

TREE CROP AND PRODUCTS

NPA1055 Mejule, F.O. and Lemeke, R. (1982). Changes In Weight Of Cocoa During Storage.
NSPRI Technical Report. No.15. Pp. 137-142.

Cocoa on arrival into and evacuation from the Ikeja cocoa board stores were weighted and the changes in weight Over the period of 11 months storage were noted . The insect infestation and the percentage moisture content of the beans were assessed while the relative humidity and temperature of the stores were monitored . There was a significant drop in weight and moisture content of the stored cocoa by 1 .54% and 0 .31% respectively .

NPA 1056 Mijinyawa, Y. and Falayi, F.R. (2000). Coefficient Of Static Friction Of PalmKernel Shell On Selected Structural Surfaces.
Proceeding Of The International Conference And Millennium General Meeting Of The Nigerian Institution Of Agricultural Engineers. (A Division Of The Nigerian Society Of Engineers. First Vol.22. Pp.76-77.

An experiment was conducted to measure the static coefficient of friction of palm kernel shell (PKS) on plywood, galvanized iron and glass.

The results of the test showed that the coefficient of static friction of PKS increases with moisture content irrespective of the surface employed. The values of coefficient of static friction obtained varied from 0.42 to 0.75 on plywood, 0.34 to 0.62 on galvanized iron and 0.32 to 0.56 on glass for moisture contents ranging from bone dry to 18.4% wet basis. This implies that PKS is most resistant to flow on plywood and least on glass. A statistical analysis showed that these variations with structural surfaces were significant. Further similar work using the cracked palm kernel is recommended.

NPA 1057 Mijinyawa, Y. and Falayi (2000). The Influence Of Post-Cracked Exposure Period On Some Physical Properties Of Palm Kernel Shells.
Proceedings Of The First International Conference And Millennium General Meeting Of The Nigerian Institution Of

Agricultural Engineers (A Division Of The Nigerian Society Of Engineers. Vol.22. Pp. 78-81.

A series of experiments were conducted to measure the influence of the duration of exposure to inclement weather after cracking on the bulk density, solid or true density, porosity, and water absorption characteristics of palm kernel shells (PKS).

The results showed that the bulk and true densities decreased respectively from 0.60g/cm^3 and 1.37g/cm^3 , for freshly cracked shells to 0.53g/cm^3 and 1.25g/cm^3 for shells that have been exposed to inclement weather for over ten years after cracking. The porosity and ability to hold moisture increased with the duration of exposure.

These experimental observations are attributable to the organic nature of the shells as a result of which there is a gradual biodeterioration especially of the adhering fibres. This reduces the dry matter content and increases the void. Density values obtained are comparable with other materials of construction such as earth and wood which is an indication that PKS has potentials for use as a material for construction. Further work on the mechanical properties of the material is recommended.

NPA 1058

Musa, R.E.O. and Jambawal, J. (2001). Small Scale Palm Oil Processing By Local Farmers In Sierra Leone, Ghana And Nigeria.

Proceedings Of The International Conference & Annual General Meeting Of The Nigerian Institution Of Agricultural Engineers. Vol.23. Pp. 305-313.

The authors identify the small-scale palm oil processing methods which were developed and its usage in those countries.

NPA 1059

Mohammed, B. (2001). A Review Of The Causes Of Wood Deterioration And Some Preventive Measures. And Zone **Journal Of Engineering Technology And Environment. Vol. No.1. Pp. 35-40.**

This paper examines the problems and prospects associated with the structural use of wood. The paper reveals that wood deterioration is caused by microbiological and entomological agents and weathering among others. Deterioration due to microbiological and entomological agents is as a result of the actions of bacteria, fungi and insects while weathering is as a result

of the actions of water, light and heat. The paper also suggests that the deterioration due to these two main causes can be prevented through the use of naturally durable woods, wood preservatives and site and soil treatments. The paper concluded by observing that wood is the most widely used of all building materials because of its abundance and good workability.

NPA 1060 Negedu Anthony (2002). Production And Utilization Of Oil Palm *Elaeis guineensis* (jacq).

Raw Materials Update. Vol.2. No.2. Pp. 7-8.

The author highlights the commercial importance , production and utilization of oil palm .

NPA 1061 Nuhu, A.M., Mshelia, M.S. and Yakubu,Y. (2000). Antimicrobial Screening Of The Bark Extract Of Pterocarpus Erinaceus Tree.

Journal Of Chemical Society Of Nigeria. Pp. 85-87.

Pterocarpus erinaceus is a plant that belongs to the family: Papilionaceae and is of the pterocarpus gems (group of woody plant). It grows in most parts of Nigeria and is explored because of its ethanomedical importance. The extract of the Bark of the plant was screened against some microorganisms. That are disease causing with a view to assessing the efficacy. The result obtained showed high activity against *Staphylococcus* species at higher concentrations, while moerate activity was recorded for *Streptococcus* species and fungi. Qualitative analysis indicated the presence of alikaloids, tannins, saponins and flavonoids in the bark extract

NPA 1062 Nwankwo, F.I. and Nwogu, E.O. (1976). A Survey Of Seasonal Quality Of Bagged Palm Kernels And Cocoa Awaiting Export From Port-Harcourt.

NSPRI Technical Report. Pp. 47-56.

An examination of bagged palm kernels and cocoa beans showed that infestation was highest on palm kernels. This could be attributed to long storage particularly at the wharf, which was reflected in the high free fatty acid recorded from palm kernels at the wharf. Cocoa was in reasonable condition though again

slightly less infested in the Arcon sheds and was in need of fumigation before export

NPA 1063

Nwokedi, G.I.C. (1966). A Comparison Of Some Characteristics Of Commercial Brown And White Palm Kernels. **NSPRI Technical Report. No.10.** Pp. 89-92.

The oil was extracted cold with petroleum spirit [boiling range 62°C - 68°C]. Supplied by Shell Company of Nigeria Limited]. Solvent was removed as much as possible under reduced pressure in a water bath and then gently heated to a temperature not exceeding 85°C for about 20 minutes. The following analyses were carried out on oil from white, brown and mixed kernels; free fatty acid content, moisture content, saponification value; aflatoxin and colour.

NPA 1064

Nwokedi, G.I.C. (1966). A Quantitative Method For Grading Palm Kernels. **NSPRI Technical Report. No.11.** Pp. 93-96.

There is no doubt from the results that the grading of palm kernels based on standard colours appears satisfactory.

NPA1065

Odeyemi, O.O. (2002). Influence Of Environmental Factors On Competition Between *Ephesia cautella* (Walker) And *Corcyra cephalonica* (Stainton) In Stored Cocoa *Theobroma cacao* (Linn) **Post-Harvest Science. Vol.No.** Pp. 40-43.

Competition between *E. cautella* (Ec) and *C. cephalonica* (Cc) was studied under conditions of density ratios 4Ec:8Cc, 6Ec:6Cc, 8Ec:4Cc:16Cc, 10Ec:10Cc, 16Ec:4Cc, 4Ec:36Cc, 20Ec:20Cc, 36Ec:4Cc, temperatures of 20°C, 27°C, 32°C and relative humidities of 15%, 35%, 75%. Experiments were set up using adult insects of both species in equal and unequal numbers.

Interspecific competition between the moth species has effect on their population but to varying extents. The mechanism of competition involved some components of interference such as influence of temperature, relative humidity and aggression of larvae which depends on the initial input numbers of either species. Using the replacement series approach, it was predicted that when *E. cautella* and *C. cephalonica* are brought together as components of the same ecosystem, *E. cautella* becomes extinct while *C.*

cephalonica dominates at high temperature and low relative humidity. At high temperature and high relative humidity, both species will coexist while *C. cephalonica* becomes extinct with increased relative humidity

NPA 1066

Odunfa, S.A. (1989). Bacteria Involved In The Deterioration Of Nigerian Palm Oil under Storage.
International Biodeterioration. Vol.25. Pp. 393-405.

The percentage of lipolytic bacterial colonies in samples of good-grade palm oil varied from zero to 26%, while in the deteriorated oil it was from 52-73%. The organisms isolated and their percentage frequencies were *Bacillus subtilis*, 43%; *B. pumilus*, 31%; *B. laterosporus* 14%; *B. megaterium*, 6%; and *B. brevis* 6%. *B. subtilis* and *B. pumilus* were the only species with pronounced lipolytic activities. Over the range 25-40°C, temperature had a profound effect on the lipolytic activities of these two species. The deterioration of the palm oil was ascribed to improper processing which leaves traces of water in the oil and also to post-processing contamination from the use of previously used containers and from unhygienic handling during transport and marketing.

NPA 1067

Odunfa, S.A., Komolafe, O. B. and Ekunsanmi, J.F. (1987). Effect Of Chemical Preservative Of The Microorganisms Isolated From Fermenting African Locust Bean.
Nigerian Food Journal. Vol.5. Pp. 66-75.

The effects of sodium benzoate (SB), sodium metabisulphite (SMS) and sodium chloride on the growth of *Bacillus subtilis* and *Staphylococcus* species from fermenting African locust bean (*Parkia biglobosa*) were studied. All the preservatives showed inhibition to the test microorganism, the *Staphylococcus* species were more salt tolerant, growing at 15% sodium chloride concentration. More than 0.8% of each of sodium benzoate and sodium metabisulphite was required to inhibit the growth of the *Staphylococcus* species. The growth of *Bacillus subtilis* was inhibited in 0.2% concentration of sodium benzoate (SB) and sodium metabisulphite (SMS). More than 8% of sodium chloride was required to inhibit *B. subtilis*. Both sodium benzoate and sodium chloride enhanced protease activity of *B. subtilis* up to 1.5% concentration. In view of the fact that the levels of SB and SMS required to inhibit growth were above the acceptance levels

in food, 15% NaCl was recommended for use in preservation of 'iru'

NPA 1068 Ogunjobi, S.O., Oluwatosin, A., Oluleye, A.K. and Adesina, O. (2000). Effect Of 35% Inclusion Of Cocoa Pad Husk (C.P.H.). In The Diet Of Growing Goats.
Farming Systems Research And Extension. Technology Generation And Dissemination. Pp. 63-65.

The result showed that there was no case of disease infestation or any nutritional disorder as a result of the trial feeds. Treatment T₂ has a slight economic advantage over the check.

NPA 1069 Ogunjobi, S.O., Oluwatosin, A., Asaolu, O.O.A. and Arabi, R.O. (2000). Effect Of Phosphine Tablet On The Storage Of Kolanut.
Farming Systems Research And Extension Technology Generation And Dissemination. Pp. 66-69.

The results showed the least level of pest infestation was observed in the farmers practise [7.84%] While nuts stored without any formof pestcontrol recorded 36.9%. Nuts stored using the NSPRI Technology recorded 20.52% pest infestation. As far as pest control in stored kolanuts is concerned, it would seem as if the farmers” practise is superior.

NPA 1070 Okobi A.O. (1975). A Study Of The Effect Of (5) Months Storage On Bagged Cocoa In A 1, 25 Ton Stck
NSPRI Technical Report. No.1. Pp. 13-15.

A 1,000 ton stack of bagged cocoa beans was studied over a period of 5 months in a cocoa warehouse at Ikeja, Lagos. Free fatty acid increased from 0.43% to 0.77%. Moisture content remianed constant at 6.6%. Insect infestation as measured by suction trap fell to a low-level by the end of the investigation from 432 per four hours to 25 per four hours.

NPA 1071 Okoli, E. C. and Ezeneké, O.I. (1989). Performance Of Palm Wine Extract As Bakers Yeast Substitute In Maize/Wheat. Composite Flour Bread Making.
Nigerian Food Journal. Vol.7. Pp. 1-11

The feasibility of complete or partial replacement of baker's yeast with palmwine extract (PWE) in 30/70 maize/wheat composite flour breadmaking was investigated. Bread was made using

baker's yeast substituted with palmwine extract at levels of 100%, 90%, 80%, 70%, 60%, and 50%. Sample made with 100% baker's yeast was used as control. Palmwine extract and yeast/PWE blends were incorporated into the dough after brewing with water, sugar and some flour for 60 minutes at 30oC. Specific volumes of loaves made with 100% PWE were significantly lower than those of the control (P 0.05). Formula containing 20/80 yeast/PWE blend was found to be optimum for specific colume response. Organoleptic evaluation showed that fresh samples made with 100% PWE were acceptable (P<0.05) in terms of aroma, taste, volume and crumb texture, but better (P<0.05) loaves were obtained with 20/80 yeast PWE blends and other blends containing higher baker's yeast levels. Storage studies showed that loaves made with 90% and 100% PWE developed sour taste and pronounced palmwine flavour and became unacceptable after 3 day. Other samples stored well for 4 day

NPA 1072

Olorunfemi, M.O., Olaofe, I., Oladeji, E.O. and Ayodeji, O.I. (1987). Metal Content Of Some Cocoa Beans Produced In Ondo State Nigeria.

Nigerian Journal Of Science Food Agriculture. Vol.41. No.3.
Pp. 241-245.

The metal contents in 11 cocoa samples collected from different parts of Ondo State, Nigeria, were determined by the use of atomic absorption spectrophotometry. The moisture and ash contents of the samples were in the range 2.0-3.2% and 2.0-3.8%, respectively, the means being 2.5% and 2.9%, respectively.

The mean contents of calcium, magnesium, potassium, sodium, manganese, iron, copper and zinc were 25.5, 5170, 2480, 21, 17,15.8, 8.2 and 62 ug g⁻¹, respectively of cocoa bean as purchase. Magnesium was present at much higher levels that the other metals. In some cases the difference between the mean metal content of samples was significant.

NPA 1073

Oludemokun, A.A. (1982). Processing Storage And Utilization Of Kolanuts *Colanitida* And *C .acuminata*.

Tropical Science. Vol.24 (2). Pp. 111-117

Kola nuts are harvested mainly between September and January, Afterwards the seeds, complete with seeds coats, are removed from the pods, then soaked to facilitate removal of the seed coats. The

seeds are 'sweated' for a few days before being stored in baskets lined with leaves.

Besides soaking in water, there are other ways of softening the seed coats to facilitate peeling. Nuts with seed coats may be heaped on the ground or left in a basket for some days and occasionally moistened. Alternatively, they may be buried in moist soil or termite heaps. They are later washed, sweated and stored.

Storage is usually in baskets lined with leaves of *Thoumatococcus* sp., *Aframomum* sp., *Musa* sp., (banana or plantain). The leaves are replaced about once in three weeks, defective nuts being removed at the same time. To avoid problems inherent in the traditional use of leaves for storage, there have been some attempts to store kola nuts in polythene bags, so far without success.

During storage, kola nuts are liable to insect and fungus attack. *Balanogasteris colae* and *Sophrorhinus insperatus* have been identified as the most devastating insect pests of stored kola, while *Botryodiplodia theobromae* is the most important non fungus of the crop. Attempts have been made to control both insect and fungus attack in storage.

Traditionally kola is used chiefly for chewing: it has also been used during ceremonies and as an indigenous medicine valued for its healing and mildly stimulating properties. Recently, however, more uses have been found for kola nuts, for example, as an ingredient in soft drinks and wine.

NPA 1074

Oluka, S.I. (2001). Production And Processing Of Cashew In Nigeria.

Journal Of Engineering Technology For Food Agriculture Environment.Pp 30-39

The economic importance of Cashew is widely growing in Nigeria. Cashew production has been relegated to the background despite the earlier recognition of its importance in the economic growth of Nigeria. Cashew is still a wild cash crop suffering the yearly effects of bush burning.

This work aims at highlighting the production, processing and the general economic uses of cashew, and its byproducts. The work includes the soil and climatic conditions, cultural and management practices necessary for growing the cashew tree. Also included in the work are the uses and processing of cashew fruits; cashew nut shell liquid extraction; C.N. Kernel Oil extraction etc., and the manufacture of wine from the cashew apply.

Engineering techniques for improving the production and processing of cashew are also included. It is hoped that this work will promote large-scale cashew plantations and enhance increased processing of cashew and its products.

NPA 1075

Onuoha, S.A., Olawepo, O., Akoma, O. and Eluwa (1999). Preliminary Studies On the Production Of 'Elonuwon'. A Nigeria Wine From Parkai Biglobosa. **Proceedings Of 23rd Annual NIFST Conference**. Pp. 9-11.

The results obtained in the study show that it is possible to upgrade the technology of 'Elonuwon' production.

NPA 1076

Onwuka, N.D., Nwanjobi, E.M. and Onwuka, G.I. (1998). Effects Of Some Chemical Preservatives And Packaging Materials On the Shelf-Life Of Cola Nitida. **Nigerian Journal Of Technology Education. Vol.15. No.1**. Pp. 117-123.

Cola nitida seeds were stored at both room and refrigeration temperatures, using different packaging materials and different concentrations of sodium chloride, sodium metabisulphite and Ascorbic acid. The effects of these on the storage life of the nuts were analysed during and after a 12-week storage period. At given periods, the stored samples were examined for browning, drying, fungal growth and any other noticeable change. The fungal growth were also isolated and characterised. The result showed that the storage of Cola nitida at either room or refrigeration temperature without pre-packaging exhibits poor storage life in terms of moisture loss, browning and fungal growth.

NPA 1077

Onwuka, G.I., Onwuka, N, D. and Neburagho, W.O. (1999). Some Physical And Chemical Properties Of Rubber Seed Oil (*Havea brasiliensis*). **Proceedings Of 23rd Annual Conference (NIFST)**. Pp. 236-237.

The result of toxicological studies showed that the oil is not toxic. This oil has a smoke point of 218.5 °C. This shows that oil from rubber tree seeds can serve a very important culinary in food processing. Other important physical and chemical indices such iodine value, saponification value, non-saponifiable matter [table 1.] are still within acceptable limits.

NPA 1078 Onyearu, A.K. (1966). The Keeping Quality Of Palm Kernels In Relation To Climate And Insect Infestation.
NSPRI Technical Report. No.12. Pp. 97-102.

The major pests of palm kernels as indicated by earlier surveys^{2,3} were found in the present investigation. It is, however, surprising that *Ahasverus advena* and *Tribolium castaneum* assumed much greater prominence than *carophilus dimidiatus* and *nacrobia rufipes*. Since both insect [*I e. Ahsverus* and *Tribolium*] are secondary pests of stired products their predominance suggests the presence of degradation products and possibly mould directy or indirectly associated with the kernels

NPA 1079 Oyeniran, J.O. (1969). Mould Deterioration Of Nigerian Kolanuts.
NSPRI Technical Report. No.8. Pp. 53-55.

Twenty-two mould species were isolated from three samples of Nigerian kolanuts and identified. Of these, nine have not been reported before from stored products in Nigeria perhaps because the kolanuts from which they were isolated had much higher moisture contents (over 60 per cent) than any other stored product so far examined.

NPA 1080 Oyeniran, J.O. (1970). Internal Mouldiness Of Commercial Cocoa In Ibadan, Western State Nigeria.
NSPRI Technical Report. No.2. Pp. 19-27.

A survey of internal mouldiness of commercial cocoa beans from nine produce stores in Ibadan was carried out during the 1969-70 cocoa season. One hundred and one samples were obtained and 300 beans from each sample were examined for mouldiness. The samples were found to contain low percentage of internally mouldy beans generally; an average of 1.6% was obtained. A partial relationship was observed between the overall moisture content and mouldiness of cocoa at different times of the season. Twenty-eight moulds, the largest number so far recorded from Nigerian cocoa were isolated, but only thirteen occurred frequently. Others occurred very occasionally and most of them have not been isolated before from commercial cocoa. There was no marked variation in mould species at different times of the year as was anticipated.

NPA 1081

Oyeniran, J.O. (1972). Some Observation On The Quality Of Nigerian Cocoa From The Port Of Shipment In Lagos. **NSPRI Technical Report**. No.2. Pp. 25-30.

Samples of cocoa beans from the export consignments at Apapa Port in Lagos were obtained periodically over two years – 1971 and 1972. They were examined for moisture content, internal mouldiness, insect-damage and other quality defects of commercial cocoa. The results showed that in general, these samples were extremely good in quality – having low moisture content, average of 6.8 per cent, low internal mouldiness, average of 0.9 per cent and low amounts of the other defects. However, many samples showed evidence of insect activity, even though present in little amounts. It appears necessary that more adequate pest control measures should be taken to reduce this defect still further from Nigerian export cocoa.

NPA 1082

Oyeniran, J.O. (1974). The Comparative Infectivity Of Cocoa Beans By Moulds. **NSPRI Technical Report**. No.2. Pp. 37-38.

Cocoa beans were inoculated with the spores of eight species of moulds previously isolated from commercial cocoa to find out if each species could on its own cause internal mouldiness of the beans. All the species penetrated the beans, but some did so faster than others. *Rhizopus arrhizus* and *Aspergillus chevalieri* penetrated nearly 100% of the beans within the first month of storage. The others, except *Penicillium citrinum*, penetrated 90-100% of the beans in two months

NPA 1083

Oyeniran, J.O. (1974). The Effect Of Temperature On The Growth And Development Of The Storage Moulds Of Cocoa **NSPRI Technical Report**. No.3. Pp. 39-43.

Ten species of moulds isolated from cocoa were subjected to various temperatures of incubation: room temperature (27-29°C), 40°C, 45°C and 50°C to test their tolerance to these temperatures. All the moulds grew well at room temperature. Most of them grew well also at 40°C but growth of the majority of the species was inhibited at 45°C. All except two died at 50°C. The result of this test was related to the occurrence of these moulds at different stages of cocoa preparation and storage.

NPA 1084

Oyeniran, J.O. (1976). The Influence Of Moisture Absorption On Internal Mouldiness Of Cocoa Beans During Storage In Controlled. Atmosphere.

NSPRI Technical Report No.1. Pp 31-37.

Samples of cocoa beans stored in atmospheres of various relative humidities (R.H.) were examined at intervals for moisture content and internal mouldiness. It was found that the moisture content increased as the R.H. of the atmosphere increased. Internal mouldiness commenced at R.H. 75% and increased sharply between R.H. 81 and 98%. Thirteen mould species were isolated and some variation in mycoflora was noted at the different levels of relative humidity

NPA 1085

Oyeniran, J.O. (1976). A Study Of Biochemical Effects Of Some Moulds Of Commercial Cocoa.

NSPRI Annual Report. No.2. Pp. 39-45.

A study was conducted to test five moulds previously isolated from commercial cocoa to see their effects on the free fatty acid content of the beans. One of them *Aspergillus flavus* was also tested to see if it would produce aflatoxin in cocoa as in groundnuts or maize. Sterile Cocoa Beans Were Inoculated With Pure Cultures Of *Aspergillus flavus*, *Aspergillus fumigatus*, *Aspergillus chevalieri*, *Penicillium citrinum* And *Paecilomyces varioti*. replicate samples Of treated and control were stored at temperatures of 25°C, 35°C And 45°C, also to see the effect of temperature on the biochemical action.

It Was Found That Most Of The Moulds Caused An Increase In The Free Fatty Acid Content Of The Cocoa Beans. However, *A.flavus* Did Not Produce Aflatoxin In The Cocoa Even With Internal Mouldiness Of Over 90% Developed Within 4 Weeks.

NPA1086

Oyeniran, J.O. (1973). The Effect Of Prolonged Fermentation On The Internal Mouldiness Of Cocoa.

NSPRI Technical Report. No.3. Pp. 33-37.

The experiment on mouldiness of cocoa beans fermented for various lengths of time is reported. Samples of cocoa were fermented for 4 to 11 days and internal mouldiness of the beans was found to commence as from the 6th day (4%), increasing steeply until the 11th day (31%) of fermentation. The species of moulds causing the mouldiness are: *Aspergillus fumigatus*, *Mucor pusillus*, *Aspergillus flavus*, *Aspergillus niger* and *Rhizopus*

arrhizus. The weight of the cocoa beans decreased substantially as the fermentation prolonged.

NPA 1087

Oyeniran, J.O. (1985). The Effect Of Pre-Harvest Fungal Infection Of Cocoa Pod On Mouldness Of Prepared Beans. **Proceedings Of 8th International Cocoa Research Conference**. Pp. 829-833.

The fungi which cause the internal mouldiness of commercial cocoa in Nigeria infect the beans at different stages of cocoa preparation, storage and marketing. The role played by the species which infect the pods and beans before harvest, is the subject of the investigation reported in this paper.

Ripe cocoa pods, bearing pre-harvest infection were collected and the beans from them were examined. The beans were found to be either black, brown or white. Out of the black beans from the diseased pods, as many as 63.1% were internally mouldy, 9.1% of them with visible mycelium. In the brown beans, 34.4% were mouldy out of which 1.9% were visible. The significance of the microscopically mouldy beans led to experiments in which black pre-harvest diseased beans were mixed with normal healthy beans and fermented at temperatures up to 45°C and 51°C respectively, and later dried. The moulds isolated from the diseased beans at harvest were mainly *Botryodiplodia theobromae*; while *Fusarium solani* and *Macrophoma* sp. occurred in a few beans.

In the 45°C experiment, it was found that as much 9.4% of the internally mouldy black beans still had viable mycelium of *Botryodiplodia theobromae* after fermentation. In the beans fermented at 51°C, the mycelium of all the pre-harvest moulds was killed.

In order to confirm this even further, the mycelium of *B. theobromae* in pure culture was incubated at different temperatures ranging from 25°C to 50°C for a period of 1-15 days. The viability of the fungus was determined on alternate days. It was found that while the growth of the mycelium was vigorous at lower temperatures, it was restricted but not dead at 45°C; and was dead at 50°C.

This showed that if the temperature of fermentation is not high enough, internal mouldiness by pre-harvest moulds would still remain viable and develop further. If high, the mycelium will be killed. It was found that if all the beans with dead mycelium and those with *B. theobromae* and similar species arose from pre-harvest infection, this factor alone possibly contributes nearly a third of the internal mouldiness of commercial cocoa in Nigeria.

NPA 1088

Oyeniran, J.O. (1985). The Influence Of The Storage Environment On The Quality of Commercial Cocoa With Special Reference To Mouldness Of The Beans.

Proceedings Of 8th International Cocoa Research [Unpublished Conference. Pp. 1- 9]

Two experiment were carried out to show the hygroscopic nature of cocoa and the effect of such phenomenon on the moisture and mould content of the commercial beans during storage . In the first experiment , cocoa beans were kept for three months in desiccators maintained in constant relative humidities [R. H .] of 65% , 71% , 84% , 90% , and 98% . The cocoa beans changed to moisture contents in equilibrium with the different relative humidities , Mouldness developed in the beans from R . H . of 75% upwards with the highest mouldiness of 95% being recorded at 98% R . H . . In the second experiment , commercial cocoa beans were kept in natural atmosphere of laboratory verandah and room. During 3 months of storage , the beans fluctuated in moisture content ending up with higher moisture contents than they started with . Mouldiness also developed in the beans especially in the samples kept on the laboratory verandah . Xerophytic moulds especially those belonging to the *Aspergillus glaucus* group were the most commonly isolated species in the mouldy beans detected .

NPA 1089

Opeke, L.K. (1982). Cocoa Harvesting And Processing. Tropical Tree Crops. Pp. 108-122. (891) Opeke, L.K. (1982). Kolanut Harvesting And Processing.

Tropical Tree Crops. Pp. 166-173.

The experiments demonstrated the hygroscopic nature of cocoa beans and showed the extent to which the different levels of beans humidity of storage environment can affect the moisture content and mouldiness of the beans.

NPA 1090

Opeke, L.K. (1982). Coffee Harvesting And Processing.

Tropical Tree Crops. 2Pp. 197-201.

Coffee processing may be divided in to two phase they are pre industrial and an industrial phase .The pre- industrial processing involve the wet and dry methods while the operations involved in the industrial phase of processing are graving, roasting and griding.

- NPA 1091 Opeke, L.K. (1982). Harvesting Of Rubber.
Tropical Tree Crops.Pp. 226-240.
- Latex in the main economic product from rubber tree. Latex is obtained by traping the trunk of the tree. The time of tapping rubber for highest provition is in the early hours of the morring.
- NPA 1092 Opeke, L.K. (1982). Harvesting And Processing Of Cashew.
Tropical Tree Crops. Pp. 248-250.
- The methods of harvesting and the peseant and commercial methods of processing are described also the uses of cashew products is highlighted.
- NPA1093 Opeke, L.K. (1982). Processing Of Palm Fruits .
Tropical Tree Crops. Pp. 267-274.
- The operations involved in the processing of palm fruits to palm oil kernels are described. The stages highlighted involved sripping, milling, separation, processing-clarification storage and sales.
- NPA 1094 Opeke. L.K. (1982). Harvesting And Processing Of Coconut.
Tropical Tree Crops. Pp. 283-287.
- The process of harvesting and products that can be obtained from coconut palm majority nuts and other useful products are highlighted.
- NPA 1095 Opeke, L.K. (1982). Harvesting And Processing Of Tea.
Tropical Tree Crops. Pp. 296-297.
- The work illuminated the harvesting procedure for tea, different types of tea are explained to depend the methods of processing caring and fermenting . Other steps to be taken to produce quality tea are highlighted.

NPA 1096

Olaniyan, A. M. (2003). Effects Of Thermal Pre-Treatments On The Bioyield Strength Of Shea Kernel. **Proceedings Of The 4th International Conference And 25th Annual General Meeting Of The Nigerian Institution Of Agricultural Engineers. Vol. 25.** Pp. 258-268.

Laboratory investigations were performed on thermally pretreated shea kernels to study the effects of temperature, heating time and loading position on load, deformation, energy absorbed and strain at the bioyield point of the kernels. Shea kernels were heated at 40, 60, 80 and 100°C for 10, 20 and 30 min and then compressed by the Testometric Universal Testing Machine in axial, lateral and transverse loading positions using a loading rate of 1.25mm/min. The data obtained from the experiments were statistically analysed for the Analysis of Variance (ANOVA) and Duncan's Multiple Range Test (DMRT) using the GENSTAT package.

Results of the statistical analysis show that all factors considered were significant at P. 0.05 on the strength parameters at bioyield with the exception of temperature which was not significant on energy absorbed and strain at bioyield. Some interactions were significant on load, deformation and strain at bioyield but none was significant on energy absorbed at bioyield (all at P.0.05). Load, deformation, energy absorbed and strain at bioyield decreased with increasing temperature and heating time. The highest load, deformation, energy absorbed and strain at bioyield were in the transverse loading position while the lowest were in the axial loading position. Information from this study should enable the development of more efficient handling and storage system for shea kernels.

NPA 1097

Qureshi, A.H. (1966). The Toxicity Of Hydrogen Phosphite To Some Insect Pest Of Stored Products Fumigated In 44 Gallon Drums Containing Cocoa. **NSPRI Technical Report. No.20.** Pp. 133-136.

The work shows the present using airtight containers $\frac{1}{4}$ pellet of "phstoxin" in a 44 gallon drum, *i.e.* approximately 0.23 mg./ l; would give a total kill of adults of *S. zeamais*, *T. castaneum* and *A. fasciculatus* in 24 hours exposure. This equals $c \times t$ product of 5.52mg./l \times hr.

NPA1098

Qureshi, A.H. and Ajulo, E. (1971/73). Preliminary Quality Assessment Of Nigeria Sheanuts Stored In Kano. **NSPRI Technical Report**. No.7. Pp. 51-52.

An account is given of investigations into oil content, free fatty acid content and moisture content of sheanuts of normal trading quality. Means of 41.30% for oil content, 8.31% for free fatty acid content and 5.62% for moisture content were obtained in November-December.

NPA1099

Rees, A.R. (1962). Some Observation On The Preparation And Storage Of Oil Palm Seed. **Journal Of West African Institute For Oil Palm Research Vol.** Pp. 329-338.

The experiments demonstrated the hygroscopic nature of cocoa beans and showed the extent to which the different levels of beans humidity of storage environment can affect the moisture content and mouldiness of the beans

.NPA 1100

Rilley, J. and Simmons, E.A. (1966). A Survey Of Palm Kernels Exported From Apapa And Port-Harcourt With Special Reference To Discolouration And Infestation. **NSPRI Technical Report**. No.9. Pp. 81-88.

The result show the average condition of kernels sampled at Apapa and Portharcourt month by month over a period of one year at Apapa and thirteen months at Portharcourt. The mean count of insects per bag from the seavings is similarly recorded.

NPA 1101

Rilley, J. and Simmons, E.A. (1967). The Fumigation Of Large Cocoa Stacks In a Specialized Designed Cocoa Warehouse Using Phosphine. **NSPRI Technical Report**. No.1. Pp. 17-27.

The results of sieving 20 bags before and after fumigation are shown in table 2. Sieving gave comparable counts for living adults of some species in the investigation;

- NPA 1102 Riley, J. and Simmons, E.A. (1967). The Fumigation Of Large Cocoa Stacks At The Ikeja Cocoa Stores Using Methyl Bromide In The 1966-67 Cocoa Season.
NSPRI Technical Report. No.2. Pp. 29-38.
- The result shows that the special cocoa stores at Ikeja are suitable for use in fumigating cocoa beans with methyl bromide but further modifications to the system of ventilation are needed to avoid having to close the ventilation shafts by means of sheeting which prevents the use of the fans for preliminary airing.
- NPA1103 Riley, J. (1968). A Trial Of Dichlorovous Pest Strips For The Control Of Insect Pests Of Cocoa Stored In A Special Designed Warehouse At Ikeja:Lagos.
NSPRI Technical Report. No.1. Pp.15-20
- The mean results from the thermohygrogh about 4 feet above the floor in the central place between the stacks gave a temperature of 28° C and are relative humidity 78 per cent. The thermohygraph on top of the stack gave a mean temperature of 33.6°C and mean relative humidity of 57.1 per cent cocoa opposite both these area s had a moisure content of 7.13 per cent as can be seen from . Table 4 which gives the means moisure contents found in the various perts of the stack.
- NPA 1104 Riley, J. (1969). The Fumigation Of Large Cocoa Stacks In A Special Designed Cocoa Warehouse Using Phosphine Part 2.
NSPRI Technical Report. No.1. Pp. 17-22.
- Phosphine in the form of proprietary tablets of aluminium phosphide each containing 1,000 mg. Phosphine was applied to bagged cocoa beans in an airtight warehouse. 7,160 tablets were applied to the top of two stacks of cocoa containing in all 2,500 tons. The store volume was 9,226 cubic metres. The mean et product obtained was 12.48 mgh/1. Good control of all insect pests was obtained but reinfestation by the day-flying *Carpophilus dimidiatus* took place after airing.
- NPA 1105 Riley, J. (1970). The Fumigation Of Large Stacks In A Specially Designed Cocoa Ware House Using Phosphine.
NSPRI Technical Report. No.1. Pp. 15-17.

7,200 tablets of aluminium phosphide were laid on the floor round 2,400 tones of bagged cocoa beans in a warehouse designed to be airtight. An even distribution of gass was obtained but considerable leakage appeared to have occurred as a c x t product (mg.h x 1) of between five and six was obtained instead of the 11 to 16 expected from previous tests. A good kill of insects was obtained.

NPA 1106

Riley, Jaw and Jegede, J.O. (1971). Studies On Infestation At Ikeja Cocoa Stores.

NSPRI Technical Report. No.1. Pp. 19-21

A single application of synergised pyrethrins in the form of a fog was applied in the daytime around large stacks of cocoa in an attempt to control *Carpophitus obsoletus*. Some reduction was obtained but the most dramatic effect was the virtual elimination of parasites.

Sieving bags of cocoa beans from large stacks inside a warehouse and on the verandah under tarpaulins showed that general pests were more numerous on the verandah while mould feeders and predators were more numerous inside the warehouse.

NPA 1107

Robert, S.I., Akinnusi, O., Adindu, M.N. and Dike, O.U.N. (1987). Preliminary Studies On The Effect Of Synitetic Antioxidants And Some Local Spices On The Oxidative Stability Of Manually Processed Palm Oil.

NSPRI Technical Report. No.11. Pp. 79-86.

Manually processed palm oil was preserved with synthetic antioxidants and extracts from some local spices at 0.05g/100g of palm oil (500ppm) level of treatment and stored in airtight plastic containers under ambient conditions for twelve months. Results show that at P = 0.05 level of significance, the total oxidation values of treated oil samples did not alter significantly during the period of storage. Citric acid, BHT and Nutmeg appear to be most effective for protecting the oil against extensive oxidation. Aflatoxin contents of all the stored oil samples were within the tolerable levels (30ppb) for oil meant for human consumption. Low microbial counts were also observed for all the stored oil samples.

NPA 1108

Raji, A. O. Alamutu, L. O. Farinu, A. O. and Longe, A. S. (2003). An Appraisal Of Kolanut Processing And Utilization In South West Nigeria.

Proceedings Of The 4th International Conference And 25th Annual General Meeting Of The Nigerian Institution Of Agricultural Engineers. Vol. 25. Pp. 201-205.

A survey of kolanut production, processing, storage and utilisation was carried out with a view to assessing the present state of mechanization of the kola industry. The investigation covered the kolanut producing and processing areas in the southwestern part of Nigeria. The study revealed that kolanut production is at a small-scale level and declining with an average farm size of 4 – 6 acres per farmer. The industry is predominantly managed by old farmers and labourers within the 45 – 70 years age bracket. The traditional techniques are still in use in most of the area, hence the present production and processing levels cannot meet up with the high direct consumption and industrial demands. The techniques in use in the areas are not likely to improve for a long time unless there are accelerated research, development and extension services to encourage and promote production and mechanization of processing and handling to reduce losses.

NPA 1109

Sanni, L.O. and Francies, T.Z. (1999). Effect Of Drying Methods On The Chemical And Sensory Qualities Of 'Iru;.

Proceedings Of 23rd Annual Conference NIFST. Pp. 283-284.

The result shows that there was significant difference in the dried samples compared to the wet Iru samples alone. Generally, there were no significant differences in the sensory qualities of dried Iru samples except for the colour [$P < 0.05$]. In terms of overall acceptability, cabinet dried Iru samples has the highest overall acceptability, followed by sun dried Iru samples and then microwave dried sample. Since , Iru is a consumer product, drying of Iru is a desirable trial and is hereby recommended for commercial purpose as a way of preserving Iru.

NPA1110

Somiri, R.T. and Udoh, A.E. (1993). Evaluation Of The Performance Of Yeasts Isolate From The Sap Of *Elaeis Guineensis* In Dough Leavening.

Nigerian Food Journal. Vol.11. Pp. 34-44.

Saccharomyces cerevisiae, *S. chevalieri* and *Candida sp.* were isolated from the fermenting sap of *Elaeis guineensis* and compared to commercial “bakers” yeast (control) in their ability to leaven bread dough. Amongst the isolates, *S. cerevisiae* recorded the best proof height at 80% RH, while *S. Chevalieri* performed better than the others at 85% and 90% RH. The optimum proof

height of dough fermented with the control for 180 mins at 80% RH was 5.7cm, while those for *S. cerevisiae*, *S. chevalieri* and *Candida sp.* were 5.4cm, 4.6cm and 4.3cm respectively. To exploit the full potentials of the yeasts occurring in palm sap for dough leaving, it is recommended that the strains with the desired characteristics be isolated from the palm wine and used as pure cultures

NPA 1111

Sowumi, O. (1978/). The Effect Of *Aspergillus Niger* *Aspergillus flavus* (Lnk Ex Fr) Growing On Palm Oil. **NSPRI Technical Report**. No.10. Pp. 87-91.

Aspergillus niger (Van Tiegh) and *Aspergillus flavus* (Link ex Fr.), commonly associated with the Nigerian palm produce were separately cultivated on sterilized media with palm oil at 30°C for six weeks. At the end of the growth period, *A. niger* was more abundantly produced (mycelial dry weight, 4.9g.) than *A. flavus* (mycelia dry weight, 2.76g.) but *A. flavus* showed a higher utilization of palm oil (% utilization, 71.51) than *A. niger* (% utilization, 64.81). Growth of both *Aspergillus* species did not show any consequential loss of the total carotene of the oil as the losses in the inoculated samples (*A. niger*, 395 mg/kg). Fungal growth also showed no consequential oxidation increase as both the inoculated and uninoculated samples were about equally oxidised. However, fungal growth caused increase in f.f.a. which was higher with *A. flavus* (76.84%).

NPA 1112

Syvia, V.A., Mmegwa, Balogh, E., Obi, P. Ngoddy (1988). Formulated Palm Wine Comparative Fermentation Studies. **Nigerian Food Journal**. Vol.6. Pp. 35-43.

Changes in chemical components during fermentation of natural palm wine were compared with those of a formulated version termed formulated palm wine and a 1:3 blend of the two, termed extended palm wine. Results showed that the formulated sap required a larger inoculum for the initiation and sustenance of a good fermentation than natural palm sap. However, as long as sufficient inoculum is added to the formulated sap it would ferment just as vigorously as palm wine. The extended version did not require additional inoculation if it contained 20-25% natural palm wine. The formulated version produced more alcohol and less acid than the natural one. This is attributed to the possible reduction in the viability of lactics in this artificial medium, as the lactics would usually divert some of the sugar in natural palm wine to acid and

polysaccharide production thus reducing the amount of alcohol that can be produced

NPA 1113

Umar, I.M. (2000). Elemental Contents Of Some Kolanuts.
Journal Of Chemical Society Of Nigeria. Vol.25. Pp. 69-70.

Elemental contents of *Kola nitida* and *Kola acuminata* have been determined using neutron activation analysis. The concentrations of these elements have been evaluated and found to be comparable to those normally found in plants.

NPA 1114

Umeh, E.O. and Simmons, E.A. (1966). A Colorimetric Method For The Determination Of The Free Fatty Acid Of Palm Oil.
NSPRI Technical Report. No.8. Pp. 75-79.

The author highlight that Geater value would come from the colorimetric method if it could be used for palm kernels, enabling single kernels to be tested and work on these lines is now proceeding.

NPA 1115

Uzo chukwu, S.V.A., Balogun, E. and Ngoddy, P.O. (1991). Standard Pure Culture Inoculum For Natural And Formulated Palm Sap Farmentation.
Nigerian Food Journal. Vol.9. Pp. 67-78.

Microbial analysis of the dregs of palm wine tapped and collected with (a) the usual traditional repeatedly used implements, (b) well cleaned (washed) previously unused implements and (c) with sterile implements were carried out.

The number of genera of yeasts and bacteria was high in the palm wine collected with repeatedly used implements (6 yeast specie and 7 bacteria genera).but very few in palm wine collected using sterile implements [1 yeast specie and 3 or 4 bacteria]. In the sample collected with clean previously unused implements, there were 2 yeast genera and 3 bacteria genera. The most abundant and consistently present organisms were found to be *Saccharomyces yeasts* and the lactic acid bacteria: *Leuconostoc* and *Lactobacillus* regardless of the implements used. The yeasts and bacteria isolated from palm wine collected by using sterile implements were strains of *Saccharomyces cerevisiae*, *S. chevalieri*, *Leuconostoc dextranicum*, *Leuconostoc mesenteroides*, *Lactobacillus casei* and another *Lactobacillus species*. These microorganisms were employed individually in pure culture

fermentations of sterile palm sap. Analysis of the resulting ferments indicated that of the microorganisms found in palm wine collected with sterile implements, a combination of *Saccharomyces cerevisiae* and *Leuconostoc dextranicum* could be all that is required to convert palm sap to palm wine. This combination was thus employed in the fermentation of sterile palm sap and formulated palm sap. Sensory evaluation of the resulting ferment confirmed that *Saccharomyces cerevisiae* and *Leuconostoc dextranicum* can ferment palm sap to give acceptable palm wine. It was however necessary to substitute *Leuconostoc dextranicum* with *Leuconostoc mesenteroides* to obtain similar results with formulated palm sap. These combinations are therefore recommended for pure culture fermentation of natural and formulated saps respectively

NPA 1116

Uzuegbu, J.O. and Tawase, J.A. (1990). Comparative Studies On The Effect Of *Capsicum Frutescens* (L) (A Local Spice) And Sodium Metabisulphite (A Chemical Preservative) On Palm Wine Yeasts (*Sacharomyces* SPP). **Nigerian Journal Of Technical Education. Vol . 7** pp42—47 .

The comparative effect of *Capsicum frutescens* (L) and sodium metabisulphite on palmwine fermentation was investigated. Water soluble extract of varied concentrations of *Capsicum frutescens* (L) and sodium metabisulphite were each added to 500 ml of unpasteurised fresh palmwine, and were left to ferment under laboratory temperature (28 – 30oC). The sugar concentration and yeast counts were monitored at zero hour and every 24 hours for up to 144 hours of fermentation.

The percentage sugar loss at 100 mg concentration of sodium metabisulphite at 24 hours interval of fermentation for up to 144 hours were 16.7, 28.6, 37.4, 42.1, 49.8 and 61.7, while that of *Capsicum frutescens* at the same concentration were 39.8, 42.1, 49.8, 54.3, 60.2 and 61.4 at the same interval of fermentation. The range of viable yeast in the palmwine treated with 100 mg sodium metabisulphite between 24 and 144 hours of fermentation is 100×10^5 to 17×10^5 respectively, while the range for that treated with 200 mg *Capsicum frutescens* is 96×10^5 to 20×10^5 at the same interval of fermentation

NPA 1117

Wood, G.A.R., Cornes, M.A. and Riley, J. (1973). A Study On The Transport Of Cocoa In Containers From Nigeria To The

United Kingdom With Special Reference To Problems Of
Moisture Translocation.
NSPRI Technical Report. No.2. Pp. 27-32.

A series of trials on the suitability of containers for transport of cocoa in bags was conducted. Condensation problems and moisture translocation to the upper layer of bags raised the moisture content of a part of the load above the danger level of 8.0 per cent. Under the particular conditions of these trials, this did not lead to mould development before the beans were processed. It was concluded however, that containers were unsuitable for transport of bagged cocoa because of the risk of deterioration which would result from delays in delivery of the containers or in processing the beans after delivery. In addition, the labour required for loading and unloading the containers was greater than for normal shipments. A single shipment of bulk cocoa in a modified container presented less labour problems and although condensation was encountered, further trials on transport of bulk cocoa in containers are proposed.

NPA 1118

Zibokere, D. S. (2003). A Study Of The Pneumatic Separation Of Hulls From The Kernels Of Shelled *Treculia* Seeds.
Proceeding Of 4th International Conference Of The Nigeria Institution Of Agric. Engineers. Vol. 25. Pp. 167-173.

A study was conducted to separate hulls from kernels of shelled *traculia* seeds using air current at the parboiled state, moisture content of about 57.6%wb. The terminal velocities of hull and kernel fractions were examined and found to be 12.1 m/s and 71.8 m/s respectively. Cross flow and parallel flow air current experimental set ups with the blower set to utilize the difference in terminal velocities of the hull and kernel fractions were used. Statistical wind separation ratio and separating efficiency were defined to examine the degree of separation achieved with both airflow principles. It seemed difficult to separate the fractions by the cross flow principle. For blower air speed range of 30 – 50 m/s, the parallel flow principle was found to be highly effective with separating efficiency becoming as high as 96% on the 50.5 kg/hr throughout point

TUBERS AND PRODUCTS

NPA 1119

Abba, V.N., Okaghu, R. N. and Ogbadu, G.H. (1990). The Production Of Aflatoxin By *Aspergillus flavus* In Cassava Flour.
Nigerian Food Journal. Vol.8. Pp. 87-92.

One hundred and four cassava flour samples from different parts of Nigeria were obtained and analysed for the presence of aflatoxin producing strains of *Aspergillus flavus*. Thirteen out of sixty *A. flavus* strains isolated from the various cassava flour samples produced aflatoxins in yeast extract broth medium containing 20% sucrose. Ten of the aflatoxigenic strains produced aflatoxins B₁, B₂, G₁, G₂, while three produce aflatoxins B₁ and B₂ only. The amount of aflatoxins produced were relatively high and ranged from 3.0-14.2 (pg/ml (B₁), 0.9-11.9 pg/ml (B₂), 0-12.5 pg/ml (G₁) and 0-9.2 pg/ml (G₂).

NPA 1120

Abba, V.N., Kareem and Okagbue, R.N. (1991). Studies On The Microbiology of Cassava. **Nigerian Food Journal. Vol.9.** Pp. 85-91

A total of 104 samples of cassava flour obtained from different parts of Nigeria were analysed for total aerobic bacteria, aerobic spore formers, lactose and non-lactose fermentating Enterobacteriaceae, xerophilic and hydrophilic moulds. The flour samples were observed to be highly contaminated by the various groups of microorganisms were aerobic plate count ($1.1 \times 10^4 - 2.8 \times 10^7$ cfu/g), aerobic spore count ($<1.3 \times 10^3 - 2.9 \times 10^6$ cfu/g), lactose fermenters ($<1.0 \times 10^3 - 6.6 \times 10^6$ cfu/g), non-lactose fermenters $<1.0 \times 10^3 - 3.8 \times 10^5$ cfu/g), xerophilic moulds ($<1.0 \times 10^2 - 1.6 \times 10^5$ cfu/g), hydrophilic moulds ($<1.0 \times 10^2 - 6.4 \times 10^5$ cfu/g) respectively.

The predominant genera of moulds were *Aspergillus* and *Penicillium*. Sixty percent of the total number of samples were contaminated by *A. flavus* which was the most predominant specie from the *Aspergillus* genus. The second most predominant fungus, *A. niger* was isolated from 43% of the total number of samples, while *Penicillium* spp occurred in 48% of the samples examined. Other species of fungi isolated were *Sporendonema sebi*, *Curvularia lunata*, *Aureobasidium pullulans*, *Rhizopus stolonifer*, and *R. oryzae*.

NPA 1121

Adeola, O. Bankole (2000). The Use Of Low Temperature Dried Munkoyo And Sweet Potato Sources Of Exogenous Enzymes For Sweet Wort Production. **Nigerian Food Journal. Vol.18.** Pp. 74-81.

Exogenous enzymes derived from two low temperature dried higher plants *Munkoyo* (*Eminia polyadenia*) roots and sweet potato tubers (*Ipomea batatas*) were studied for their sweet wort production characteristics. *Munkoyo* sweet worts filtered very fast ($\geq 48\text{h}^{-1}$) and was found to be richer in all measured fermentable simple reducing sugars (glucose, maltose, maltotriose). Sweet potato sweet worts contained appreciable quantities of reducing sugars but filtered rather slowly. ($\geq 2\text{h}^{-1}$) Equal portion of *Munkoyo* and sweet potato enzyme powders was found best for sweet wort reducing sugars production.

Less than 50% substitution of *Munkoyo* roots enzymes for sweet potato enzymes in other combinations were similarly found effective at sweet wort production. Enzymic extracts of *Munkoyo* were richer in measured amylolytic and proteolytic enzymes when compared to what was obtained in sweet potato. This study showed there is comparative economic and process advantages in the combination of these two enzyme sources for sweet wort production over the sole use of *Munkoyo* roots for the same purpose

NPA 1122

Adesina K. [2001] Free Cyanide And Metal Concentrations Of Commercial Gari In Ado-Ekiti
Proceedings Of The 25th Annual NIFST Conference .Pp 107-108.

The author highlights that Iron, cadmium and lead were detected while cobalt and chromium were not detected in the samples. Cadmium is naturally present in the soil in trace quantities and may be present in plant due to dust and spray as insecticide for crop protection during cultivation. Iron is also present in the soil and functions in fixing trace elements like copper. Zinc and pollutants such as lead. Uptake of metals from the soil by plants is influenced by a number of factors such as soil pH, temperature, metal concentration and other components of the soil; This may explain why metal concentrations varied from sample to sample.

NPA 1120

Adesiyani, S.O. (1975). Histopathology Studies Of The Yam Tuber (*Dioscorea Rotundata*) Poir Infected With *Scutellonema Bradus* (Steiner And (CHEW).
International Biodeterioration Bulletin. No.11. Vol.2. Pp. 48-55.

Examination of transverse and longitudinal sections through yam tubers with symptoms of 'dry' and 'wet' rot revealed that yam

decay is a disease syndrome involving both plant and animal origins. It is a process that can be separated into 'dry' rot and wet rot stages; each stage being associated with definite colouration and microbes. Whereas intracellular movement of nematodes at the dry rot stage resulted in cell rupture, the actual wet decay of yam is exclusively due to the activities of fungi and bacteria which are secondary invaders.

NPA 1121

Adesuyi, S.A. (1971). A Survey Of The Moisture Content And Insect Infestation Pattern On Dried Yams For Twenty-One Months In the Market At Ibadan.(Western State).
NSPRI Technical Report. No.10. Pp. 65-71.

This work, carried out on dried yam, surveyed the changes in its moisture content and insect infestation pattern fortnightly for twenty-one months

Market samples are uninfested by insects from October to March. These are all newly processed yams from the farms. Insect infestation of market samples starts from April and gradually becomes more and more serious until August when the product is very heavily infested. Control of insect infestation on dried yams may not be necessary until late in March or early April.

The mean monthly moisture contents are generally below the safe level, 15.8 per cent, between November and June and above it between July and October. This however, does not result in mouldiness visible to the naked eye.

All insects collected had been reported as major insect pests of dried yams in previous works.

NPA 1122

Adesuyi, S.A. (1971). Curing Technique For Reducing The Incidence Of Rot In Yams.
NSPRI Technical Report. No.9. Pp. 57-63.

Different combinations of temperature, humidity and conditioning period were tested for prestorage treatment of yams, in an attempt to reduce the incidence of rot during storage. In general, it was found that high humidities were unsuitable for curing yams before storage, but in yams subjected to prestorage temperatures of 25°C, 30°C and 35°C with high humidity less rot was recorded during storage than in control yams which had no prestorage conditioning. Prestorage conditioning at 25°C and 30°C with low humidity for

five days was found to be most suitable for controlling rot in yams subsequently stored in local yams barns.

NPA 1123

Adesuyi, S.A. (1972). Effect Of Fertilizer Treatment On The Storage Ability Of Yams.

NSPRI Technical Report. No.12. Pp. 85-88.

Yam tubers of species *Dioscorea rotundata*, variety D 107 (Gwaguzu) were treated with Nitrogen, Potassium and phosphorus fertilizers at two levels each while they were growing in the field. They were stored in the yam barn for six months after harvest. There was no significant difference between the losses in weight of the treatments and control after the period of storage. They all started sprouting from the 7th to 9th week of storage. Application of potassium fertilizer prolonged dormancy for five weeks after all the yams in the control had sprouted. The result of this work suggests that application of nitrogen fertilizer to yam plants does not lead to rot in storage but that what is most important is a careful selection of undamaged yam tubers for storage.

NPA 1124

Adesuyi, S.A. (1972). The Relative Importance Of The Major Insect Pests Of Dried Yam during Storage.

NSPRI Technical Report. No.13. Pp. 89-92.

The relative importance of the four major insect pests of stored dried yams has been investigated. *Dinoderus porcellus* (Lesne) was the most important of them all and except perhaps for *Sitophilus zeamais*, (Mots), the others (*Araecerus fasciculatus*, Deg *Tribolium castaneum*) (Herbst) can be regarded as secondary pests. They all depend on *D. porcellus* to initiate damage before they can infest the dried yams. It was felt that the loss in weight and loss due to damage to dried yams can be considerably reduced if *D. porcellus* is controlled or prevented from reaching the produce.

NPA 1125

Adesuyi, S.A. (1973). Effect Of Manual Removal Of Sprouts At The Time Of First Development On Losses In Stored Yams. (*Dioscorea rotundata* Poire).

NSPRI Technical Report. No.11. Pp. 79-83.

Yam tubers of *Dioscorea rotundata* Poir, variety Gwaguzu were stored in a yam barn for six months. The sprouts from one set of tubers were removed weekly as soon as they developed while the sprouts from another set were left to grow as normally practised by the farmer.

It was found that removing the sprouts as soon as they developed reduced the loss in weight of stored yams by more than half, reduced the incidence of rot, loss of moisture content and loss carbohydrate food reserve, and improved the palatability of the yams after storage. This method is very simple with no extra cost and can fit into the routine of the peasant farmer. It is therefore recommended to the farmer for adoption.

NPA 1126

Adesuyi, S.A. and Mackenzie, J.A. (1974). The Effect Of Temperature On Storage Losses Of Yam Tuber. (*Dioscorea Rotundata* Poire).

NSPRI Technical Report. No.9. Pp. 73-84.

Substantial losses due mainly to sprouting and microbial deterioration occur in stored yams of *Dioscorea* sp. in Nigeria. Yam tubers were stored at 15°C, 20°C, 25°C and in a yam barn (27-35°C). Loss in weight at 20°C, 25°C and in the yam barn was similar and more than twice that at 15°C. Moisture loss was least at 15°C, 15°C prolonged dormancy for four months longer than 25°C or the yam barn. Rot occurred at all temperatures. Rot at 15°C was not due to chilling damage. Yam store at 15°C were most palatable and those at 25°C the least acceptable

NPA 1127

Adesuyi, S. (1976). The Effect Of Different Environmental Conditions On The Respiration Patterns Of Stored Yam Tubers. (*Dioscorea Rotundata* Poir).

NSPRI Technical Report. No.13. Pp. 109-116.

The effects of storage of yam tubers in the traditional barns, in a store kept at 15°C, and the transference of yam tubers from 15°C to 430°C after six months on tuber respiration rates were investigated.

There was a considerable weekly fluctuation of respiration rates both in the yam barn and at 15°C. Sprouting increase respiration rate only slightly relative to the rate for decay. Respiration rate in excess of about 20mg/kg/hr in the yam barn and 15mg/kg/hr at 15°C signified incidence of rotting. Respiration rate at 15°C was lower than at ambient temperatures in the yam barn. 15°C proved

a safe temperature for storage and it inhibited sprouting for six months.

On transfer of yam tubers from 15°C to 30°C after six months storage, there was first a sharp increase and a later fall in their respiration rate. The carbon dioxide output increased again when sprouting got underway. The respiration pattern was normal and storage of yam tubers at 15°C for six months did not affect the viabilities

NPA 1128

Adindu, M. N. Olayemi, F.F. and Nze-dike, O.U [2000] A Survey Of Cyanogenic Potential Of Some Cassava Products In Port Harcourt Market In Nigerian. **Proceedings Of The 24th Annual Conference.** Pp 230-231.

The results show the moisture content of the products ranged between 12.02, and 15.66% for gari , 68.66 and 71.54% for Fufu,65.63 and 73.00% for cooked cassava slices.

NPA 1129

Adetuyi, F.C. and Nwankwo, O.C. (2002). Microorganisms Associated with Lafun Cassava Products From Akure Markets **Postharvest Science. Vol.1. No.1.** pp. 82-86.

The microorganisms associated with lafun sold at both the local market and departmental stores in Akure were investigated. Bacteria and fungi were present on all samples. The total viable counts of bacteria were between $2.0 \times 10^2 - 9.0 \times 10^5$ cfu/g. Fungal population was lower than bacteria count $1.0 \times 10^3 - 2.0 \times 10^5$ cfu/g. Isolates of bacteria included *Bacillus* sp., *Micrococcus* sp., *Leuconostoc* sp., *Lactobacillus* sp., *Pseudomonas* sp., *Streptococcus* sp., and *Staphylococcus* sp., while the fungal isolates were *Aspergillus* sp., *Penicillium* sp., *Mucor* sp., *Rhizopus* sp., *Syncephalastrum* sp., *Trichoderma* sp., and *Fusarium* sp. Percentage total titrable acid was between 0.18-0.52. Moisture content was lower in departmental store samples than the open market samples. The pH for fresh samples were lower than the pH of the other ten samples (5.0 – 7.2). The shelf life of the samples were approximately seven and nine months at 25°C for both market and departmental store samples respectively. This time was longer at 5°C.

NPA 1130

Adewumi ,B. A. Adegbulugbe, T. and Balogun E. A. 2005][Performance Evaluation Of A Modified Cassava Chipping Machine.

Journal Of Raw Materials Research Vol. 2 NO 2 Pp 103-117.

A modified cassava-chipping machine, which requires a maximum torsionl moment of 41.96 nm, shaft diameter and length of 30 mm and 620mm, chipping disc thickness of 6 mm and 2 kw to operate, was produced,it was tested with an electric motor at speeds of 300,411 and 514 rpm . The three axial dimensions [length , thickness and width] of the chips produced were measured for the selected speeds. The skewness and kurtosis of the axial dimensions were determined in order to assess the normality of the distribution of the dimensions of the chips. Analysis of variance at 95% levelof confidence showed a significant difference in the length of the chips with a speed of 514 rpm producing the longest chips of a means length of 33 . 90 mm . While ther was no significant difference in the width of the chips at speed of 300 and 514rpm , a speed of 411 rpm showed a significant difference producing wider chips with mean widthof 17 . 44 mm . The machine had a maximum capacity of 148 kg / hr at 514 rpm , and maximum chipping efficiency of 91 . 26% at a speed of 300 rpm . However, for optimum performance , a speed of 411 rpm with chipping efficiency of 89 . 88% and chipping capacity of 112 . 08% is recommended .

NPA 1131

Ahamed, K.A. (1977). The Use Of Some Chemicals To enhance The Storage Of Yam (*Discorea Rotundatepoir*). Sweet Potato (*Omaea Bateta*) And Irish Potato (*Solanum Tuberosum*). **Proceedings Of 28th Annual Conference Nutrition Society.** Pp. 22-23.

Eight species of fungi were associated with three types of rot observed in the tubers. Soft rot in yam was associated with the fungi *Penicillium camberti* and *Candida tropicalis* while the dry brownish rot was associated with *Aspergillus niger* and *Microsporium gypseum*. *Aspergillus flavus* and *Microsporium ferrugineum* were associated with dry rot of sweet potato while *Candida tropicalis* and *C. parapsilosis* were associated with soft rot in the tuber. *Ceotricum candidum* and *C. tropicalis* were responsible for soft rot in Irish potato tubers. The effect of two chemicals, Bordeaux mixture and benlate suspension on the storage life of the tubers showed that both chemicals were effective

in reducing storage losses by about 90%, with benlate suspension most effective.

NPA 1132

Almazan, A.M. (1986). Cyanide Concentration In Fried Cassava Chips And Its Effect On Chip Taste.
Nigerian Food Journal. Vol.4. No.1. Pp. 65-74.

Fried chips prepared from cassava tuber or flour are consumed as snack in some Asian countries such as India, Indonesia, Malaysia and the Philipines. Chips made from fresh tubers were similar to potato chips and contained safe levels of cyanide, if low-cyanide varieties were used. Those processed from flour, often called *Kroepack*, also contained minimal cyanide if the flour was obtained from low-cyanide clones. The colour and taste of *Kroepack* also depended on the cassava variety.

NPA 1133

Ajibola, O.O. (1985). Moisture Dependence Of Some Electrical And Electric Properties Of Cassava.
Journal Of The Food Science Of Food And Agriculture. Vol.36. Pp. 359.366

The electrical resistance and the 1.0 kHz dielectric properties of cassava were measured at different moisture content values with the Kiethley digital multimeter and GR 1608 –A impedance bridge respectively. The resistance increased linearly with decreasing moisture content while the Napierian logarithm of the a.c. conductivity decreased linearly with decreasing moisture content. Regression constants were obtained in both cases. The dielectric constant decreased with decreasing moisture content.

NPA 1134

Akalusi, D.O., Opadokun, J.S., Ogalie, E.I. and Okobi, A.O. (1986). Chemical Trails On The Storage Of White Yam (*Dioscorta rotundata*). Tubers.
NSPRI Technical Report. No.1. Pp. 32-38.

Dioscorta rotundata tubers were treated with ash slurry, as slurry plus benlate, lime slurry and local gin before storage for 10 months in a ventilated yam barn. Temperature varied between 24°C and 35°C while relative humidity varied between 50% and 94% during the period of storage. No treatment had any significant effect on weight losses.

Percentage decay ranged from 25 to 70. No treatment was significantly better than the control in taste, but those coated with ash slurry alone and those washed with local gin were worse in taste than the control at the end of ten months of storage. *Fusarium spp.*, *Penicillium sp.* and *Aspergillus niger* were the major spoilage agents of the yam tubers. Coating with lime slurry appears to be promising in extending shelf life by reducing decay in white yam tubers

NPA 1135

Akano, D.A., Afolabi, J.F and Kuku, F.O. (1984). Moisture And Mycoflora Contents Of Cassava Flour Stored In Plastic Containers. **NSPRI Technical Report**. No.7. Pp. 69-74.

The level of moisture content and mouldiness increased in samples of cassava flour during an eight month storage in plastic containers. The initial moisture content of most of the samples was higher than 12% the recommended safe level. Nine mould species were isolated of which *Aspergillus flavus* Link, *A. fumigatus* Fres, *A. niger* V. Tieghem, *A. chevalieri* (Mang.) Thom & Church, and *Syncephalastrum racemosum* (Cohn) Schroet were the most common.

By the eight month of storage, the samples were dull yellow in appearance with musty odour.

NPA 1136

Akano, D.A., Afolabi, and Opadokun. (1986). Long Term Storage Of Gari. **NSPRI Technical Report**. No.9. Pp. 40-43.

Samples of white and yellow gari with an initial moisture content of 8.55% and 8.2% respectively retained their initial taste and fine appearance after storage for a period of 18 months in airtight plastic and polyethylene bags. The moisture level

remained below the recommended safe level (12.5% and 13.0% for white and yellow gari respectively) even after the period of storage.

Species of *Aspergillus niger*, *Aspergillus fumigatus*, *Fusarium moniliforme* and *Rhizopus arrhizus* which were isolated did not cause any deterioration in the samples.

From the storage trail, moisture and the method of storage are the two important factors that determine the quality of Gari during long term storage.

NPA 1137 Akindansi, A . A. and Oboh, G . [2000] Effect Of Changes In Relative Humidity On The Storage Stability Of Micro-Fungi Fermented Gari.
**Nigeria Institute Of Food Science And Technology
NIFST Proceedings Of The 24th Annual NIFST Conference
Pp75-77.**

This result indicate that gari from fermentation using *Sacchararomycee cerevisaehas* the highest equilibrium moisure content. Considering the fact that this gari had high protein content, the high EMC value might suggest that the protein present in the gari is polar. Which would allow water to be dissolved in them. The increase in protein level and reduction in fat content might be responsible for the high EMC value in gari fetmented with *Saccharomycee cerevisae*. Since protein is more soluble than fat, more water would be absorbed in the gari firrom fermentation with *Saccharomycee cerevisae*. The gari from fermentation with *Rhzopus* also had a higher EMC when compared with the unfermented gari ; this may also be due to the higher protein content of *Rhzopus oryzae* fermented gari .

NPA 1138 Akinnusi, O.A., Oyeniran, J.O. and Sowumi, O. (1981). Effect Of Chemical Treatment On Yams Stored In An Improved Yam Barn.
NSPRI Techical Report. No.11. Pp. 69-77.

Using yam tubers (*Dioscorea rotundata*, Poir) the comparative effectiveness of three rot preventing chemicals was investigated, inside as improved yam barn. Test chemicals used are, RE49 dust (a Halophen-base chemical, produced and patented by Winton chemical Products in U.K.) RE49 liquid and locally brewed gin (Ogogoro). A control, with no chemical applied was also set up along with treatments.

The results obtained showed that RE49 dust controlled rottenness in stored yam tubers more effectively than RE49 liquid and the locally brewed gin (Ogogoro), but its overall performance was less than 50% at the end of the storage period.

NPA 1139 Akintunde, B.O. and Tunde-Akintunde, T.Y. (2001). Design And Contruction Of A Motorized Cassava Chipping Machine.

Proceedings Of The International Conference And Annual General Meeting Of the Nigerian Institution Of Agricultural Engineers. Vol.23. Pp. 41-46.

A motorised Cassava Chipping machine that is easy to assemble, operate and maintain was developed. It consists of a rotating circular chipping plate and the housing.

The machine was tested with Cassava and Chips of length 60mm, width 15mm, and thickness 2mm were produced using the machine. The maximum throughput capacity of the machine was 258.78kg/hr. with a chipping efficiency of 80.2%.

NPA 1140

Akhuemonkhan, I.A. and Adepoju, P.A. (1999). Production And Evaluation Of Gin From Cassava Processing Waste. **Proceedings Of NIFST 23rd Annual Conference. Pp. 25-27.**

The results obtained compared favourably with a commercial sample obtained from the market and used as a standard. The hydrogen cyanide content was 0.0032 ppm in the final product, while the ethanol was 42.96% as compared 43.23% in reference sample, and ester was 6g/100L ethanol as compared 4g/100L in reference sample. Methanol and ethyl carbamate were not detected. Overall, the gin produced falls within the standard required by AFDAC.

NPA 1141

Alonge, A . F . and Essien, S . O . [2010] Moisture Sorption Characteristics Of Dried Cocoyam Chips . **Book Of Proceedings Of The 10th International Conference and 31st Annual General Meeting Of The Nigerian Institution Of Agricultural Engineers .pp118—128.**

Cocoyam [*Colocasia antiquorum*] is a tropical plant grown primarily as a vegetable food for its edible corn and secondarily as a leaf vegetable . moisture sorption characteristics of dried cocoyam chips were determined using the static method of ambient temperature [32⁰C] over five water activity conditions ranging from 0 . 113 to 0 . 843 . Prior to this , the initial moisture content of dried cocoyam chips was found to be 16 . 99% [dry basis] for unbalanced chips while it was 13 . 35% [dry basis] for balanced chips using the association of official analytical chemists [AOAC] method . For the range of water activity , the equilibrium moisture content determined ranged from 5 . 79-21 . 08% [dry basis] for unbalanced chips and 6 . 05-20 . 08% [dry basis] for balanced chips . A linear relationship was established between

the equilibrium moisture content and water activity for both and they are $EMC = 22.2a_w + 1.479$ [unbalanced chips] and $EMC = 20.44a_w + 1.448$ [balanced chips]. The equilibrium moisture content of the chips increased with increasing water activity. The sorption isotherm observed for both had a shape close to sigmoidal shape typical of the type II classification of sorption isotherms. It was recommended that the sorption isotherm can be used to determine storage condition for dry cocoyam chips and is important in drying.

NPA 1142

Anioke, S.C, and Nwokocha, H.C. (1998). Effect Of Time Of Harvesting On The Keeping Of Sweet Potato Root Tubers. **Proceedings Of The 32nd Annual Conference Of The Agricultural Society Of Nigeria.** Pp.139-142.

Investigation on the effect of time of harvesting on the keeping quality of sweet potato root tubers was carried out in the laboratory with temperature and relative humidity (R.H.) ranges of 27.0 to 28.5°C and 87 to 9% respectively at the National Root Crops Research Institute (N.R.C.R.I.) Umudike. Tubers harvested at 12, 16, 20 and 24 weeks after planting (w.a.p) were stored in black polythene bags covered with moist sawdust. 500ml of water were added at fortnightly intervals per bag. At each harvest, twelve tubers weighing approximately 200-300g were put in the polythene bags and arranged in a completely randomised block design. Observations on individual tubers were made at fortnightly intervals. The parameters measured included the number of sprouts, weight changes, incidence of rot and tuber condition. Results showed that watering fortnightly and desprouting of sweetpotato root tubers stored in moist sawdust prevented weight loss due to dehydration but caused significant increase in weight. Tubers harvested at 24 w.a.p. had the highest percentage weight gain while those harvested 16 w.a.p. produced the highest number of sprouts. Root tubers harvested at 24 w.a.p. has also the highest percentage of rotted tubers.

NPA 1143

Arinze, A.E. and Smith, I.M. (1982). Effect Of Storage Condition On The Resistance Of Sweet Potato Tissues To Rotting By *Botryodiplodia Theobromae* (Pat) And Other Fungi. **Journal Of Stored Products Research.** Vol.18.(2) Pp. 37-41.

Sweet potato tubers were exposed to a range of temperatures from 0-20° C, either as a pre-treatment before inoculation with *Botryodiplodia theobromae*, *Botrytis. Cinerea* or *Cladosporium*, or during storage of inoculated tubers. In the latter case, the effect of aeration was also investigated. Pre-exposure to temperatures below 9°C made tubers progressively more susceptible to rotting by all three fungi as the temperature was lowered. This chilling effect may be due to an increased sensitivity of the tissue to pectic enzymes from the pathogen and to reduced capacity to synthesize the phytoalexin ipomeamarone. As far as storage conditions after inoculation are concerned, rotting by *B. theobromae* was prevented by good aeration and lower temperatures (13-15°C). Tubers were not rotted by the other species even under the most unfavorable conditions tested (no aeration, 25°C).

NPA 1144

Asoiro, Felix U. and Ani, Anthony O . [2010] Determination Of Some Physical Properties Of African Yam Beans .
Book Of Proceedings Of The 10th International Conference and 31ST Annual General Meeting Of The Institution Of Agricultural Engineers pp497—505 .

Various post harvest physical properties of African yam beans [*sphenostylis stenocarpa*] as well as their application were investigated and reported . The mean values for major diameter , intermediate diameter , minor diameter and geometric mean diameter were determined as 8 . 1778cm , 6 . 712cm, 6 . 3025cm and 7 . 0128cm respectively . The mean sphericity indicated the bean shape [0 . 85933] is close to a sphere . This is different from the values for coffee bean [0 . 69], *jatropha curcas*1 nut [0 .64] and *jatropha* kernel [0 .68] that are ellipsoidal . The mean surface area and specific surface area were 77.404cm² and 169 . 709cm²cm⁻³ . This high specific surface area indicates that the mass or energy transfer rate through the surfaces of the beans might be very high . The static coefficient of friction on three different material surfaces varied from 0 . 114 to 0 . 196 on Asbestos , from 0 .097+

NPA 1145

Asumugha, G.N., Njoku, J.E. and Nweke, F.I. (2000). Socio-Economic Determinants Of Producer Supply Of Traded Ginger (*Zingiber Officinata*) In Southern Kaduna Area Of Nigeria.
Proceedings Of The 33rd Annual Conference Of The Agricultural Society Of Nigeria. (ASN). Pp. 52-56.

Ginger (*Zingiber officinale*) a root crop, is an important cash crop in Nigeria which contributes to foreign exchange earnings. Ginger is used as spice in confectionary and bakery industries, in culinary as well as soft drink concentrates, and in perfume and pharmaceutical industries. In this study, the socio-economic determinants of the producers supply of ginger traded in southern Kaduna are analysed using the method of ordinary least squares (OLS) regression. Cross-sectional data were obtained in a survey across the major ginger growing and marketing areas of Kaduna State. The study covered the period 1996 – 1997. The empirical result of the regression analysis suggests that the ginger quantity supplied and traded is fairly well accounted for by age of trader, marital status, household size, social organization membership, trading experience, source of capital and transportation mode as indicated by the high t-values obtained for the co-efficients. This was at 1-10 percent levels of probability. The co-efficient of determination (R²) was 0.83 showing that 83 percent of the total variations in ginger supplied and traded was explained by the included explanatory variables. It is recommended that in increasing the quantity of ginger produced and traded, attention should be paid to this group of variables by considering them as priority since they appeared to be important variables in explaining variations in the quantity of ginger traded in Nigeria

NPA 1146

Asumugha and Uwalaka, C.U. (2000). Chemical And Organoleptic Evaluation Of Snacks Developed From Cocoyam. (*Cologasis Esculenta Xanthosoma Mafafa*). And Wheat (*Triticum Spp.*) Composite Flours. **Nigeria Agricultural Journal**. Vol.31. Pp. 78-88.

Snacks (cakes and cookies) were developed from cocoyam and wheat composite flours. The products were evaluated by panelists for acceptability based variously on crust/crumb colour, texture and flavour. The developed products were evaluated for their proximate composition. The cakes produced from wheat flour alone XCA2 were better in terms of colour but not in terms of texture and flavour. There was a significant difference ($p \geq 0.05$) in the ratings for general acceptability of the cakes developed. There was also a significant difference among the cookies in terms of texture. The cookie made from wheat flour alone was most acceptable followed by that from 50% xanthosoma flour and 50% wheat flour. The protein content of the cake sample CCA3 was the highest (11.90%) followed by that of XCA2 (9.45%). While for

the cookies, the protein content of XCO3 (12.25%) used as control was the highest. Generally, the snacks were not disliked. These range of snacks could add variety to that available to the consumers and also increase the demand for cocoyam flour.

NPA 1147

Ashamo, M.O. and Odeyemi, O.O. (2001). Effect Of Rearing Temperature On The Fecundity and Development Of *Euzopherodes Vapidella* Mann (Lepidoptera: *Euzopherodes Vapidella* Mann (Lepidoptera: Pyralidae) A Pest Of Stored Yam. **Journal Of A Stored Products Research. Vol.37.** Pp. 253-261.

The fecundity and development of the yam moth, *Euzopherodes vapidella* Mann on *Dioscorea alata* L. was investigated in the laboratory at four different temperatures, 20, 24, 29 and 33°C. The mean fecundity per female at 20, 24, 29 and 33°C was 51.8 ± 3.5 , 102.4 ± 3.8 , 102.4 ± 3.8 , 123.3 ± 4.4 and 124.4 ± 4.4 eggs, respectively. Hatchability of eggs was highest at 29°C and lowest at 20°C. The mean developmental time at 20, 24, 29 and 33°C was 12.1 ± 0.6 , 6.2 ± 0.3 , 3.0 ± 0.0 and 2.7 ± 0.1 days for the egg, 23.6 ± 1.1 , 20.0 ± 0.9 , 15.4 ± 0.7 and 12.9 ± 0.4 days for the larval stages, 13.0 ± 0.03 , 8.9 ± 0.02 , and 6.4 ± 0.03 days for the pupa and 48.7 ± 3.5 , 35.1 ± 2.3 , 26.3 ± 1.2 and 22.0 ± 1.0 days for the period from egg to adult emergence, respectively. The development threshold for the egg stage was estimated as 16.8°C with thresholds of 8.0, 6.2 and 11.4°C for larvae, pupae, and egg to adult emergence, respectively. Storage of yam tubers at low temperatures (but higher than 12°C to avoid damage to tubers) will significantly retard the development of *E. vapidella* and therefore help in their control. Adult males ranged from 0.50 to 0.65 cm in length and females from 0.70 to 0.90 cm

NPA 1148

Aniyi, S.O. (2000). Development Of Ginger Root Peeling Machine. **Proceeding Of The First International Conference And Millennium General Meeting Of The Nigerian Institution Of Agricultural Engineers. (A Division Of The Nigerian Society Of Engineers. Vol.22.** Pp. 57-61.

The peeling of ginger root in its preparation for various food items; flavour; medicine, confectionery and preservatives in syrups has remained a tedious and messy operation. Despite the availability of various peeling methods for other root vegetables, no peeler, has been developed for ginger root. An abrasive type power operated

ginger peeler was designed and constructed for peeling and separating the peel from the tuber.

The abrasive brush-type ginger-peeling machine, essentially consists of two continuous brush belts being driven in opposite directions with a downward relative velocity of a variable speed motor. The movement of the two brush belts in opposite directions provides the abrasive action on the ginger passing in between, while the downward relative velocity provides the downward flow of ginger. The spacing between the belts and the belts velocity could be varied.

The machine, after testing, was found to have an efficiency of 85% with 2.5% material loss. The experimental machine has a throughput of 200kg/hr. Drying of peeled ginger was done at different temperatures and moisture contents for its best organoleptic and biochemical qualities. Drying peeled ginger in two stages, i.e. up to 50% moisture (w.b) at 85°C and to required moisture content at 65°C is recommended.

NPA 1149

Atu , U.G. and Nwankiti, A.O. (1986). Effects Of Yam Nematode And Root-Knot Nematode Infections On Stored White Yam Tubers.

Nigerian Journal Of Plant Protection. Vol.10. Pp. 29-32.

Rate of deterioration in tubers with light, moderate and severe infections of yam nematode and root-knot nematode were investigated in 1983 and 1984. Yam tubers infected by nematodes stored poorly in yam barn. The critical period of storage in tubers with the nematode infections was 12 weeks after harvesting. Below 12 weeks, there were no significant ($P = 0.05$) differences in weight loss and wet rot between the light and moderately nematode infected tubers and control. After 12 weeks, wet loss, and rot increased rapidly on infected tubers and were also significantly different from control. By the end of the experiment at 24 weeks, there were significant decreases in the tuber spouts and vine length in tubers with severe infections when compared with control and tubers with light infections . Two fungi , *Fusarium moniliforme* and *Botryodiplodia theobmae* were involved in the tuber rot complex .

.NPA 1150

Azodeh, I.C. (1982). The Susceptibility Of Processed Yam And Cassava Chips To Damage By *Araecerus Fasciculatus* De Geer (Coleoptera Anthribidae).

NSPRI Technical Report. No.8. Pp. 85-91.

Parboiled and unparboiled chips of yam, *Dioscorea* sp. variety 'Iyawo' and cassava, *Manihot* sp, variety 53101 were used for the laboratory assessment of damage by *Araecerus fasciculatus* De Geer.

The parboiled chips gave 11.1% weight loss on yam and 9.7% weight loss on live insects than the corresponding unparboiled chips.

Graphs of adult emergence and log number of emergence to weight loss indicated that as pest number increases, the weight loss due to pest damage also increases for both the yam and cassava chips

NPA 1151

Aduke E. Bamiro, Charity C. Edwuals and O. O. Onyekwere. (1978). Effect Of Method Of Processing Of Cassava Flour On Baking Properties Of Composite Bread). **Proceedings Of The 2nd Annual Conference.** (NIFST. Vol.2. Pp. 81-88.

Cassava flour was prepared by four different methods, and used to replace wheat flour at 15 and 20 percent and further supplemented with 5 percent full fat soy flour. Cassava Flour yield and quality were compared with those of cassava starch. Effects of processing methods on dough mixing properties and bread baking performance were studied.

Dough Development time, and stability were reduced while tolerance was increased with 1% Sodium Metabisulphite.

Values for water absorption were higher for cassava flour doughs than for cassava starch. Composite bread baked from sulphited cassava flour had the best bread qualities and the highest bread score.

Cost analysis based on raw materials alone gave cheaper composite flour cost when cassava flour was used. Indications are given on the profitability of baking with composite flour

NPA 1152

Abu, O.A., Oguntimein, G.B. and Tewe O.O. (1998). Protein Enrichment Of Sweet Potato By Solid State Fermentation Using Four Mono-Culture Fungi. **Nigerian Journal Of Biotech. Vol.9. No.1.** Pp. 1-4.S

Washed, sliced and oven-dried whole sweet potato tubers (*Ipomoea batatas*) of the local variety were milled and supplemented with a mineral salts solution containing (g litre⁻¹) glucose, 5; (NH₄)₂SO₄ 1.5; KH₂PO₄,1.5; MgSO₄ 0.05; Yeast extract, 0.05 and fermented at 30°C for 72 hr by solid state fermentation (SSF) using *Neurospora sitophila*, *Aspergillus niger*, *Candida utilis* and *Saccharomyces ivarum*. At the end of the

fermentation period *A. niger* gave the highest protein content of 11.8%, DM basis while *S. uvarum* showed the least protein content. However in terms of true protein production *N. sitophila* gave the best value of 8.98%. While *S. uvarum* gave the least value under the standard conditions.

NPA 1153

Asumugha ,V . U .[2000] Product Development Sensory And Chemical Evaluation Of Sweet Potato/ Wheat Composite Flour Products

Nigeria Institute Of Food Science And Technology NIFST Proceedings Of The Of The 24th Annual Conference Pp 212-213.

The result shows the proximate analysis of the cakes showed that their protein content was between 8.75- 14. 70%. The cake enriched with soybean SSWD had the highest protein content of 14. 70%. Such use of legumes for enrichment of local starchy staples should be encouraged since their nutritive value is improved. The use of sweet potato to substitute wheat flour in these flour products certainly adds variety to the utilization of sweet potato.

NPA 1154

Balogun, S.A., Salawu, R.A. and Ogunbodede, B.A., Ogun, A.O. and Obembe, B.O. (2000). Evaluation Of The Efficiency Of Available Drying Facilities For Adaptation For Cassava Flour Drying.

Farming Systems Research And Extension Technology Generation And Dissemination. Pp. 101-102.

The author highlighted that how to prevent the contermination by soot a heat exchanger using medium gauged metal sheet was fabricated to facilitate drying by radiation. It was discovered that the kerosene burner could not supply enough heat to the exchanger for efficient drying. 225kg of the flour was dried in 18hours It was therefore concluded that for farmer adoption this will not be appropriate as the design does not give room for efficient drying of the flour even with the modification.

NPA 1155

Boniface, Ugwu, (1996). Increasing Cassava Production In Nigeria And Prospects For Sustaining The Trend.

Outlook On Agriculture. Vol.25. No.3. Pp, 179-185.

In terms of consumption, cassava is the most important root crop in Nigeria. It is also an important source of cash income, as about 45% of total output is marketed by the producer. Cassava production is increasing because purchased inputs are being used, processing and marketing infrastructures are available, and there is a market for cassava, mainly for human consumption. This market could be broadened to include non-food uses and export, and production could be expanded given the appropriate inputs and extension strategies. Another possibility is to improve upon the existing postharvest technology, making it more suitable for adoption by rural households. Market demand, an efficient input delivery system and the availability of appropriate postharvest and marketing infrastructures will help to sustain the trend of increasing cassava production in Nigeria.

NPA 1156

Component, W.I.A. (2000). Evaluation Of Three Cassava Varieties For Akpu Preparation.

Farming Systems Research And Extension Technology Generation. Pp. 27-28.

The result of the trial carried out in the three locations are represented in the table 1, 2 and 3. The palatability test by panel of judges scored Akpu made from TMS30572 highest because of its smooth silky texture. Though most of the farmers liked the white colour of the Akpu from the local varieties, they however showed greater preference for TMS30572 because of its desirable qualities. TMS30572 scored highest and was more widely accepted. It is therefore recommended for farmers and other Akpu processors.

NPA 1157

Eka, O.U. (1998). Roots And Tubers.

Nutritional Quality Of Plant Foods. Pp. 1-31.

The work highlights the origin of food production and general description of root and tuber crops. It also explained the importance of information on edible root and tuber crops in Nigeria and prevention and utilization of edible root and tuber. Added to these is the nutritional component of different tuber crops.

NPA 1158

Edith, N. Elenwo and Late Yubedee, A.G. (1999). The Role Of Different Type Of Handling Wounds In The Deterioration Of Yam And Cocoyam Tubers In Storage.

Nigerian Journal Of Botany. Vol.12. No.2. Pp. 145-149.

Sharp, Sear and natural wounds inflicted on yam tubers (*Discorea rotundata*. Poir) and cocoyam. (*Xanthosoma sagittifolium*. (L.) Schoot) Provided avenues for affection by tuber rot fungi. Tubers inflicted with sharp and scar wounds were more frequently and severely rotted than those inflicted with crush and natural wounds. *Aspergillus* sp. *Rhizopus stolonifer* and *Sclerotium rolfsii* were most frequently isolated from both yam and cocoyam tubers. The same organism was also implicated for rot of the tubers storage. Disease development was very severe on cocoyam (RL = 4.0) irrespective of the types of wound involved. Rot developed more and to a greater extent at the middle and tail regions of yam tubers than at the head region. Polygalacturonase (PG-ase) activity was also reater at the middle and tail regions when sharp acar and crush wounds were inflicted on yam tubers but not on cocoyam. The implication of certain cultural practices in the harvesting handling and storage of tuber crops are discussed.

NPA 1159

Fayose , F . T . [2009] Coparative Study Of Mechanical Properties Of Extrudates Of Root Tuber and Cereal Starches .
Proceedings Of 3rd International Conference Of WASAE and 9th International Conference Of NIAE pp183—190 .

The rheological properties of foods obviously play an important role intextural evaluation as wellas in the selection of the correct equipments in operations involving the deformation of foods . .Aalso , extrusion cookingis a versatile process that produces intermediate products for further processing . In this study , the variation of forces and the corresponding deformations with extrusion time of extrudates [2- 30 mintes] from flour and starches of cassava , maize and wheat at different moisture [25% , 30% , 40%] for given screw speeds [100, 150 , 200 rpm] were determined at points of leaner limit , bio yield point and rupture points under compressive load tests . Also , the compressive strength of the samples with varying duration of sampling at different moisture levels and screw speeds were determined . For cassava products product compressive strength increase from 660 to3050 N with increase in moisture content from 25 to 40% . However, for cereal products the rate of changeof product compressive strength with duration of operation increase from 18 . 2 N as the duration increased up to a critical value of 530 N above which it decreased to 18 . 1 N . The maximum compressive strength of 3050 N was attained by cassava starch while the minimum of 18 .2 N was attained by maize starch .

NPA 1160

Gbadamosi, L. and Babatunde, O.O. (2000). Application Of Four-Bar Linkage Mechanism To The Development Of Crank-Rocker Treadle Operated Cassava Grater.

Proceedings Of The First International Conference And Millennium General Meeting Of The Nigerian Institution Of Agricultural Engineer (A Division Of The Nigerian Society Of Engineers. Vol.22. Pp. 71-75.

A treadle operated cassava grater was developed and operated using a four bar linkage crank-rocker mechanism with time ratio varied as 1.48, 1.52, 1.55 and 1.59. Indices of performance used in evaluating the grater were output speed, throughput and grating efficiency using five subjects to operate the machine at the four time – ratios of the linkage mechanism. The grater was found to have 48.46Kg/hr throughput and 97.05 percent grating efficiency at 165.58 r.p.m. of grating drum speed.

NPA 1161

Irtwange, S.V. and Igbeka, J.C. (2001). Effect Of Moisture Content And Power Input On Thermal Conductivity Of African Yam Bean (*Sphenastylis Stenocarpa*).

Proceedings Of The International General Meeting Of The Nigerian Institution Of Agriculture Engineers. Vol.23. Pp. 267-274.

Thermal conductivity of two African yam bean accessions (TSs 137 and TSs 138) was determined at 4 moisture content levels of 4, 8, 12 and 16 percent wet basis and power input (rate of heating) levels of 0.900, 2.025, 3.600, 5.625 watts to provide information for its processing, storage and utilization. The experimental design used was Split Plot in Randomized Complete Block Design (RCBD). The line heat source method was used for measurement of thermal conductivity. Thermal conductivity increased with increase in moisture content for the two accession at all power inputs. For all accessions, moisture contents and power input levels, thermal conductivity values ranged from 0.2097-0.3065w/moC. There was a highly significant statistical difference (P.0.,05) in the thermal conductivity values of the two accessions. The effect of moisture content and power input on thermal conductivity was highly significant (P< 0.05) indicating that time and temperature of exposure to heat is very critical in processing and storage of African yam bean for maximum efficiency and effectiveness.

- NPA 1162 Igbeka, J.C. (1985). Storage Practice For Yam In Nigeria .
AMA Agricultural Mechanisation In Asia, Africa And Latin America. Vol.16. No.1. Pp. 55-58
 A preliminary survey of the storage methods for yam tubers was made in order to identify the most popular ones in Nigeria. The most popular technique was later to be evaluated from an engineering point of view. The survey shows that the yam barn was the most widely accepted and practiced method. Other practices included pit, platform, heap and building storage. Losses in some of these methods were found to be high.
- NPA 1163 Jackson , B .A . Adamade , C . A . and Oladipo , N . O . [2010]
 Comparative Study NCAM Peeler and Common Knife In Cassava Peeling
Book Of Proceedings Of The 10th International Conference and 31st Annual General Meeting Of The Nigerian Institution Of Agricultural Engineers pp436—441
 Results obtained show that the peeling tool had an average flesh loss of 10 . 38% while with the common knife , flesh loss averaged was 11 . 02% . Peeling efficiency obtained for the peeling tool was 87 % while it was 74% in the common knife . In the peeling tool an average of 44 . 2 kg / h was obtained as the peeling rate while this value was 38 . 33 kg / h when using the common knife . Statistical analysis shows that there is a marked significant difference in the factors considered at the 5% significant level using the Duncan Multiple Range Test .
- NPA 1164 Kogbe, J.O.S. Bamtefa, O.T., Olaopa, W.S., Basorun, G.O.A., Sanuth, J.A.B. and Kupoluyi.(1998) Comparing The Quality Of Confectioneries Made From Sun Dried And Mechanically Dried Cassava Flour.
Farming System Research And Extension Technology Generation And Dissemination. Pp. 56-60.
 Generally , it was observed that the flour obtained in treatment 2 was whiter in colour and it took more water to mix the dough to a consistency for frying . This implies that it is more economical to produce flour using the sun drying method during the dry season . When there is no sun the farmers can produce their flour mechanically , incurring more cost in production which they can add to the price of their product . However it should be that it is

difficult to produce cassava flour in the wet season . The experiment showed that it is possible to produce acceptable quality of cassava flour using a mechanical drier . This makes it possible to produce all the year round .

NPA 1165

Mefuna, C. Obizoba (1998). Fermented Foods.
Nutritional Quality Of Plant Foods. Pp. 160-198

Due to the favourable attributes of fermentation as food processing procedure, the prospect for the popularization of these products [AYB and CP flours and milk] appears to be good . This study, the first in a series of exploratory work, was undertaken to develop new potential foodstuffs [AYB and CP fermented flours. AYB and CP milk and AYB and fermented milk] to provide alternate sources of good quality foods ,children and adults alike.

NPA 1166

Obiegbuna, J. E. and Idakwoji, S. E. [2000] Influence Of Processing Methods On The Yield HCN Content And Sensory Properties Of Cassava 'Fufu'
Nigeria Institute Of Food Science And Technology NIFST Proceedings Of The 24th Annual Conference.Pp.224-225

The research shows that Modified fermentation [FFS]has the advantage of improving the organoleptic properties as well as eliminating the HCN from the final cooked fufu product.

NPA 1167

Meadow, Alfred, B.A.O., Olorunda, T.O. Aina, O. Olatunji and Odunfa, S.A. (1998). The Size And Localisation Of Yellow Pigmented Lipid Cells (6-Gingerol) In Two Varieties Of Nigerian Ginger (*Zingiberis Officinale* Roscoe) At Various Maturity Stages.
Nigerian Food Journal. Vol.16. Pp. 6-14.

The size and distribution of the main pungent principle (6-gingerol) in two ginger varieties "Tafin giwa" (the yellow variety) and "Yatsum biri" (the dark variety) at 4, 5, 6, & 8 months stages of maturity at harvest were studied empirically by the determination of the mean no. of yellow pigmented lipid cells per unit area (Cell Density = D) and their sizes (diameter = d) mainly in the Cortex and Central "Pith" regions of the transverse sections (150 – 200 nm thickness) using the light microscopy. It was observed that the transverse sections of fresh ginger rhizomes contain spherical yellow pigmented lipid cells (the spot of aroma and pungency mediating compounds) which were distributed more in the central than in the cortex regions of the rhizomes. The

mean cell distribution showed that the proportion of these yellow lipid cells varied with ginger variety and maturity at harvest. “Tafin giwa” contains more yellow lipid cells (73-200 cells mm⁻²) than “Yatsum biri” (57-143 cells mm⁻²) while the latter possess slightly bigger cells at the various stages of maturity examined. The yellow lipid cell densities varied with ginger variety being maximal at 5 months maturity for “Tafin giwa” and 6 months maturity for “Yatsum biri”.

NPA 1168

Mijinyawa , Y . and John , O . Alaba .[2009] Comparative Studies Of Barn and Platform As Storage Structures For Yam Tuber In Ibadan , Nigeria .
Proceedings Of 3rd International Conference Of WASAE and 9th International Conference Of NIAE Ppp266—270 .

A study was undertaken to evaluate and compare the performance of a local barn and platform , as storage structures for yam tubers [*Dioscorea rotundata* poir] , The criteria use for evaluation and comparison were the degree of weight loss during storage , tuber sprouting and rotting of yam tubers during a 17 week storage duration between march and june 2008 measurements of temperatures and relative humidity in the storage environment were taken thrice daily during the period . Weight loss in each tuber was measured weekly while sprouts were removed from tubers fortnight . Results show that the average temperature and relative humidity on the platform were 30 . 4⁰C and 57 . 3% respectively while for the barn , they were 26 . 5⁰C and 55 . 5% respectively . The average weight loss in tuber in the barn during the duration was 32 . 8% while for tubers on the platform , it was 30 . 3% . Yam tubers on the platform recorded 5 . 4% sprouting while those in the barn had 4 . 9% sprouting palm leaves cover for yam tuber on the platform protected the tuber from excessive heat and moisture loss . Rotting was observed in 10% of the tubers stored in the barn but was completely absent from those stored on the platform .

NPA 1169

Nwanchukwu, S.U. and Edward, A.W.A. (1987). Micro-Organisms Associated With Cassava Fermentation For Lafun Production.
Journal Of Food Agriculture. Vol.1. Pp. 39-42.

Five yeast namely *Candida tropicalis*, *Geotrichum candidum*, *Picbia onyebis*, *Rhodotorula* sp. and *Hansenula* sp.1 two moulds *Aspergillus niger* and *Penicillium* sp., and three bacteria, *Leuconostoc* sp., *Corynebacterium* sp. and *Lactobacillus* sp. were isolated in cassava fermentation for lagun production. All the yeasts *Hansenula* persisted throughout the fermentation. Highest populations of *C. tropicalis*, *P. onyebis* and *Rhodotorula* sp. were observed in the first day of the fermentation and persisted up till the second day. *G. candidum* became apparent three days after the fermentation started. Both *A niger* and *Penicillium* sp. increased in population from about the second day. The populations of *Leuconostoc* and *Corynebacterium* reached their peaks on the first and third days respectively.

The moisture content of the fermenting material which decreased from 70% to 12% over the period affected the growth pattern of the organisms isolated. *Hansenula*, *P. onyebis* and *Lactobacillus* were significantly affected. The pH of the cassava also decreased from 7.8 to 5.8 within the period.

NPA 1170

Nnodu, E.C. (1998). Evaluation Of Low Cyanide Cassava Varieties At Umudike Prior To Release To Farmers. **Proceedings Of The 32nd Annual Conference Of The Agricultural Society Of Nigeria.** Pp.199-202.

Eight newly developed low cyanide cassava varieties – NR series 84292, 8420, 8420, 84104 (from NRCRI, Umudike), TMS – serial 71762, 82/00033 and 30474 (from IITA, Ibadan) were evaluated for yield and resistance to cassava pest and disease at Umudike during the 1996/97 cropping season. They were evaluated with and without fertilizer applied. Variety TMS 4 (2) 1425 which is a low cyanide variety (LCV) already released to farmers was used as the control. Also varieties NR 8082 and TMS 30572 which are high cyanide varieties (HCV) were included to compare their performance against the LCVs. The results showed that among the low cyanide varieties (LCVs) only TMS 82/00033 significantly yielded higher than the control when fertilizer was applied. There were no significant difference between TMS 82/00447, TMS 71762 and the control. When no fertilizer was applied, TMS 71762 and TMS 82/00033 yielded higher than the control but only TMS 71762 was significantly higher. When the low cyanide varieties (LCVs) are compared with the high cyanide varieties (HCVs), TMS 82/00033 and TMS 71762 (LCVs) yielded as high as NR 8082 (HCV) but significantly higher than

TMS 30572 (HCV). Yield of TMS 30572 was not significantly different from the rest of the LCVs. The starch and dry matter contents of all the varieties are good and acceptable. Cassava green spidermite damage (CGSM) was the only damage recorded and was mild to moderate in all the varieties. Most of the varieties were resistant to major cassava diseases (African cassava mosaic, bacterial blight and anthracnose). Based on the data collected. Varieties TMS 82/00033, TMS 71762, TMS82/00447 are candidate varieties for release to farmers. These varieties are better or as good as the control.

NPA 1171

Nnodu, E. C. (1992). Storage Of Fresh Sweet Potato Tubers (*Ipomoea batatas*) Using Moist Sawdust. **Nigerian Journal Plant. Protection. Vol.14.** Pp. 29-32.

Storage of fresh sweet potato tubers in sterilized moist sawdust preserved them in edible and marketable condition for four months. Tubers stored without sawdust dried up within two months and were neither fit for sale nor for food. Pre-storage dipping of the tubers in Thiabendazole (Mertect 340-F, 1500 ppm) for 24hr before storage in moist sawdust controlled microbial decay. Chemical proximate analyses of tubers from four sweet potato cultivars before and after four months storage in moist sawdust showed only little changes in dry matter and protein contents for all the cultivars and starch content for only cultivars TIS 1176 and TIS 2352.

NPA 1172

Nwachukwu, E. C. and Obi, I. U. (1998). Some Effects Of Gamma Irradiation On M.V. (*Discoma Rotandata* Pair) Seedling. **Proceedings Of The 32nd Annual Conference Of Agricultural Society Of Nigeria (ASN).** Pp. 121-124.

True yam seeds of the white yam, *Dioscorea rotundata* were exposed to varying doses of gamma rays to study the effect of gamma irradiation on MV1 population of white yam seedlings. Generally, increasing doses of gamma ray decreased seedling vigour (seedling heights and number of leaves) and tuber yield. Chlorophyll deficient mutants and seedling morphotypes with elongated primary internode were isolated. Vegetable characteristics associated with morphotypes with elongated

primary internode include the production of multiple branches giving them a bushy growth.

NPA 1173

Nwagugu , N . I . and Okonkwo , W . I . [2009] Experimental Determination Of Compressive Strength Of Sweet Cassava [*Manihot esculanta*] .

Proceedings Of 3rd International Conference Of WASAE and 9th International Conference Of NIAE pp191—197 .

Compressive test was carried out on sweet cassava [*manihot Sp*] to determine its compressive strength loaded along parallel and across cassava fibre directions for head ,centre and tail sections to determine the compressibility , expansion characteristics etc , of the assava . A load spring with capacity of 125 kg was used in the Monsato Housfied tensometer . The total samples tested were 30 pieces of sweet cassava weighted in an electronic analytical balance . Five cassava samples each from thehead , centre tail were tested along the parallel cassava fibredirection and the remaining five were tested acrss the cassava fibredirection . [i . e. Ten numbered replicate samples each from the cassava head ; centre and tail were picked at random , weighted in an electronic analytical balance , and recorded] . A total of ten sample each from the head , centre and tail respectively . The cassava was in cubes of 20x20x20m dimensions . The average mean moisture content of the head , centre and tail were determined to be 67 . 40% , 68 . 72% and 71 . 19% every 60 minutes from the three samples for 6 hours respectively . The effect of moisture content on compressive strength of the cassava decreased with increases moisture content from 67-71% . The head [67 . 46%mc] wb has a maximum compressive strength force of 558N . The centre [68 . 72%mc] wb has a maximum compressive strength of 466N, while the tail [71 . 19%mc] wb has the maximum compressive strength of 374N . Results of the experiment revealed that the tailhas a resistance force that is almost constant at the maximum load when loaded both along parallel and across cassava fibre directions .

NPA 1174

Olukunle O . J .and Atere, A .O . [2009] Development In Cassava Peeling Mechanization In Nigeria .

Proceedings Of 3rd International Conference Of WASAE and 9th International Conference Of NIAE . pp54—60 .

Cassava processing is becoming a daily affairin Nigeria where the crop has been adopted as a major staple . Several unit operations have been mechanized successfully . However , peeling remains a global challenge to design engineers . This is due tovariations in

physicomechanical properties of cassava, which are borne out of the existence of many cultivars of cassava, and variation in climate as well as the cultural practices employed in the production of the crop. To this end IITA in conjunction with Federal University of Technology, Akure initiated the search for an effective cassava peeler in 2005. Cassava peeling mechanization has come a long way from the conventional knife to modified knives; to the more recent automated cassava peeling machines. However, the challenges of cassava peeling are still scaring. An appraisal of the various mechanisms for cassava peeling was done in order to reveal the prospects and limitations of each device. Recommendations were made on emerging areas of research for development in cassava peeling mechanization.

- NPA 1175 Oyebanji, A. O., F. F. Olayemi and W. I. Okoye (2003). Varietal Effect On Spoilage Of Yam (*Dioscoria rotundata*). Tubers During Storage.
Tropical Science Vol.43. Pp. 199-200.

Of three common varieties of yam stored for 28 weeks, Gbakumo was the most resistant to rotting and sprouting. Odokumo the most susceptible to rotting and Odo most susceptible to sprouting.

- NPA 1176 Oyebanji, A.O. (2003). Increasing Cassava Production in Nigeria.
Raw Materials Update Cassava And Important Food And Industry Crop. Vol. 4, No. 1, Pp. 31-33.

The author explained level of cassava production in Nigeria and recommended post harvest practice for cassava production and postharvest handling.

- NPA 1177 Osunde, Z. D., Yisa, M. G. and El-Okene, A. M. (2003). Quality Changes Of Yam Under Different Storage Structures.
Proceedings Of The 4th International Conference and 25th Annual General Meeting Of The Nigerian Institute Of Agricultural Engineers. Vol.25. Pp. 206-212.

Quality changes in yam tuber of the *D. rotundata* variety stored under ambient conditions in three different storage structures were monitored periodically for 18 weeks. The storage structures used were local yam barn, improved yam barn and the pit storage structure. Two cultivars of *D. rotundata* *giwa* and *asuba* were

used for the experiment. Quality changes monitored include weight loss, dry matter content, crude protein and percentage sugar content. The pit storage structure had the least weight loss (20.2 for *giwa*, 17.6 for *asuba*) followed by the improved barn (21.4 for *giwa*, 20.3 for *asuba*) and the local barn (22.2 for *giwa*, 17.6 for *asuba*). The ratio of dry matter content to the total weight of the tuber increased during the storage period. Although no difference was observed between the structures, the two cultivars showed differences in the dry matter content of the tuber. The increment ranges from 38.41% - 45.15% for *giwa* and 40.9% - 49.2% for *asuba*. The crude protein content of the tuber decreased during the storage period. In local barn the decrease ranges from 3.48 to 2.23% for *giwa* and 2.23 to 0.94% for *asuba* in improved barn from 2.27 to 1.57% for *giwa* and 2.02 to 1.57% for *asuba* in pit storage structure from 2.93 to 2.1 for *giwa* and 2.64 to 1.2 for *asuba*. A slight difference was also observed in crude protein content between the two cultivars. Percentage free sugar content increased during the storage period. The increment in free sugar content ranges for local barn from 3.5 to 8.4, 3.6 to 6.6% for improved barn 3.9 to 6.63% for pit structure 3.85 to 5.5, 3.98 to 5.4 for *giwa* and *asuba* respectively. No difference was observed between the structure and cultivar in the free sugar content of the tuber.

NPA 1178

Osunde, Z. D., Yisa, M. G., and El-Okene, A. M. (2003). Prediction Of WeightLoss And Sprouting In Stored Yam. **Proceeding Of The 4th International Conference And 25th Annual General Meeting Of The Nigerian Institute Of Agricultural Engineers. Vol. 25.** Pp. 229-250.

Yam is one of the grain tuber crops grown in Niger State of Nigeria. The main problems in yam storage are respiration, transpiration and sprouting which cause weight and quality losses. In this study four different yam storage structures were evaluated in terms of air temperature, humidity, sprouting of the tuber and weight loss. The storage structures were local yam barn, improved yam barn, improved pit I and improve pit II. Using the data collected from the improved pit II a model was developed to estimate sprouting and weight loss. The adequacy and overall utility of the model was tested using the test and ANOVA. The result of the test shows that the model is useful for predicting sprouting and weight loss. The model was validated using the data from the other three structures and a close relationship was established between the measured and computed values in all

cases. The model can be used to predict weight loss after a given storage period.

NPA 1179

Okafor, Emmanuel Chukwuma (1998). Mechanical Dehydration Of Cocoyam (*Colocasia esculenta*) Chips. **Proceedings Of The 32nd Annual Conference Of Agricultural Society Of Nigeria.** (ASN). Pp. 84-86.

Mechanical drying of Cocoyam chips was determined in the conventional drying oven, using the chips surface areas of 400mm², 200m² and 100mm², with the drying temperature of 65°C, 100°C and 130°C. The results show that drying temperatures affect the drying characteristics of cocoyam chips. At 2 hours of drying, the chips loose more than 50% of their moisture content, irrespective of the drying temperature and chip surface areas. The difference in drying temperature and chips surface areas have little effects on the recovery rate.

NPA 11780

Obatolu, A. Veronica. (2000). Nutritional Quality Of Yam Bean Flour As Affected By Household Processing. **Tropical Science. Vol.42. No.1.** Pp. 1-5.

Flours prepared from boiled, fermented, roasted and malted yam bean were compared with raw yam bean flour. The protein contents ranged from 20.3% in raw flour to 25.3% in malted flour. The minerals except calcium were not significantly affected by processing. Roasting increased the calcium content, while fermentation and malting increased the amino acid content. The sulphur – containing amino acids in raw flour were greater than in the processed flour. The true digestibility was improved by all the processing methods. A relatively good true digestibility (79.0%) was observed for boiled yam, but it was lower than that of the control (86.7%). The processing conditions significantly improved the net protein utilization, biological value and protein efficiency ratio of yam bean.

NPA 1181

Ogbonna, C.I.C. (1986). The Effects Of Palm Oil On The Colonization Of Gari By Thermophilic And Thermotolerant Fungi. **Nigerian Journal Of Biotechnology.** Vol.2. Pp. 36-44.

An investigation was carried out on the effects of added palm oil on the colonization of gari exposed at the laboratory by thermophilic and thermotolerant fungi. The results obtained showed that yellow gari which was processed with palm oil was colonised by more species of thermophilic and thermotolerant fungi than white gari which had no added palm oil. Analysis showed that the yellow gari contained 2.3% of palm oil. Both types of gari have the same initial water content while at the end of the experiment the yellow gari had more percentage water content than the white gari. The pH value of the yellow gari at the end of the experiment was also lower than that obtained for the white gari. The thermophilic and thermotolerant fungal isolates that have 50% and above percentage frequencies of occurrence were found to possess the ability to hydrolyse palm oil and utilize free fatty acids as sources of carbon. The same fungi were also found to possess the ability to produce amylase and could hydrolyse starch into simple sugars. These fungi when reinoculated into freshly prepared gari in sterile jute bags that were free from fungal colonization raised the temperature of the gari from an average value of 25°C to 52°C within six weeks and the gari also appeared highly deteriorated. The economic implications of the results are discussed.

NPA 1182

Taiwo, K. A., Akanbi, C. T. and Ojo, A. [2004] Studies On The Deep Fat Frying Of Yam Slices
Journal Of Agricultural Engineering And Technology Vol .12 Pp54-64

This study investigated the effects of frying temperature [100-160°C], frying time [5-20 min], pre-treatment [untreated, frozen, blanched] and frying medium (soya oil and palm oil) on the yield, moisture content and fat content of yam slices with a view to developing yam chips for the market. Frying at higher temperatures for longer periods decreased yield and moisture content with concomitant increase in fat content of the chips. Going from 100 to 160°C increased oil content by 85 to 235% depending on the type of pre-treatment while increasing frying time from 5 to 20 min resulted in 20 – 57% increase in oil content. Blanching prior to frying did not enhance moisture loss neither did the use of palm oil. Frying time and percent yield correlation coefficient in the range ($0.9474 < r < 1.0$), moisture content ($0.9050 < r < 1.0$) and oil content ($0.8625 < r < 1.0$) and the degree of fit increased with the transformation of time. The type of oil used had significant influence ($p > 0.05$) on the quality attributes of the yam slices.

- NPA 1183 Okeleye, K.A., Atayese, M.O. and Afolami, S.O. (2001). Storage Techniques For Preserving Cassava Stems In The Savanna-Forest Transition-Zone Of Nigeria. **The Ogun Journal Of Agricultural Science. Vol.1. Pp. 180-186.**
- On farm trials to identify sustainable storage technique for fresh cassava cuttings were conducted on two locations. Fami Ajegunle and the University of Agriculture, Abeokuta (UNAAB) farm both in the transition Zone of Southwest Nigeria. Five existing storage techniques: Nylon, Trench Benomyl, Benomyl + Actelic dust and Shade (control) were evaluated for viability and survival at monthly intervals for six months. Two common varieties of cassava (MS-6 and TMS 30572) were used in the trials. There was decline in viability with storage time in all treatments. Benomyl + Actelic dust obtained 70 percent viability after six months; shade, about 60 percent; Benomyl, 40 percent; nylon, 20 percent and the trench, zero percent even as early as three months in TMS 30572. The result obtained therefore supported treatment of cassava stem cuttings with a mixture of Benomyl + Actelic dust and storage under shade. However, resource poor farmer may prefer by because there is no cost implication
- NPA 1184 Okonkwo, J.C., Ene, L.S.O. and Okoli, O.O. (1995). Harvesting, Sorting, Grading And Storage Of Potato
Potato Production In Nigeria, National Root Crops Research Institute Umudike Pp67 -84.
- Ideal approaches to harvesting sorting grading and storage of potato are mentioned
- NPA 1185 Okonkwo, J.C., Ene, L.S.O. and Okoli, O.O. (1995). Potato Processing And Utilization
Potato Production In Nigeria. Pp.85-89.
- Many uses of potato were mentioned. Some of them include Potato Crisps, Chips, Starch, Flour, Feeds etc.
- NPA 1186 Okonkwo, J.C., Ene, L.S.O. and Okoli, O.O. (1995). Problems And Prospects Of Potato Production In Nigeria:
Potato Production In Nigeria. Pp.90-97.

Problems identified include; Climate.non- availabiltyof good quality seed, high cost of farm in put, disease problems,use of unimproved varieties, storage and marketing .

NPA 1187

Okonkwo, J.C. (2002). Evaluation Of Three Storage Methods For Post-Harvest Storage Of Seed Potato (*Solanum Tuberosum* L.) In Jos, Plateau Area, Nigeria.

Post-Harvest Science. Vol.1. No. Pp. 31-35.

Studies were carried out in 1991 and 1992 to assess sthe Postharvest tuber losses of 4 potato varieties: Nicola, Arka, Mirka and Desiree stored in a Cold Store, diffused light store and a farmers' store for 7 months.

The results showed a close relationship between the storage environment and postharvest tuber losses. Hence, lowest tuber weight loss and loss due to rots occurred in the cold store which had the highest relative humidity and lowest temperature. Seed tuber weight loss and loss due to rots were significantly higher in the farmer's store than in the diffused light store. Differences in the storability of potato tubers due to variety were also significant. Nicola stored better than the other 3 varieties.

This study indicated that where it is not feasible to use cold store for seed potato storage and minimum air temperature is below 17°C, diffused light store can be used for seed storage for a period up to 4 months with minimal losses of seed potato

NPA 1188

Osagie, A.U. (1977). Biochemical Changes In Deterorating Root An.d tubers.

Proceedings Of the First National Seminar On Root And Tuber Crops, Umudike.Pp. 160-165.

Quality begins to deteriorate very early in harvested tubers, usually by rotting from harvet wounds . If rotting is avoided , other forms of deteriorating occur and increase with time , including strivelling, associated with water loss .

NPA 1190

Agbetoye,LA.S.andOyedele , O . A . [2005]Development And Testing Of A Dual Powered Gari Sifter

Proceedings Of The 6th International Conference And 27th Annual General Meeting Of The Nigeria Institute Of Agricultural Engineers Vol.27 Pp192-210

A Dual powered sifter for grated and dewatered cassava mash [gari] was designed ,fabricated and tested . When manually operated, the machine has a maximum sifting capacity of 84 kg /h and sifting efficiency of 97.3% of grated and de-watered gari mash, requiring 0.015 kw power at 60 rpm. When the machine is powered by an electric motor, the maximum sifting capacity and cleaning efficiency increase to 170 kg/h and 98% respectively requiring a maximum power of 1.815 kw. The machine was further evaluated at three operating speeds of 533, 355and 266 rpm . It was observed that increase in speed of operation improved both the siffing capacity and siffing efficiency of the machine . All materials used for fabrication were obtained locally , and the estimated cost of producing one unt of the siffing machine [without the electric motor] is seven thousand , five hundred and ninety-five Naira [N7,595 . 00 .

NPA 1191

Osunde, Z.D. and Yisa, M.G. (2000). Effect Of Storage Structures And StoragePeriod On Weight Loss And Sprout Growth On Stored Yams.

Proceedings Of The First International Conference And Millennium General Meeting The Of Nigerian Institution Of Agricultural Engineers. (A Division Of The Nigerian Society Of Engineers. Vol.22. Pp. 196-199.

Yam is one of the main tuber crops grown in Niger State. It has high cash and food value to the local farmer. Substantial amount of the tuber is lost yearly during storage. In this work three different types of yam storage structures were constructed and put to use from February to June. The storage structures were local yam barn, improved yam storage structure and the pit storage. The boot yam barn is made of wooden poles as as frame with guinea corn straw wall and roof. While the basis yam storage structure is the same as local barn but improved with rice straw lining from case of the pit storage 1m deep pit was dug and similar structure as the local barn was built above the ground. Air temperature, air humidity, soil temperature, weight loss and sprouting of tuber were monitored during the storage period. The result showed that air temperature and soil temperature were lowest in the pit (25.2 – 37.5°C for air and 25.84 – 33.09 °C for soil) and highest in the local barn (27.97 – 38.00°C for air 25.87 – 34.94°C for soil). Humidity was highest in the pit (18.99 – 82.80%) and lowest in the local barn (16.43 – 78.38%). Sprouting and weight losses were lowest in the improved yam barn.

- NPA 1192 Oti, E. and N.I. Mgbolu (1987). Chemical Composition And Organoleptic Assessment Of Fresh And Stored Nigeria Ginger (*Zingiber Officinale*). **Nigerian Food Journal**. Vol.5. Pp. 76-79.

The results shows that freshly harvested black ginger rhizomes had higher levels of the following constituents than freshly harvested yellow ginger rhizomes: moisture, total lipids, starch, crude fibre, oleoresin and ascorbic acid. Freshly harvested yellow ginger rhizomes contained more crude protein, total reducing sugars, total free amino acids, and total carotenoids than fresh harvested black ginger rhizomes. Moisture, total reducing sugars, and ascorbic acid were lost in the rhizomes of the two varieties of ginger during storage, whereas crude fibre, starch, total free amino acids and total carotenoids increased.

- NPA 1193 Samuel, Adeniran Adesuyi, (1975). Investigations In The Storage Physiology Of Yam Tubers. (*Dioscorea Rotundata-Poir*) With Special Reference To The Control Of Spouting. **Dissertation Submitted To The Faculty Of Agriculture, Forestry And Veterinary Science For The Degree Of Doctor Of Philosophy Of the University Of Ibadan**. Pp.1-317.

Investigation in this work dealt with the study of certain aspects of the physiology of the yam tuber in storage with a view to having a better understanding of its behaviour, and the causes of the different types of losses. These studies facilitated the development of better storage techniques that decreased the enormous losses in weight and quality that occur in yam tubers stored by the traditional methods in the tropics. Special attention was directed at inhibiting sprouting.

- NPA 1194 Storing Your Produce (1982). Yam Tubers And Dried Yam. Advisory Booklet. **No.2. NSPRI**.

The guidelines for the storage of yam tubers were explained.

- NPA 1195 Storing Your Produce (1983). Cassava And Gari. **NSPRI Advisory Leaflet**.

Various ways cassava can be stored are explained. This include storage e in sawdust using different containers.

NPA 1196

Ufodike, E.B.C. (1986). Digestibility And Utilization Of Corn And Potato Based Diets By Rainbow Trout (*Salmo gairdneri*). **Nigerian Journal Of Biotechnology. Vol.2.** Pp. 55-63.

Rainbow trout, (*Salmo gairdneri*) fingerlings were fed for 10 weeks on diets containing 10%, 20% and 30% of corn or potato and a control containing neither corn nor potato. Nutrient digestibility and grow responses were studied. Results indicate the increase in dietary corn or potato led to greater weight increases and better SGR, PER and apparent NPU. Inclusion of appreciable quantities of digestible carbohydrate into the diets raised the digestibility of carbohydrate from 4.5% (in the control) to a maximum of 53% (for 30% corn). The carbohydrate in corn was better digested than that in potato. A slight increase in protein digestibility from 86.6% to 90.1% was recorded with the inclusion of up to 30% digestible carbohydrate into the diets. Optimum protein digestibility pathology or variations in tissue composition resulted. Corn and potato in diet led to increase in dietary digestible energy and were well utilized for protein sparing by *Salmo gairneri*.

NPA 1197

Umar, I.A. Omage, J.J., Lawal, Y.L., Igbkwe, I.O. and Modu, S. (1996). Prevention Of Beer-Induced Hyperlipaemia By The Essential Oil Of Garlic (*Allium sativum* Linn). **Bioscience Research Communications. Vol.8. No.4.** Pp.273-277.

Garlic oil, at dose rates of 10 and 20mg per 100g body weight, was administered daily by gavage to two groups of rats (groups 5 and 6) maintained on a high-lipid diet and beer for 12 weeks after which certain biochemical parameters were estimated in the plasma. The values obtained were compared with those of the groups fed high lipid diet and beer (group 4), 7% aqueous solution of ethanol (group 3) or aqueous solution of glucose (group 2) isocaloric with the ethanol solution and beer. Baseline data were obtained from untreated rats fed only normal standard diet (group 1). Plasma lipid concentrations increased significantly ($P < 0.05$) in groups 2, 3 and 4 compared to group 1.

The increase in the plasma total lipids and triglycerides were comparable in ethanol- or beer-fed rats (groups 3 and 4), but the increase in plasma cholesterol was significantly ($P < 0.05$) greater in the ethanol – and beer –fed rats when compared with glucose-

fed rats, with the beer – fed rats showing a significantly (< 0.05) greater decrease. Therefore, it seemed that there was a tendency for the beer to cause less hypercholesterolaemia and prevent lipid-induced hyperphospholipidaemia than 7% ethanol.

Rats fed garlic oil with beer showed significant ($P < 0.05$) decreases in the plasma phospholipids decreased further. The hypolipaeamic effect of garlic oil in beer-fed rats was dose-dependent

.NPA 1198)

Williams, J.O. Olayemi, F.F. and Suleiman A. (2002). Effect On polypropylene Packaging And Pesticide Application On The Storage Period Of Cassava Stem Cuttings. **Postharvest Science. Vol.1. No.1.** Pp. 36-39.

Methods for the extension of the storage period of cassava stems to retain viability were investigated. Storage of the cassava cuttings in perforated polypropylene packages after fungicidal and insecticidal treatments and deeping the root and into shallow soil moistened weekly extended the viability of the stem by 150 days. Cassava cuttings that were stored under shade as control lost viability after 30 days of storage. This study also shows that the viability of the cassava cultivars can be extended for various periods.

NPA 1199

Williams, J.O. and Babarinsa, F.A. (2002). A Free Convection Crop Dryer Fired With Kerosine. **Tropical Science.** Pp. 1-5.

The hot air dryer comprises a firing compartment, heat exchanger and drying chamber. It was evaluated by drying cassava chips at $50 - 57^{\circ}\text{C}$ and compared with traditional sun drying at $21-28^{\circ}\text{C}$. Drying times were reduced by 67% and the product was of higher quality in terms of colour and appearance

GRAIN CROP AND PRODUCTS.

NPA 1200

Abu, E. A. Anigo, K. M. and James [2003] Effect Of Processing Method On Some Anti Nutritional Factors Of Lima Bean [Phaseolus Lunatus] Seeds.

Proceedings Of The 27th Annual NIFST Conference pp166 –67.

The finding indicates that boiling at 30 or 45 minutes is enough to inactivate more than 50% of the anti-nutrients studied in the lima beans seed. Combination of boiling and fermentation or soaking was more effective in reducing the level of phytic acid than TIA or cyanide.

NPA 1201

Abu, D . J. and Adam P. C.[2001] The Influence Of Sprouting Properties Of African Yam bean *Sphenostylis Sternocarpa*

Nigerian Institute Of Food Science and Technology NFST 25th Annual Conference pp 1- 2.

This study has shown the sprouting of AYB leads to increase in foaming capacity, water absorption capacity, emulsion activity and stability, and a decrease in bulk density . It could therefore be suggested that AYB flour is suitable for preparation of supplementary or weaning foods .

NPA 1202

Abu, E. A. Anigo, K. M. and James, D. B. [2003] Effect Of Processing method on some Anti nutritional Factors of Lima Bean[*phaseolus lunatus*] Seeds.

Nigerian Institute Of Food Science and Technology NIFST 27th Annual Conference pp166- 167

The boiling at 30 or 45 minutes is enough to inactivate more than 50% Of the anti-nutrients studied in the lima beans seed. Combination of boiling and fermentation or soaking was more effective in reducing the level of phytic acid than TIA or cyanide.

.NPA 1203

Abdulraman, A. Audu and Mohammed, I. Musa [2003]

Effectiveness Of Traditional Food Processing Techniques In The Removal Of Residual Permethrin In Preserved Grains
Proceedings Of The 27th Annual NIFST Conference pp29- 30

The result showed the levels remaining in the prepared meal ready for consumption is below the levels found safe for human consumption, since acute toxicity of this pyrethroid is only observed for mammal at 224 mg/kg of body weight [Doria].

NPA 1204

Adebayo, O. and Koyejo, O . A. [2 006] Mineral Composition and Effect Of Seed Processing On The Propagation Of Miraculous Berry [*Synsepalum Sehum and Thonn Danielli*]
International Journal Of Food and Agricultural Research
Vol. 3. No 1 pp30—35.

The germination study on *Synsepalum dulcificum* seeds chemical and proximate analysis of the fruit was carried out at the Forestry Research Institute of Nigeria, Ibadan on 56 fresh matured fruits. Results show that fruits sown directly germinated two days earlier, but with lower germination percentage of 42.8% .On the other hand, the extracted seeds germinated two days late but with a higher germination percentage of 60 . 72% .Chemical and proximate analysis show that the fruit contains sodium [Na] 0.25%, Phosphorus[p] 0 . 81%Potassium[k] 0 . 13%, Iron [Fe] 0 . 029%, Calcium [Ca] 0 .30%, Magnesium [Mg] 0 .17% zinc [zn] 0 .011% . The following soluble sugars were identified, Glucose, 12 .90%, Fructose 7 .00% , Sucrose 5 . 20% and Lactose, 0 .30% . It was observed that the berries of the plant contain a glycoprotein called miraculin . Carbohydrate was found to be the major constituent of the fruit with 76 . 1% The implication of these

findings for the domestication and conservation of the species was discussed .

NPA 1205

Adebisi, M. A. Ola, J. A. Akintobi, D. A. C. and Daniel, I. O. [2007] Storage Life Of Sesame[*sesamum indicum* L.] Seeds Under Humid Tropical Conditions
The Nigerian Agricultural Journal vol.38 pp 62- 69.

The highest seed storage life of approximately 11 months was derived for seeds of 530-3 genotype stored in UNAAB environment, followed by E48 with seed storage life of 10 months under UNNAAB environment. Seeds of C-K-2 and 530-6-1 genotypes stored in UNAAB environment had high storage life of about 9 months. The shortest seed storage life of approximately 3 months was estimated for seeds of 73A-97 genotypes stored in BABCOCK environment. The result showed that the storage of seed under favourable ambient environments over good potential for short-term sesame seed quality maintenance.

NPA 1206

Adeola, O. Bankole and Maurice, M . Metche [2001] Poteolytic Enzymicaction Of Aqueous Infusions Of Low Temperature Dried Munkoyo [*Emina Polyadenia*] and Wheat Malt On Wheat Gluten During Brewing.
Nigerian Institute Of Food Science and Technology NIFST Proceedings Of The 25th Annual Conference. Pp167- 168.

The result showed the brewing with aqueous enzymic infusions of Munkoyo roots for the supply of adequate amino nitrogen for the purpose of production of fermented brews as is practiced in part of central Africa is quite justified . Unfermented, the sweet wort could be much more profitable articulated into protein-rich beverages.

NPA 1207

Adetokun, S. M. Osodi, A. A. and Adebowale, K. O. [2000] Invitro Multienzyme Protein Digestibility Of Some Processed Legumes
Nigerian Institute Of Food Science and Technology NIFSE Proceedings Of The 24th Annual Conference. Pp191- 192

The result showed that dehulling and fermentation may benefit protein digestibility by roadering the protein more susceptible to

hydrolysis due to actual changes destruction of anti-enzymatic factors or decrease lipid-protein starch-protein complexes.

NPA 1208

Adegboye, O. A. [1998] Production Of Fortified Breakfast Cereal From Maize and Groundnut.

Proceedings Of The Annual Conference Of The Nigerian Society Of Agricultural Engineers Vol.20 pp270- 272

Protein enriched cereal was produced using fermented maize [zea mays] and groundnuts [Arachis hypogea] as the raw materials. The formulation 90;10, 80;20, 70;30, 60;40, and 50;50 of maize and groundnut respectively were used. Proximate analysis of the product showed they had protein content comparable to other locally protein enriched cereals e.g Soy Ogi. Sensory analysis were carried out on the samples, a formulation 80;20 was rated the best in terms of colour taste, aroma and texture microbial analysis showed no pathogenic organisms.

NPA 1209

Adejumo, B. A. and Babatunde, O. O. [2005] Performance Evaluation Of A Natural Convection Grain Dryer

Proceedings Of The 6th International Conference and 27th Annual General Meeting Of The Nigerian Institute Of Agricultural Engineers Vol. 27 pp186 191

A model natural convection heat transfer grain dryer was developed and evaluated, using fresh maize as grain models. Temperature varied at the hot water conveying pipe from 74°C at inlet to 47°C at outlet along a pipe length of 750mm and width of 250mm. The average temperature and relative humidity in the drying compartment were 52°C and 48% respectively with at least 10% moisture absorbed by the drying air. The test results show that the dryer was capable of drying fresh maize grains from 54% moisture content [wet basis] to equilibrium moisture content of 15% [wet basis] in 19 hours at the rate of 9.5% per hour.

NPA 1210

Adelaja, S. O. [2000] Development and Evaluation Of Some Quality Parameters Of Cowpea [vigna unguiculata] Snack.

Nigeria Institute Of Food Science and Technology NIFST Proceedings Of The 24th Annual Conference pp258- 259

The author highlight that a dried cowpea based snack would be acceptable and satisfy protein needs as compare with cerea- based snacks.

NPA 1211

Adepoju, P. A. and Marcus,A. A.[2000] Effect Of Processing On The Quality and Acceptability Of Two Varieties Of Cowpea Flour
**Nigerian Institute Of Food Science and Technoiody NIFST
Proceedings Of The 24th Annual Conference pp327- 328.**

The study shows that heat treatment has effect on flour and water absorption capacity, hence a drying method should be developed so as to have little effect on the protaing.

NPA 1212

Afolabi, E. Bamidele.[2001] Fortification For Ogi and Custard with Griain Amaranth Flour.
Nigerian Institute Of Food Science and Technology NI FST

Proceedings Of The 25th Annual Conference pp10- 12

The result from a number of previus studies of grain amaranth that showed that the protein content increases with heat application. Also it was revealed that Ogi supplemented with fermented amaranth contained higher fat content implying that fermentation leads to an increase in the fat content of the product.Decreases were noticed in the starch contents of Ogi and custard fortified with fermented and popped amaranth in that order.

NPA 1213

African Science Tech Digest. [2010] Beware Of Aflotoxin Silent Killer, The Effects On Food Crops and Health Implications.
African Scince Tech Digest Vol.10 No,9 pp25 26.

Aflatoxin is carcinogenic on humans and livestock upon consumption of contaminated products . The aflatoxins are chemically stable, even at high temperature up to 250°C enabling cumulative effect in the consumption of aflatoxin contaminated products. Although products can be detoxified by chemical technology, but at expensive extra cost often unacceptable.

NPA 1214

Agbo, A. B. and Jafun, F. B. [2000] Localization Of Mineral Element In Different Parts Of Soughum
**Nigerian Institute Of Food Science and Technology NIFST
Proceedings Of The 24th Annual Conference pp 53.**

The presence of the elements in the embryo further strengthen the suggestion that elements like potassium and phosphorus are linked to the production to endosperm degrading enzymes because that is the site of production. The lack of minerals in the endosperm further confirm the reports that endosperm is made up of storage materials only . Nutritionally, it is important to note that any process that results in the loss of the embryo of the grains to wastage reduces its nutritive quality.

NPA 1215

Agbo, E. B.and Jafun F. B [2000] Sorghum Malting Studies; Effect Of Germination On Mineral Element Composition
Nigerian Institute Of Food Science NIFST
Proceedings Of The 24th Annual Conference pp54- 55

Since the concentration of mineral elements is expressed in relation to the weight of the grain, the results would appear to be constant. Mineral elements such as phosphorus and potassium which have been linked to the malting quality of grains mainly concentrated in the embryo which is not being degraded as the endosperm is . So, it would appear that the materials which are not being incorporated into the germinating seedlings would be left practically unaltered in concentration.

NPA 1216

Agu, C. O. [2001] Effects Of Controlled Conditions On The Quality Of 'Burukutu' An Alcoholic Beverage from Sorghum Sorghum bicolor.
Nigerian Institute Of Food Science NIFST
Proceedings Of The 25th Annual Conference pp148- 149.

From the result was observed that controlled conditions gave a better and more acceptable product['' burukutu''beer] and therefore be encourage.

NPA 1217

Agu, H.O.,Anosike, A.N. ,Yusuf, I.Z. and Jideani,I.A. [2003] Physicochemical and Sensory Qualities Of 'Ambu' Produced From Different Cereal Grains.
Nigerian Institute Of Food Science and Technology NIFST
Proceedings Of The 27th Annual Conference pp31-32.

This study showed that any of the cereal grains could be used to substitute the other grain in Dambu production.

NPA 1218 Agu,H. O. Anosike,A.N. Yusuf,I.Z.and Jideani,I.A.[2003] Storage Qualities Of Dambu Produced From Different Cereal Grains
**Nigerian Institute Of Food Science and Technology NIFST
Proceedings Of The 27th Annual Conference pp33-34.**

The above results conformed that dambu is a perishable food product that cannot be stored for more 24 hours.

NPA 1219 Ahmed, E. U. Musa, H.and Ngoddy,P. O. [2003] Sensory Attributes Of Extruded Cereal-Legume Blends For Instant “Kunun-Zaki” Beverage Analogue.
**Nigerian Institute Of Food Science and Technology NIFSE
Proceedings Of The 27th Annual Conference pp5-6.**

The result showed that maize and sorghum-based extrudate ‘kunun-zaki’ analogues exhibited similarity on colour attribute as relate to the traditional sample. The degree-of different[DOD]of the attributes tested, also varied but appreciable quality enhancements leading to enhanced acceptability relative to the traditional sample were recorded for instant”kunun-zaki” analogues containing 15% [w/w] added malt-flour.

NPA 1220 Agidi, G. and Zibukere, D. S [2005] Performance Evaluation Of Burma Rice Processing Plant.
Proceedings Of The 6th International Conferece And 27th Annual General Meeting Of The Nigerian Institution Of Agricultural Engineers Vol. 309- 316.

A 3 tones per day capacity rice processing plant was established for the burma farm in Bayelsa state. The installed machines are; one rice thresher, one wet cleaner three rice parboilers. One Rotary steam Dryer,four miling machines and one pneumatic cleaner. All the machines were fabricated in the National cereals research Institute Badeggi, with funds provided by the Nigeria Agrip Oil company Ltd Port –Harcout. The performance of each of the machines were evaluated and their results were recorded. The milling recovery of the plant was observed to be 69.5%- 70.43%. while the performance of the various components of the plant are clearly highlighted.

NPA 1221

Akhuemonkhan, I. A. and Anifowose [2000] Production and Evaluation Of Food Gum From *Mucuna Flagellipes*.
**Nigerian Institute Of Food Science and Technology NIFST
Proceedings Of The 24th Annual Conference pp252-253.**

From the foregoing *Mucuna flagellipes* gum evidently showed comparable rheological and emulsification properties with gum tragacanth and hence it could serve as a good substitute for the production of some desserts. It could also be used as thickener in commercial salad, since had earlier reported it toxicologically safe. It is envisaged that this move would lead to its commercial cultivation and concomitantly serve as a foreign exchange earner for the country.

NPA 1222

Akhuemonkhan, I. A. Adepoju P. A. and Oginni, A. O.[2001] Effect Of Different Pre-Treatment On The Cooking Time and Nutritional Composition Of African Yam Beans *Sphenostylis Stenocarpa*.
**Nigerian Institute Of Food Science and Technology NIFST
Proceedings Of The 25th Annual Conference pp 7- 9.**

The result indicated that the edible salts used at low concentrations accelerated softening of the beans and thus reduce the cooking time. Proximate analyses of the raw beans are similar to those reported by NAS. The minimal loss observed in nutrients analysed were due to leaching in to soaking and cooking water as reported by Kabbara in conclusion pre-processing treatments do not appear to have serious deleterious effect on nutrients composition of African yam beans. Hence, soaking and cooking in 0.5% NaHCO₃ is recommended since earlier work of Koneshan and Kailasapath have suggested that this salt improves the tenderness and palatability of cooked beans.

NPA 1223

Akhuemonkhan, Innocent Ayemec. And Badaru, Olayinka Fatimal [2000] Production and Quality Assessment Of Ogiri Cubes From Soya Bean and Melon Blend.
Proceedings Of The 24th Annual NIFST Conference pp262-264.

Sensory evaluation showed that there was no significant difference in terms of odour and general acceptability between the cubed and

local ogiri. Shelf studies on the cube showed stability of the product in terms of texture, odour and microbial load

NPA 1224

Akinjayeju, O . and Bakare, L. O.[2005] Effect Of Legume Types and Substitute Levels On Some Physical and Rheological Properties Of Plantain- Legume Flours.

Proceedings Of The 27th Annual NFST Conference pp169-171.

As substitution level increase , there were progressive decreases in maximum and cooled –paste viscosities , a trend , which also reflected on the stability and consistency of the flours , with most likely adverse consequences on the texture of properties of the ‘‘Amala’’ prepared from the flours .

This will however be confirmed by carrying out the cooling tests on the flours and sensory evaluation of the ‘ Amala’ obtained from them . With respect to the legume type, it is expected that cowpea will be a better fortifier of plantain flour in respect of the effects on the physical and rheological properties, when legume flours are added. This however would have to be corroborated or disproved by cooking studies and organoleptic assessment of yhe cooked samples.

NPA 1225

Akinjayeju, O. and Asu, A. O. [2003] Effect Of Legume Type On Some Properties Of Yam Legume Flour Blends.

Proceedings Of The 27th Annual NIFST Conference pp172-174.

Sensory evaluation shows that overall acceptability of the cooked samples from blends was relatively lower than that from 100% yam flour with Bambara nut recorded lower mean sensory rating of 4.70 ± 0.05 , out of total of 9 for liked extremely, compared with

6.20±0.25. In general, cowpea will more likely be a better fortifier of yam flour than Bambara nut if the flour is to be used for the production of 'Elubo' flour.

NPA 1226

Akinsete, J. A. and Oyewole, O. B. [2000] Microbiological Safety Of 'Ogiri' Produced from fermented melon [*Citrullus vulgaris*]
**Nigerian Institute Of Food Science and Technology NIFST
Proceedings Of The 24th Annual Conference pp110- 112.**

The results obtained in the incubation of ogiri with *E. coli*, *klebsiella sp.* and *proteus mirabilis* showed an increase in the number of colonies of *klebsiella sp.* up to the 24hour but showed down progressively to the end of incubation [figure 1] . *proteus mirabilis* however multiplied slowly until the 24th hour when the number reduced to the end of incubation . *E. coli* increased throughout from 9.9×10^3 - 2.7×10^6 cfr / g . Earlier study 2 also revealed the isolation of *Esherichia* , *klebsiella* and *proteus* species from ogiri' with these organisms. Since they are associated with diseases of man, they could cause diseases in consumers of 'ogiri'. The risk of contacting diseases from these pathogens was eliminated when none of the organisms could be isolated from 'ogiri' after cooking.

NPA 1227

Akoma, O. Onuoha, S. A. Ajiboye, M. O. and Alawoki, A. M. [2001]The Nutrition and Sensory Quality Characteristics Of Kunun-zaki Produce With The Addition Of Hydrolytic Enzymes From Malted Rice *Oryza Sativa*
Proceedings Of The 25th Annual NIFSE Conference pp55- 57

The used of an alternative-sweetening agent for the production of kunun-zaki in order to reduce cost of the product and as well for health purposes is hereby advocated.

NPA 1228

Akinola, S. O. and Obuekwe C. O. [2002] Effect Of Roasting Sundrying and Germination on The Proximate Composition Of Groundnut[*arachis hypogea L.*]

Proceedings Of The 26TH Annual NIFST conference pp 143-144.

Groundnut samples allowed to germinate must have gone through a process of fermentation which aided the increase of the proteins. The oil extracted in the roasted samples was highest ad least in the germinated sample.

Also the carbohydrate content was highest in the roasted sample and least in the germinated sample.

NPA 1229

Akintobi, D. C. A. and Salau, A. W. [2007] Assessment Of The Resistant Of Podwall Of Cowpeas [*vigna un gukulata*] To Bruchids.

The Nigerian Agricultural Journal Vol. 38 pp49- 56.

This study was carried out to evaluate podwall resistance of ten cowpea genotypes to storage pest, bruchids [*Callosobruchus maculatus* [f] and *Bruchids atrolineatus*] in four location in Nigeria. Thepods were stored in sealed brown paper bags at ambient condition for 50days after which they were assesd for bruchid infestation. Two genotypes, Tvnu72 and Tvu2027, expressed high pod wall resistance having recorded the lowest numre of eggs and adult emergence and pod damage, while Danila with the highest number,had low resiatance,.Similarity, seeds of Tvu72 and 2027 and IT 84S -2246-4 were highly resistance while seeds of Danila were highly susceptible. There was locational effect in the expression of podwall resistance. Ibadan,with the

highest number of eggs, adult emergence and pod damage, had low podwall resistance, while Mokwa and onne had high resistance. podwall resistance appeared to have been influenced by location and storage conditions such as temperature and relative humidity rather than genotypic differences.

NPA 1230 AKubor, P. I. and Egbekun, M. K. [2000] Functional Properties Of Soybean Maize Carrot Flour Blends For Food Formulations. **Proceedings Of The 24th Annual NIFST Conference** pp150-151.

This study has characterized the functional properties of soy bean / maize / carrot flour blends essential for food formulations.

NPA 1231 Akubo, P. I.[2000] Physical and Sensory Properties Of Biscuits Prepared From Blends Of Toasted African Breadfruit and wheat Flours **Proceedings Of The 24th Annual NIFST Conference** pp35- 36.

The results of this study showed that up to 90% of TABKF could be incorporated into WF without adverse effect on biscuit quality. However, the biscuits prepared from 40% TABKF and 60% WF blend was the most preferred with respect to flavour, texture, taste and overall acceptability . TABKF/ WF biscuits would serve as a vehicle for increasing intake of protein and calories in Nigerian diets.

NPA 1232 Alaka, I. C .[2002] Effect Of Water Source On Chemical and Physicochemical Properties Of Pregelled Broken Rice Flour.

Proceedings Of The 26th Annual NIFST Conference pp 147-148.

The results showed that The conversion of broken grains into pregelled flour would lead to an increase in the level of utilization of broken rice grains.

NPA 1233

Alao, O. A. [2000] Incorporating Acha [digitaria Exilis Staff] Grains Into Weaning Food To Curb Iron Deficiency In Infants
Proceedings Of The 24th Annual NIFST Conference pp309-310.

The use of acha in weaning food will definitely reduce the incidence of iron deficiency in infants during weaning it is encouraged that dietary education and structured programme are carried out, so that parents irrespective of their social background can benefit from advice, education and support during weaning. A mother can develop other means of incorporating the grains into diet. The yellow specie containing substantial amount of lead is discouraged for weaning because lead is particularly toxic to the infants. Effort should be made to increase the production of these grains to meet the demand. The cost of a measure of the grains is the same as a measure of rice. The cost is likely to reduce if production increases.

NPA 1234

Alobo, A. P. and Babalola, I. [2002] Effects Of Pre-treatments On The Proximate and Functional Properties Of Bambara Groundnut Flour.

Proceedings Of The 26th Annual NIFST Conference pp181-182
Autoclaving resulted in flour with the most desirable flavour but appeared to be uneconomical because of losses during the squeezing and washing of the seeds.

NPA 1235 Alonge, A. F. , Olaniyan, M. A. , Oje, K. and Agbaje, C. O. [2004] Development Of A Screw Press For Village Level Groundnut Oil Extraction
Journal Of Agricultural Engineering and Technology Vol. 12.
pp46- 53.

A manually operated screw press was designed, constructed and tested for village level groundnut oil expression. Materials for construction were sourced locally . The press was tested for efficiency, throughput and durability. The results of the test indicate that a maximum oil yield of 24.93% was obtained at 80⁰C and pressure of 42.28kpa. The oil expression efficiency was found to be 54.7%. The press is simple and can be easily operated, used and maintained by rural women who are the major processors of groundnut oil . The design puts into consideration the techno-economic status of rural life.

NPA 1236 Aluko, O. Banjoko, I. O. and Egiolanhem, P. I. [2005] Production Of Evaluation Of Food Grade Gum From Brachystega Eurycoma
Proceedings Of The 27TH Annual NIFST Conference pp175-177.

This apparently suggests that the gum Arabic is less pseudoplastic than the indigenous gum extracted from Brachystegea eurycoma seeds.

NPA 1237 Anih, A. C. [2000] Micronutrient Fortification Of Weaning Food Formulated From Soybean Malted Sorghum and Hungry Rice ‘acha’ and Tiger Nuts.
Proceedings Of The 24th Annal NIFST Conference pp 271-272.

The nutritional composition of each sample is quite encouraging compared with the control nutrend brand weaning food and WHO standard. Therefore, the burden of infant malnutrition can be eliminated by formulating weaning food with complements of soybean rich in essential amino acids, sorghum and D exilis malt rich in alpa- and bet- amylases respectively which degrade starch to the desired sugars and proteinases that break down protein to amino acids while the dietary fibre is provided by the tiger nuts.

NPA 1238

Anih, A. C. [2003] The Influence Of Solvent Extracted Soybean Flour In Sorghum Wort Beer
Nigerian Food Journal Vol. 21. pp.94- 98.

The result was influenced by fermentation in sufficient FAN level in brew C. supporting enough yeast growth for full attenuation of the wort sugars in the fermenting system than the brew B Brew A had the lowest FAN wort value, therefore, not enough to promote fast attenuation of wort sugars in the fermenting system. Brew C had the best foam stability, compared with other brews. In addition, brew C had the highest yeast count and viability of 19.8×10^3 and 84.4% respectively. While brew B had 15.1×10^3 and 58.4%, brew A had the least values, 62×10^3 and 39.6%. Comparative sensory evaluation of brews A, B and C showed that there was no significant difference [>0.05] between the brews in terms of flavour and mouth-feel, However, brew A was significantly different [$p \leq 0.05$] from those of B and C in terms of colour.

NPA 1239 Aneh, A. C. [2003] Evaluation Of The Baking Potentials Of Sorghum [sorghum vulgare cv. Ksv.8] and ''ACHA'' [*DIGITARIA EXILIS*] Flour Blend In B isscuit production
Proceedings Of The 27th Annual Conference NIFST
Pp35 36

The result shows that wheat flour with sorghum and ''acha'' composite flour blend in biscuits is quite impressive on the overall qualityof the products, if quality control tests are carried outat all critical points of production.

NPA 1240 Anuonye, J . C . Umaru M . I . and Idowu, A .A. [2001] Development Of Soybean fortified Local weaning Food with Enhanceed Shelf Life
Proceedings Of The 25th Annual Conference NIFST
PP 19-21

The result showed that addition of full-fat soybeanat 25% to air dried cereal starch produced a powdered mix with enhanced sensory, rheological and proximate properties, adequate for the weaning infant storage stability.

NPA 1241 Anuonye, J . C . and Umaru, I . M. [2001] Determination Of The Optimum Level Of Salt Concentrion and Soaking Time For Dehulling Of Sesame.
Proceedings Of The 25th Annual Conference NIFST pp 30-31

From the results of this work it could be concluded that optimal level of salt addition for enhanceed efficiency in dehuling sesame lie between 0 .4-3%. The optimal soaking period lies between 0-4hrs.

- NPA 1242 Aroyehun, S. O . and Adegoke, G. O. [2000] Critical control Points, Microbiological and Chemical Profile Of Akara-A street Vended Food
Proceedings Of The 24th Annual Conference NIFST ppP 90-91.
 The results obtained indicated heavy contermination with faecal coliforms in the samples collected and pathogenic bacteria of public health significance. *Bacillus* spp. *Staphylococcus ccus dureus*. *Aspergillus spp.* were the dominant microorganisms identified along the processing chain from the raw material stage through mixing to the final stage [Akara].
- NPA 1243 Ashiru, A. W. Olaleye,O . O. and Vabol, Egbennli, P .O . [2003] OccurrenceOf Pathogenic Organisms In Kunu-Zaki Drink Sold Within Lagos Methropolis
Proceedings Of The 27th Annual Conference NIFST pp 84 -85.
 The acidity of kunun-zaki beverage is a result of lactic acid production during fermentation. The percentage of lacticacid in kunun-zaki has been reported to be 0.04 to0.50%.
- NPA 1244 Asoegwu,S.N.and Eke,C.N.U.[2009] The Relationship Between Some Physical Properties and Seed Weight Of Jackbean Seeds .
Proceedings Of 3rd International Conference Of WASAE and 9th International Conference Of NIAE pp256—259 ..
 The linear regressions done between the seed weight and some physical peremeters revealed that seed weight correlates linearly with most of the parameters except sphericity and porosity with the highest coefficient of determinatios [$R^2=0 .983$] for arithmetic mean diameter followed by volume [$R^2 =0 .976$] . Both sphericity and porosity had a quadratic relationship with seed weight of jackbean . The following parameters increased linearly as seed

weight increased ; all the three orthogonal diameters , volume , particle [seed] density, and bulk density as well as arithmetic and geometric mean diameters . The data would be useful for designing separating and cleaning systems and equipment .

NPA 1245

Asumugha, V. U. [2002] Sensory and Functional Properties Of Dry vegetable Cowpea Product [Akara].

Proceedings Of The 26th Annual Conference NIFST pp 66- 67 .

The results showed that black beans had the highest swelling capacity means that it can compete with the white beans, which is conventionally acceptable in the production of Akara . It is hoped that the elucidation of the many food properties of vegetable cowpea [black and brown varieties] may lead to its increased use and exploitation as human food.

NPA 1246

Ayo, J. A. Umanze, H . and Gaffa, T . [2000] Microbiological Evaluation Of Kunnu-zaki and Sobo Sold In The Federal Polytechnic Bauchi Community.

Proceedings Of The 24th Annual Conference NIFST pp101- 102

The result of the counts of sobo drink are quite lower than kunnu-zaki and this could be due to the heat treatment [pasteurisation] given to zobo and absence of nutrient like carbohydrate.

NPA 1247

Ayo, J . A . and Okaka, J . C . [2002] The Effect Of Dangarafa [cadaba farinose] Crude Extract On The Physical and Chemical Properties Of Kunun-zaki.

Proceedings Of The 26th Annual Conference NIFST pp 35- 36

The result of the research is aimed at evaluating the effect of farinose crude extracted on the physical and chemical properties of kunun-zaki.

NPA 1248

Ayo, J . A. and Gaffa, T. [2002] Effect Of Undefined Soybean Flour On The Protein Content and Sensory Quality Of Kunun-zaki. **Nigeria Food Journal Vol. 20** pp7- 9.

The effect on the sensory qualities were generally significant [$p < 0.05$] at above 15% addition of the soyabean flour and the product was no longer acceptable. Soyabean flour up to 15% [w/w] can be added to kunun zaki to improve its protein content and this will have no effect on the overall acceptability.

NPA 1249

Ayo, J . A . Cloude, P. and Ayanlere, O . [2002] Effect Of Ascorbic Acid, An Alternative To Potassium Bromate on the Quality Of Bread.

Nigeria Food Journal Vol. 20 pp.33- 35.

The sensory properties of the ascorbic acid treatment bread and that treated with potassium bromate were generally inferior at levels above 0.065g/kg and 0.045g/kg of flour for bromate and ascorbate treated samples respectively [$p < 0.05$] .

NPA 1250

Ayo, J . A . Nkama, I . and Ibrahim, A . [2003] Effect Of Acha [digitaria Exilis starch] Grains and Other Common Cereals On The Food Intake, Body Weight and Haematological Parameter Of Rabbit.

Proceedings Of The 27th Annual Conference NIFST pp.37- 38.

The rabbit fed on acha based die with highest BIN, BGL and PCV with relatively low BGL has made acha a good potential for quality food products and more important the choice for the diabetics .

- NPA 1251 Ayo, J .A. and Okaka, J. C . [2001] Hydrolytic Effect Of Cadaba Farinosa Extract On Some Selected Cereal Starches A Preliminary Study.
Proceedings Of The 25th Annual Conference NIFST pp.40
 The millet starchhaving the smallest molecular size or weight had the highest hydrolysing effect of 0.2mg /cm³ . This agrees with fennema⁴that smaller molecules has larger surface area which help to increase the rate of reaction
- NPA 1252 Ayo, J , A .and Nkama, I . [2002] Effect Of Acha [Digitaria exilis Staph] Grain Flour On The Physical And Sensory Quality Of Biscuit .
Proceedings Of The 26th Annual Conference NIFST pp.183-184 .
 The study has demostated that acha can substite wheat flour to 30%, without any significant effect, on it's quality.
- NPA 1253 Ayo, .J . A. Ejiogu, T. N.and Iheanacho, J. O .[2003] Effect Of Spices On The Microbial and Sensory Quality Of Kunun-zaki A Millet Based Non-Alcoholic Beverage
Proceedings Of The 27th Annual Conference NIFST pp.233-234.
 The ombined quality of the interactive compounds produced by the mixture or ginger [A] and clove [B] could make it a potential in the flavouring and preservation of foods particularly the beverage .
- NPA 1254 Badau, M. H. Jideani, I. A. and Nkama, I. [2003] Sugars Of Pearl Millet As Affected By Germination Time and Cultivar.
Proceedings Of The 27th Annual Conference NIFST pp42- 43.

This study has revealed that germination increased significantly the sucrose, maltose, glucose and fructose of pearl millet. ZANGO has also been identified as good source of these sugar. Therefore, if concentration of these sugars are to be used for selecting pearl millet cultivars for malting Zango will be the most preferred cultivar.

NPA 1255

Badau, M. H. Jideani, I. A. and Nkama, I.[2003] Hydrochloric Acid Extractability Of Minerals In Pearl Millet As Affected By Germination Time And Cultivar.

Proceedings Of The 27th Annual Conference NIFST pp 40 -41

The result shows that germination of pearl Millet cultivars has increased the bioavailability of minerals and the sources of the individual mineral have been identified.

