O Akinwusi (UNIOSUN).

I acknowledge the presence of some of my spiritual fathers: Rev Pastor Tunde Ala (MFR) and his amiable wife, Pastor (Mrs) Bola Ala, Pastor Aron Balogun, (Lagos). I must appreciate my elder in the church, Elder Dr and Deaconess H.O Bibilari. I thank all the Steering Committee of the Blessed House family. Special thanks to Deaconess R.M Adeleke. I thank the Blessed men and women of the Blessed House that are here to grace this occasion.

My appreciation cannot go less to Mrs. Modupe who anchored a live interview programme for me at Lagos Television (LTV) on Virus Without Borders, on a topic: "Biotechnology: a Road Map to a Virus Free Society."

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I must also appreciate my graduate students. I recognize my postgraduate students: Ayo Oloniniran and Miss Grace Gudu my Ph.D. student, who is also a Lecturer at the Nasarawa State University.

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Special thanks to Prof Mrs Olubunmi Ajayi (former Ag. VC, EKSU) Prof Mrs Monisola Oyawoye (Former Dean of Science, Adeleke University), Prof Brai Ogeneh, Prof Temi Adegun (Provost College of Medicine), Prof Tajudeen B. Opoola (Dean, Faculty of Arts), Prof Dosu Malomo, (Dean Students' affairs) Prof J Omotosho (Dean, Social Sciences) Prof I. A Olatunji (Dean, Environmental Management and Design), Dr Babatunde Afolabi (Ag. Dean, Faculty of Management Sciences) Prof Bolaji Adeniji (Dean, Faculty of Agriculture) Prof Olufemi Abifarin (Dean, Faculty of Law). Prof I.A Suleiman (Dean, Faculty of Pharmacy), Prof Bukola Bolaji (Dean, Faculty of Engineering). Prof Olusola Adeeyo (Dean, Faculty of Basic and Medical Science), Dr. (Mrs). Olubanke Bankole (Ag. Dean, Faculty of Education). Prof Chika E Asogwa (Director of Academic planning)

I thank all Deans and Directors, Heads of Departments and units, distinguished Senate members, Colleagues, friends, brothers and sisters across the University community.

I salute the support that I received from all Heads of Departments in the Faculty of Science, Federal University, Oye Ekiti, namely: Dr Stanley Agbo Ag. HOD AEB, Dr Bashiru Ajiboye, Ag. HOD Biochemistry, Dr Lawrence Adewole, Coordinator, Department of Computer science, Dr Joan Ogundele Ag. HOD, Department of Chemistry, Dr A. Adejumo Coordinator, Department of Environmental Management and Toxicology, Dr Charles Oyelami, Ag. HOD, Department of Geology, Dr Akinola Eluwole, Ag. HOD, Department of Geophysics, Dr Opeyemi Enoch, Ag. HOD, Department of Mathematics, Dr Ayodele Ajayi, Ag. HOD, Department of Microbiology, Dr Joshua Oluwadare, Ag HOD, Department of Physics and Dr Olusegun Oluwajobi, Department of Plant Science and Biotechnology.

I joined the services of Osun State University as a pioneer staff in the year 2007. I was privileged to be the first staff employed among those employed in the year 2007 to bag a Ph.D. degree in the year 2009 upon so much pressure mounted on us by the then Provost of the College of Science, Engineering and Technology of the University, Prof Diran Famurewa. is a mentor and academic father and the pioneer Vice-chancellor, Prof Shola Akinrinade while I was climbing the leader of success in academia.

In the year 2014, when I considered leaving the Osun State University for the Federal University Oye-Ekiti, it was amazing that the immediately I assumed duty in FUOYE, I became the Ag. Head of the department for an uninterrupted period of 5 years. I worked tirelessly to nurture and establish a new programme and a Department of Plant Science and Biotechnology that was one of the Departments coined out from the defunct Department of Biotechnology. The work of watching over a new Department was so enormous. After duration of 5 years as head of the Department in 2019/2020 academic session, I proceeded to sabbatical leave at the University of Medical Science Ondo, Ondo state. I appreciate those that God used to facilitate the process. I recognize the support that I received from Dr Bello, Dr Olatunji, Dr. Mrs. Ekundayo, Dr Anuoluwapo, Dr Adebayo, Dr Asowata, in the Department of Biological Sciences (UNIMED).

The contributions of the following people are well acknowledged and appreciated: Drs: Lukman Akinola, Gabriel Ogunleye, James Agbolade, Jayeola Gbolahan (OAU), Emmanuel Adeyefa (former, Ag.HOD, Department of Mathematics), Dr Sunday Abimbade (Faculty Exam officer) and Prof Rapheal Okonji (OAU).

I wish to single out and appreciate my friend, brother and colleague, Prof O.S Hammed, Director of Top-up and Conversion programme, who has been a confidant, an adviser, a friend in need and indeed.
I am very grateful to Almighty God for sparing the lives of my parents: Mr Sola L. Ajiboye and Mrs F.A Ajiboye to this time. I cannot appreciate less the efforts of my parents for giving me a lasting legacy (education) that brought me this far in life.

I wish to specially recognize my brother Dr & Mrs. Elijah Olusegun Ajiboye (UK). I sincerely thank Mr. & Mrs. Sasere.

I recognize the presence of Blessed family as I appreciate our father in the Lord Rev Dr Tunde Ala, MFR, and his wife, Pastor B. Ala. May the grace of God continue to sustain you.

I sincerely appreciate my in laws the Akinmoyos: Tope, Bola, Bose, and Lanre. Special thanks to my mother-in-law, Mrs E. Akinmoyo, who used to stay behind at home to take care of my children when I and my wife were on our different ways out to look for means of livelihood. I really appreciate the support and encouragement of Mr Emmanuel Akinya over me and my wife while she was in the University. I must also acknowledge the support and encouragement of my late grandmother-in-law: Mrs Ogunmoko Akinya who slept in the lord in the year 2018.

The effort of my brother Femi Ajiboye is specially appreciated as I also thank my sister Mrs Iyabode Adamson.

I salute the organizing committee of this inaugural lecture led by the Deputy Vice-Chancellor Administration, Prof Shola Omotola and the Chairman of the University Ceremonials Committee ably led by Prof

B.T Opoola for their contributions and support towards the realization of this inaugural lecture. I also thank the printing press of the university community for producing the inaugural lecture note.

Special appreciation and kudos go to my children: Olujimi Emmanuel Ajiboye, Olugbenga Daniel Ajiboye, Doyinsola Esther Ajiboye and David Adedamola Ajiboye. Thank you for being the children of my dreams and for your understanding while I was burning the midnight candles to become what I am today. I appreciate you for making the joy of fatherhood and parenthood flow in my heart. To God be the Glory!

This lecture will not come to reality and fulfillment today without giving special recognition to my darling wife, Mrs. Modupe Doris Ajiboye (nee Olonimoyo), a beautiful, elegant, highly intelligent woman; someone who has been there for me through thick and thin, scarcity and surplus, sickness and health. She is my world and the love of my life. She is pretty inside out, a virtuous woman whom God has used to brighten my path in Him in this life. My jewel of inestimable value; she does not consider anything difficult to release for me and the children. She went to Nairobi-Kenya last year and bought some items for me and the children, on receiving those items, I paused and then asked her "where is your own?" She replied, "I didn't buy anything for myself" she said further as I quote, "I am happy if you and the children are happy." What a selfless woman! What a great woman! A quintessential woman! An amazon and a pillar of support to my home. I love you and will always do forever!

I specifically brought her to join academia as I thank those whom God had used to facilitate the process. I thank you my dear wife for raising our children, taking good care of me and for being a good woman in the vicinity of your husband (*Aya-rere-lo-dede-oko*).

Finally, "A man can receive nothing, except it be given him from heaven" John 3 vs 27.

I bless the name of God, the beginning and the end of all things. To you I return all the glory and adoration for making today a great success. May glory, honour and adoration be ascribed to your name now and forever more, Amen.
Thank you all and God bless!

References

Adewumi F.K, **A.A Ajiboye** and Ojo O.O (2017): Evaluation of α-amylase inhibitory potentials of *Sida acuta*, *Thitonia diversifolia* and *Chromolaena odorata* leaf extract; *Journal of Advances in Biology and Biotechnology* 14(4):1-9.

Agboola D.A, A.O. Ebofin A. M. Aduradola **A. A Ajiboye** (2004): Effect of presowing treatments on seed germination of two savanna tree legumes. *Journal of Tropical Forester* 20 (I&II) 17-24, Published by the Malaysian Society of Foresters**.**

Ajiboye A. A, O.Y. Fadimu, M.D Ajiboye, D.A Agboola, A.B Adelaja and A.A Bem (2014a): Phytochemical and nutritional constituents of common vegetables in southwest, Nigeria. *Global Journal of Science Frontier Research Vol. 14(3) 49-53.* Published by the Open Association of Research Society.

Ajiboye A.A, O.O Fawibe, M.O Atayese and D.A Agboola (2014b): Some aspect of the seed germination and seedling growth of two savanna tree species: *Prosopis africana* and *Dialium guineensis*. *Journal of Advanced Laboratory Research in Biology* 5(4):189-193.

Ajiboye A.A (2008): Influence dry heat treatment (76^0C) and gibberrellic acid (GA_3) on seed germination and seedling growth of *Prosopis africana* (Guill and Perr Taub) and *Diallium guineensis, Research Journal of Applied Sciences* 3(4):306-310.

Ajiboye A.A (2009)**:** Physiology of seed germination of four multipurpose savanna tree seeds in Nigeria. PhD thesis submitted to the Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.

Ajiboye A.A (2010a): Dormancy and seed germination in *Tamarindus indica*(L); *Pacific Journal* of *Science* and *Technology,* Published by Akamai University, USA, 11:**2**, 463- 470**.**

Ajiboye A.A , Ajiboye M.D, D.A Agboola, E.N Iwuala (2016): Effect of Ecto and Endomycorrhizae in seedling growth of four savanna tree seeds in Nigeria. (*Tamarindus indica, Albezia lebbeck, Prosopis africana and Parkia biglobossa) International Journal of Plant Research* 6(2):25-33.

Ajiboye A.A Ajiboye M.D, Iwuala E. N, Aigbevbole I.S and Awoyemi B.S.(2016): Effect of *Glomus fasiculatum* on seedling growth and pod production of cowpea(*Vgna nguiculataI*.Walp.) FUOYE *Journal of Pure and Applied Sciences* (FJPAS) 1 (1) 54-57.

Ajiboye A.A , Oyinade A.O and Folasade C. A (2017): Investigation on antioxidates, free radical scavenger and lipid peroxidation activities of whole grains finger millet **(***Eleusine cocrane* L.**);** *International Journal of Plant Biology,8: 40-43***.** (Scopus).

Ajiboye A.A, A.O Ebofin, M. A Atayese, M.O Adedire, and D.A Agboola (2006): Effect of presowing treatment and ectomycorrhizae on seed germination and seedling growth of two multipurpose savanna tree legumes, *Dialium guineense* and *Prosopis africana, Biological and Environmental Sciences Journal for the Tropics (BEST)* 3(4):23-28. Published by Bayero University, Kano (BUK-Faculty of Science)**.**

Ajiboye A.A and D.A Agboola (2008)**:** Effect of seed size and phytohormones on the germination of seeds of two forest tree species, *Prosopis africana* and *Dialium guineensis* Wild. Proceedings of the 3rd conference on National development 24-27 November, held at the University of Agriculture, Abeokuta. Pp 145-151**.**

Ajiboye A.A and D.A Agboola (2009): Dormancy and seed germination in *Parkia biglobossa*(Jcq) R.Br.Ex.G. *Nigerian Journal of Botany* (22)2,397-404**.**

Ajiboye A.A and D.A Agboola (2009): Effect of some chemical scarification on seed germination of some savanna tree legumes. *Journal* of *Research* in *Bioscience (6)2,70- 77* Published by University of Calabar.

Ajiboye A.A and D.A Agboola (2011): Some aspect of dormancy studies and vitamin D content in four tree seed species *Australian Journal of Basic and Applied Sciences* 5(9)1-5**.** (Scopus)

Ajiboye A.A and D.A Agboola (2011):Effect of coconut milk and bryophyllum pinnatum extracts on seed germination of some tree seed species; *International Research Journal of Biotechnology* 2(1)029-032.

Ajiboye A.A and D.A Agboola (2010): Effect of Phytohormones on seed germination and determination of some biochemical constituents in some selected tree species in south western Nigeria; *Nigerian Journal of Botany* 23(2), 265-272**.**

Ajiboye A.A and Oyejobi G.K (2017): *In vitro* Antimicrobial activities of *Vigna subterranean*; *Journal of Antimicrobial agents*, 3:1; 1-4.

Ajiboye A.A, D.A Agboola and M.A Atayese (2010b): Seed germination and peroxidase analysis of some valuable savanna tree seed species, *Pacific Journal* of *Science* and *Technology* 11 :**1**,430-436 Published by Akamai University, USA**.**

Ajiboye A.A, D.A Agboola and M.O Atayese (2009): Effect of some acid scarifications and *arbuscular* mycorrhizal(*Glomus mossae*) inoculation on seed germination and seedling growth of *Tamarindus indica L. Science Focus, 14(4)502-506*, Published by LAUTECH,

Ajiboye A.A, D.A Agboola, O.Y Fadimu and A.O Afolabi (2013): Antibacterial, phytochemical and proximate analysis of *Prosopis africana* seed and pod extract. *FUTA Journal of Research* in *Sciences* 9(1) 101-108**.**

Ajiboye A.A, M.A Atayese and D.A Agboola (2009): Effect of presowing treatments on seed germination and percentage starch content levels in *Tamarindus* indica, *Prosopis africana, Parkia biglobossa* and *Albizia lebbeck. Journal of Applied Sciences Research,*5 (10):1515-1519.

Ajiboye A.A, M.D Ajiboye and D.A Agboola (2011): Influence of oven dry heat (40^{o}C) treatment on germination of some savanna tree seed species: *Tamarindus indica Albizia lebbeck, Parkia biglobossa and Prosopis africana* in Nigeria; *Nigerian Journal of Botany* 24(2) 267-274**.**

Ajiboye A.A , O.O Oyedara, D.A Agboola and O.T Familola (2014) : Evaluation of antibacterial effects and phytochemical analysis of *Lantana camara linn* leaf and berry extracts. *European Journal of Medicinal Plants* 4(3):332-341.

Ajiboye A.A , Adekoya M.A, Isiaka I.A, Komolafe R.J, David A.O, Chukwuma D.M and M.D Ajiboye (2019): Comparative assessment of lectin content in leaves and seeds of two species of Okra, *Abelmoschus esculentus* and *Abelmoschus caillei, Asian Journal of Applied sciences* 7(5)562-568.

Ajiboye A.A , Agbolade J.O, David, A.O, Komolafe R.J, Adekoya M.A, Ajewole T.O and Chukwuma D.A **(2019)**: Assessment of Rhodanase from *Cocao* plant (*Theobroma cacao*) *IAETSD Journal for Advanced research in Applied Sciences* VI (VII), 2394-8442.

Ajiboye A.A, Ajiboye M.D, David A.O, Ajewole T.O, Oketayo O.O, Ofoyebi B.S and Agboola D.A(2019): Arginase in Seeds and seedlings of five varieties of tomatoes (*Solanum lycopesicum* L.) *International Journal of Research and Innovation in Applied science (IJRIAS)* iv(vii) 2454-6194

Ajiboye A.A (2015): Efficacy of mycorrhizal inoculations on seed germination and plant growth of Bambara groundnut seed *Vigna subterranean* (TVsu 283). *African Journal of Agricultural Research* 10(9)1022-1030.http://www.academicjournals.org/AJAR

Ajiboye A. A, A.O Ebofin M A Atayese M.O Adedire D.A Agboola M. Kadiri (2005): Dormancy studies and proximate analysis in *Dialium guineense* and *Prosopis* A*fricana. The Pakistan Journal of Forestry 55* (2) *2005.153-165.Published by Institute of Forestry.*

Bewley J.A (1997): Seed germination and Dormancy, *Plant cell* 9: 1055-1066.

Fadimu O.Y **A.A**, **Ajiboye** D.A Agboola M Kadiri and M.O Adedire (2013): Effect of seed sizes on seedling growth of Hog plum (*Spondia mombin*) *BEST Journal* 10(2):130-132.Published by Bayero University, Kano (BUK)**.**

Fawibe, O.O, **A.A Ajiboye** D.A Agboola (2014): Effect of water stress on growth performance of *Synsepalum dulcificum* (Schum.& Thonn.)

Daniell seedlings. *Journal* of *Tree Science* 33(1) 29-33. Published by Indian society for tree Scientist.

Fadimu O.Y, O.T.H. Hamzat **A.A Ajiboye** S.J Ipaye L.D Fagwalada O.I Fadimu I. Mohammed A.A Bem J.A.Bawa (2014b): Effect of Coconut milk and benzyl amino purine on the vegetative growth, nutritional and chemical constituent of *Amaranthus hybridus* (L) seedlings *Global Journal of Science Frontier Research* 14 (3)33-39.

Fadimu O.Y, **A.A Ajiboye** D.A Agboola. M Kadiri and M.O Adedire (2012): Effect of some combination of phytohormone on some growth parameters and vitamin c, carbohydrate, protein and chlorophyll contents of *Spondia mombin* (Linn) seedling. *Ife Journal* of *science* 14(2)397-403 Published by O.A.U, Faculty of Science.

Hamzat OT.H, **A.A Ajiboye** and Fadimu, O.Y (2015): Effect of *Arbuscular Mycorrhizal* (*Glomus intraradices*) Inoculation on seed germination and seedling growth of Bambara groundnut (*Vigna subterranean* (L)) *FUDMA J. Agric & Agric Tech*.1(1):87-91. Published by Federal University, Dutsima, Kastina.

Iwuala , E.N; **A.A Ajiboye ,** ; Kanu, R.N and Epoffiong, A.E (2016): The Impact of Exogenous Nitrogen and Salinity Stress in *Acalypha wilkesiana L..NSUK Journal of Science and Technology*, 6: 1,31-35.

Iwuala E.N , Kanu R.N, **A.A Ajiboye** and Fabiyi ,O (2016): Simulated drought influences Oxidative stress in *Zea mays* Seedlings. *Bayero Journal of Pure and Applied Sciences* 9(1): 185-190.

Iwuala E.N, Odjegba V, **A.A Ajiboye,** Umebese C, Sharma V and Alam A (2019): Effect of drought stress on the expression of genes linked to antioxidant enzymatic activity in landraces of *Zea mays* L and *Pennisetum glaucum* (L.) R. Br. *Indian Journal of Plant Physiology* 24(3):422-433.

Ogunyale O.G, Fawibe, O.O, **A.A Ajiboye** and D.A Agboola.(2014): Botanicals and Protein Sweeteners. *Journal of Advanced Laboratory Research in Biology* 5(4):153-168.

Ojo E.S, **A. A Ajiboye**, Fawibe, O.O., Adetutu B. and Agboola D.A (2017b): Comparative study on the Phytochemical content of the seeds and fruits of three Cucurbits. *Fulafia Journal of Science & Technology* 3: 1, 68-73.

Ojo E.S, **A.A Ajiboye**, Fawibe, O.O., Adetutu B. and Agboola D.A (2017a): Nutritional study on the seeds and fruits of three cucurbits in Southwestern Nigeria. *Fulafia Journal of Science & Technology 3:* 1, 134-138.

Ojo E, **A.A Ajiboye,** Fawibe O, Adetutu Bello, Ajewole T.O, Akinloye O. and Agboola D.A (2017): Effect of Phytohormone on seed germination and seedling vigour and phytochemical contents of three Curcubits. *Asian Journal of Crop Science*,4, 1-5.

Ugbaja .C.C, O. O. Fawibe, A.S Oyelakin, I. O Fadimu, **A. A Ajiboye,** D.A Agboola (2017): Comparative phytochemical and Nutritional Composition of *Trichosanthes cucumerina* (L) and some *Solanum lycopersicum* (L) cultivars in Nigeria; *American Journal of plant sciences*,8: 297-309.

Shosan O.O Fawibe **A.A Ajiboye** T.A Abegunrin and D.A Agboola (2014): Ethnobotanical survey of medicinal plants used in curing some diseases in infants in Abeokuta south local government area of Ogun state, Nigeria. *American Journal of plant science* Vol.5,3258-3268.

CHAPTER IN BOOK:

Ajiboye A.A, Fawibe O.O and Agboola, D.A. (2015): Tropical Forest Tree Seeds: Germination, Seedling Growth and Economic Importance, Recent Advances in Biological Sciences 11, 269-294.

BOOK :

Ajiboye A.A, Plant Physiology in Retrospect (2014)**,** 139 pages (ISBN 978-944-757-2) Tony Terry Print, Somolu, Lagos.

PROFILE OF PROFESSOR ABIODUN AKEEM AJIBOYE

Professor Abiodun Akeem Ajiboye hails from Obaa-Oke in Olorunda Local Government, Osogbo in Osun State, Nigeria. Although he was born and buttered in Agege, Ifako-Jaiye Lagos. He attended Iju Station Primary school, Iju, Ifako-Ijaye, Lagos state. He proceeded to Iju Grammar School, Akute, Lagos state.

Prof A. A Ajiboye is a Professor of Botany, he obtained a B.Sc. degree in Botany (2002), M.Sc. in Botany (2006) and a Ph.D. Botany in the year 2009, with a specialization in Plant physiology at the then University of Agriculture (UNAAB) now Federal University of Agriculture, Abeokuta, (FUNAAB), Ogun state, Nigeria.

Shortly after his second degree, he taught at Alaba Lawson Royal College. Oke-Ilewo Abeokuta, Ogun state where he served as a Biology teacher for both Ordinary and Advanced level students. He was a practical demonstrator at the Centre for Human Development CENHURD, Federal University, Abeokuta. He also taught pre-degree and foundation science students at the Federal university of agriculture. He was a part time facilitator for undergraduate courses at the National Open University, (NOUN), Osogbo Study Centre.

As a Class Teacher:

He taught at Nnodo Boys Secondary School Abakaliki, Ebonyi State from 2002-2003. He also taught "A" level Biology Tutor at Alaba Lawson Royal College, Abeokuta, Ogun state between 2005-2007. He was a WAEC Examiner between 2002-2007. He was a JAMB Supervisor between 2009-2010

At Osun State University, Osogbo:

He joined the services of Osun state university in 2007 as a pioneer staff of the Department of Biological sciences, College of Science, Engineering and Technology. Upon his assumption into office, he occupied various positions such as Examination Officer 2007-2009 College Examination Officer in 2009-2011. UTME Asst. Centre

Coordinator UNIOSUN Centre II 2010. Summer School Coordinator 2009-2011. He kick-started lectures at Osun state University, Osogbo Campuses in the year 2007.
He was a member of the College Academic Board in 2009-2014.
A Congregation representative to Senate 2010-2012.
Member of LOC for the Association of Vice-Chancellors in Nigeria's Conference held at Osun state university in 2010.
Member of LOC, Nigeria Society for Microbiology UNIOSUN Chapter in 2009.
A College Timetable Officer from 2010-2012.
Chairman, Examination committee from 2009-2013.
Chairman, Departmental Board from 2011-2014.
Chairman, Faculty of Science Students' Examination Malpractice Committee 20010-2013.
General Secretary of Osun State General Cooperative Society (2011-2013).

At Federal University Oye Ekiti :
Ag. Head, Department of Plant Science and Biotechnology 2014-2019.
Faculty of Science representative to the Faculty of Agric (2015-2019).
Pioneer Deputy Dean, FUOYE School of Post-graduate Studies, 2018.
Chairman, Special Issue on the Faculty Journal publication in 2017.
Member, University Central Examination Monitoring Committee.
Member, University Curriculum Committee 20019-2021.
Member Faculty Board of Studies 2014 -2021.
Member of University Ceremonials Committee 2021 till date.
Member of University Library Development Committee, 2021 till date.
Pioneer Director, Institute of Part-Time Studies, March 2021 -August, 2021.
Dean Faculty of Science 2021 till date.
Chairman Faculty A&PC 2021-till date.
Chairman, Faculty Board of Science, 2021 till date.
Chairman, Faculty Board of Studies, 2021 till date
Editor in Chief of the Faculty Journal FJPAS, 2021 till date.
Chairman, Venue Sub-committee for the last convocation in the university.

Chairman, Board Ventures and Consultancies 2022-till date.
Chairman, Junior Staff Disciplinary Committee 2022 till date
Member/Senate representative FUOYE Governing Council 2022 till date.

At University of Medical Sciences as Visiting Scholar:
Chairman, Examination Malpractices Committee @ Dept. of Bio Sci, UNIMED,2019 till date
Member, Curriculum Committee in 2019-2020.
Chairman, Faculty Practical Manual Development Committee2019-2020.
Coordinator, General principles of Basic Biology I, Bio 111 (a class of about 600 students) 2019-2020.

Prof A.A Ajiboye attended several Conferences and Workshops.
He made a live television presentation on Lagos Television (LTV) Lagos on a programme called: Virus Without Borders where he spoke on :" Role of Biotechnology in Having a Viral Free Society".

Membership of Societal bodies:
Member of the Botanical Society of Nigeria
Member, Ecological Society of Nigeria.
Member, America Society of Plant Science.
Member, Botanical Society of America.
He has won several TETFUND research and Travel grants in the University.

He has reviewed for several journals among which include, Nigeria Journal of Botany, Nigeria Journal of Biotechnology, Plant Science Today, Journal of Nigeria Young academic and FUOYE, Faculty of Science's Journal.

As a man of many parts, he is a former General Secretary of the Araromi Landlords' Association, Osogbo Local Government Housing Scheme off Ilesa Garage Osogbo, Osun state.

Patron of the Youth wing of the Blessed House of the Redeemer's Ministries, beside NULGE Secretariate, off Ilesa Garage Osogbo.

Prizes, Grants and Awards:
Best Graduating Students in Economics and Agriculture (SSCE),1996
He won 2million TETFUND grants on research of the effect of lead in foods and food products in Osun State.
He also won another 2million TETFUND Grant on the extraction of oil from *Moringa olifera* seeds.

Commendations:

a) He received Letter of Commendation from the Pioneer Vice-Chancellor of UNIOSUN for full participation in AVCNU Conference as LOC, Sub-Committee on Logistics UNIOSUN, 2010.
b) Commendation as Assistant Centre Director for UTME Examination at UNIOSUN, 2011.
c) Commendation by the Provost of the College of Science, Engineering and Technology, UNIOSUN for obtaining full Accreditation status as the Acting Head, for B. Sc Microbiology and other related B.Sc. programmes in the Department of Biological Sciences, UNIOSUN 2012.
d) Special Commendation from the Dean Science, for Excellent performance at 2017 Accreditation exercise, for being Ag. Head, Department of Plant Science and Biotechnology, (FUOYE).

He has supervised over 300 undergraduates and one Master's Degree Students and co-supervised two Ph.D. students while currently serving as a major supervisor for a Ph.D. student.

He has over 70 Journal publications with one chapter in book and a Sole Authored Book.

Prof Abiodun Akeem Ajiboye is happily married to Mrs Modupe Doris Ajiboye (Nee Olonimoyo) and the marriage is blessed with four children.