



NIGERIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY

Proceedings of the

44Th NIFST

**CONFERENCE/ANNUAL
GENERAL MEETING 2020**

Theme:

**AGRO AND FOOD-PROCESSING
FOR WEALTH CREATION-THE
NIGERIAN EXPERIENCE**



DATE: WEDNESDAY, 14TH - THURSDAY, 15TH OCTOBER, 2020

**VENUE: D'PODIUM INTERNATIONAL EVENT CENTER,
318 AROMIRE AVENUE, IKEJA LAGOS**

Editors:

Okafor, G. I., Oluwole O. B., Alamu E. A., Okolie N. P., Alagbe E. E., Ojo T. I.,
Okafor J. N., Agu H.O., Okpala L. C., Nicholas-Okpara V. A. N., Ogunji A. & Shittu T. A.



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GENERAL INFORMATION ON NIFST

NIGERIAN INSTITUTE OF FOOD SCIENCE AND TECHNOLOGY

The Nigerian Institute of Food Science and Technology (**NIFST**) is a registered Non-Profit Making Body representing Food Professionals drawn from the Academia, Industry, Government and Research organisations in Nigeria. The Mission of the Institute is a reflection of the rich Human Resources of NIFST.

Established in 1976, **NIFST** membership has grown to well over 6,000 with ten active chapters—spread across all the geopolitical zones in Nigeria. NIFST membership also extends beyond the shores of Nigeria with members resident in the United States, United Kingdom, Canada, South Africa, Ghana etc.

The Profession of Food Science & Technology in Nigeria became chartered with the establishment of the Nigerian Council of Food Science & Technology (NCFST) Act Cap A2 LFN of 16th October 2019 signed into law by the President and Commander in Chief of the Federal Republic of Nigeria, President Muhammadu Buhari.

NIFST provides professional support to individuals, public & private institutions and the food industry, advances and promotes Food Science and Technology as a Profession cum Discipline which contributes to Nation building. Over forty Institutions of higher learning in Nigeria offer this discipline.

The National Secretariat of **NIFST** is situated in Lagos State of Nigeria. This secretariat also hosts the Secretariat of the West African Association of Food Scientists and Technologists, **WAAFoST**. **WAAFoST** is the regional affiliate of the International Union of Food Science and Technology (**IUFoST**).

Our Institute actively supports sustainable economic development of Nigeria, through development of its human capital resource and creation of a sound economic platform, particularly in the Food & Allied Industry. These programmes are achieved through such activities as inventions and innovations, Consultancy, Symposia, Seminar, Training Workshops, Lecture Series and Career Talks organized either solely or in partnership with other Government Agencies, Research Institutes or Professional Bodies.

Through the teachings and practice of Food Science and Technology, **NIFST** has contributed tremendously to the phenomenal interest in the study of Food Science and Technology as a course and the growth of the Food Industry in Nigeria. **NIFST** believes in partnerships through collaborations, consultations and cooperation and has signed a number of MOUs and intends to do more with public and private organizations to optimize its objective of adding value to the food business and knowledge.

To date, **NIFST** has organized 34 Annual General Meetings (**AGM**) & Conferences where members converge to brainstorm, discuss/proffer suggestions on thought-provoking issues related to the Profession, Food Processing and Food Security.

Another area of focus, by **NIFST**, is the biannual publication of the Nigerian Food Journal (**NIFOJ**). The Food Journal was first published in 1983 and has remained an annual publication of the Institute to date. The **NIFOJ** is rated among the top 3 scientific journals by the Elsevier Publishers, a leading publisher of scientific journals, in 2014. The publishing company also hosts the **NIFOJ** on its site. From inception to date, it continues to serve as Nigeria's only organ of information dissemination on current Food/ Food Related Research Findings.

Other publications, from the Institute, include:

- a) Academic brochures such as Proceedings of Conferences and Symposia, Seminar, Book of Abstracts of Research Findings
- b) Information brochures such as Monthly Newsletter and Quarterly Magazine - THE FOOD FORUM MAGAZINE- packaged to serve the Food Industry and the General Public at grass root level.

NIFST has achieved more than the critical minimum of Scientific and Technological know-how required for the successful provision of Wholesome Foods for Nigerians. The Institute also promote job creation, wealth generation and poverty alleviation through advanced training workshops to educate, encourage and empower Micro-, Small- and Medium- Scale Entrepreneurs.

GOVERNANCE

A Board of Trustees and Governing Council pilot the affairs of the Institute. The Governing Council is made up of Principal Officers elected at **AGM**, Chapter Chairmen and Committee Chairmen constituted for specific assignments. The Corporate Affairs, Scientific & Training and Student Affairs Committees are coordinated by the 1st Vice President,

2nd Vice President and Assistant National Secretary respectively.

Members

The categories or type of membership (i) Student member; (ii) Licentiate member; (iii) Professional member; (iv) Honorary member; (v) Fellow (vi) Honorary fellow (vii) Corporate member.

The requirements for admission to the above categories or grades of membership are as follows:

i) Student Member:

He shall be a person not under 16 years of age, enrolled in a recognized course of study in Food Science or Food Technology at the time of application, and shall satisfy the conditions laid down by the Governing Council.

ii) Licentiate: He shall be a person who has either:

- (a) National Diploma in Food Science and Technology
- (b) Graduates from other related fields of study with relevant experience in Food Science and Technology (or food processing) and
- (c) has satisfied all Council requirements, by virtue of his experience in the field of Food Science and Technology and in view of the responsibility of his employment and by any additional evidence acceptable to the Council, that he is a suitable person to be admitted.

iii) Professional Member:

- (a) He shall be a person who has HND, B.Sc. or B. Tech. Degree in Food Science & Technology or Food Science or Food Technology.
OR
- (b) OND in Food Science & Technology, Food Science or Food Technology and who must have been admitted into Licentiate membership for at least one year, has applied for membership upgrade provided he/she has a minimum of 5 years relevant experience in a unit/department of an organization/institution in which scientific post-harvest food issues/business are processed/regulated/taught/researched as regular work.
OR
- (c) Any of HND or B.Sc. or B. Tech. or B. Eng. or MBBS in Food Science and Nutrition, Brewing Science and Technology, Food Engineering, Food Science and Microbiology, Chemistry, Industrial/Applied Chemistry, Nutrition, Chemical Engineering, Science Laboratory Technology, Biochemistry, Microbiology, Industrial/Applied Microbiology, Animal Science and Medicine who must have been admitted into Licentiate membership for at least one year and has applied for membership upgrade provided he/she has a minimum of 5 years relevant experience in a unit/department of an organization/institution in which scientific post-harvest food issues/business are processed/regulated/taught/researched as regular work.
OR
- (d) A Post Graduate Diploma (PGD) in Food Science & Technology plus HND or B.Sc. or B. Tech. or B. Eng. or MBBS in Food Science and Nutrition, Brewing Science and Technology, Food Engineering, Food Science and Microbiology, Chemistry, Industrial/Applied Chemistry, Nutrition, Chemical Engineering, Biochemistry, Microbiology, Industrial/Applied Microbiology, Animal Science, Agric. Engineering, Mechanical Engineering, Science Laboratory Technology and Medicine

iv) Honorary Member:

He shall be a person who has HND or B.Sc degree plus 5 years (minimum) of association with food production & the Institute.

v) Fellow:

He shall be a person not under 35 years of age who has fifteen years of NIFST membership with substantial evidence of contribution and active participation. Qualifying members apply to the Council stating biodata / qualification. The submitted evidence is scrutinized by the elected Fellows and admissions are ratified by Council before investiture.

vi) Honorary Fellow:

The title may be conferred by the Institute on an individual with more than 20 yrs of association with the food industry and the institute or an outstanding national immense benefit in the Food Industry or to the institute.

vii) Corporate Membership:

Corporate Membership, of NIFST, may be conferred by Council upon an Industry, a Company, an Institute or any otherwise legally organized body which is judged to have made significant contributions in promoting one or more of the stated objectives of the Institute.

EDITORIAL COMMENT

Distinguished NIFSTers! Permit me to present the Proceeding of the 44th Conference and Annual General meeting of the Nigerian Institute of Food Science and Technology (NIFST) with the theme “Agro and Food -Processing for Wealth Creation - The Nigerian Experience”. The conference holding in the megacity Lagos has been tagged “The Summit”.

The summit of challenges, relative to the theme have been well articulated from different angles and solutions proffered, by diverse experts who contributed their research breakthroughs, technologies and innovations to the Book of Extended Abstract. It is anticipated that the presentations during the Technical sessions will promote industrialization, food safety, processing and packaging of agricultural produce for local consumption, export and job creation amongst others.

The Covid 19 pandemic left its fingerprints on the expected number of submitted extended abstracts, whereas we had over 220 abstracts by end of August 2019, we had less than 150 this year, with 2/3 of the submissions coming at the end of August. This development, made us to enlarge the Editorial Team members, who helped to render needed services in editing the 150 abstracts received from scholars within and outside Nigeria, within a record time. The few extended abstracts omitted in the 43rd edition were integrated into this edition. The accepted abstracts were classified according to specific areas in Food Science and Technology discipline, for enhanced value to members during presentation at the Technical sessions. Authors have been assigned poster or oral presentation at the conference and should note that the stipulated forms of presentation, does not in any way make the content inferior to the other.

The challenges of Covid 19 Pandemic, late hour submission and delayed return of corrected abstracts by authors forced us to migrate from the traditional Paper to the e-version of the Conference Proceeding, which has the twin benefits of enhancing its visibility globally and accessibility. We appreciate the authors for their contributions without which this 44th edition would not have been possible.

I wish to commend the Volunteer Editorial Assistant - Mr. Akinyele Ogunji - for his devotion and commitment. My profound gratitude goes to the Editorial Sub-committee members and NIFST Secretariat staff, for their collective efforts that facilitated the execution of this task. Finally, I appreciate the Council members and entire NIFST family for the reposed trust.



Professor Gabriel Ifeanyi Okafor, FNIFST
Deputy Editor-in-Chief, Nigerian Food Journal



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ABST-109 (O) Profiling the sensory attributes and acceptability of canned ogbono soup

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SENSORY AND TEXTURAL PROPERTIES OF EXTRUDATES PREPARED FROM ACHA FLOUR AND PIGEON PEA PROTEIN CONCENTRATE BLENDS

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Introduction

There are increasing number of people in developing regions of the world including Africa suffering from malnutrition caused by inadequate intake of macro and micronutrients. Nutrient-dense extruded snacks have been used for nutrition interventions to mitigate malnutrition^[1]. Nutritious and healthy snacks are prepared from plant foods with desirable functional properties. Acha is gluten-free cereal rich in dietary fiber, micronutrients, essential and sulphur amino acids, and low in glycemic index with nutraceutical potentials^[2]. Plant-based protein concentrate has good nutritional value, antioxidant activities and functional properties. Pigeon pea proteins are rich in lysine, which is the first-limiting indispensable amino acid for humans in cereals^[3]. To date, literature on the sensory and textural properties of extrudates prepared from acha flour and Pigeon pea protein concentrate blends is very scanty. Extrusion cooking technology is a high temperature short time (HTST) technology used in creation of novel food products and improvement of existing ones like snacks^[4]. The objective of the study was to determine the sensory and textural (hardness) properties of extrudates prepared from different blends of acha flour and Pigeon pea protein concentrate.

Materials and methods

Acha (7.5 kg) and pigeon pea (1.5 kg) were purchased at Kure Ultramodern market Minna, Nigeria. Cleaned pigeon pea seeds were dried in an oven at 40 °C for 24 h and used in the preparation of pigeon pea flour using standard method. Pigeon pea flour was used in the preparation of pigeon pea protein concentrate using alkaline isoelectric precipitation method^[5]. Acha flour and pigeon pea protein concentrate (PPPC) were blended at different proportions (100, 98:2, 96:4, 94:6, 92:8 and 90:10) for the preparation of extrudates. A single-screw extruder (Model DD 85, 1BG Monforts and Reiners, Mönchengladbach, Germany) was used under the following conditions: length-diameter (L/D) ratio, 1:1; screw speed, 29 rpm; die, 1.01 cm; zone nearest the die heated with an electric resistance sleeve to a temperature of 165 °C. The temperature monitor was fastened to the barrel. A commercial extruded snack served as control sample. Sensory properties of the samples were evaluated by twenty (20) semi-trained panelists from the Department of Food Science and Technology, Federal University of Technology, Minna, Nigeria. The panelists evaluated the coded extrudate samples for appearance, taste, aroma, crunchiness and overall acceptability using a 9-point Hedonic scale of 9 (like extremely) to 1 (dislike extremely). The textural (hardness) properties of the extrudates were measured using an Instron universal testing machine (model 3342; Instron, USA) with a load cell of 50 N. All data obtained were subjected to analysis of variance (ANOVA) using SPSS version 20 (IBM, Armonk, USA). Differences among the means of the parameters were separated using Tukey's test at 5 % probability.

Results and Discussion

The sensory and textural (hardness) properties of the extruded samples are presented in Table 1. The appearance, taste, aroma, crunchiness and overall acceptability scores ranged from 5.60 to 7.60, 5.00 to 7.00, 5.40 to 7.20, 5.00 to 7.80, and 5.60 to 7.70, respectively. The scores of the sensory attributes of the extrudates increased with increasing proportion of Pigeon pea protein concentrate. In terms of overall acceptability, the control sample had the highest overall acceptability than the composite blends. The 90% acha flour and 10% Pigeon pea protein concentrate had the highest overall

acceptability score among the formulated. This observation aligned with the total sensory score. The 100 % acha extrudate had the highest hardness value (3.11N) while the control sample had the lowest value (2.46N). The hardness value of the extrudates decreased with increasing proportion of Pigeon pea protein concentrate and may be attributed partly to reduction in amylose content of the blends due to substitution of protein concentrate.

Conclusion

The study demonstrated that addition of Pigeon pea protein concentrate to acha flour improved the sensory properties of extrudates prepared from the blends, hardness properties decreased. The 90 % acha and 10% Pigeon pea protein concentrate extrudate gave the best sensory attributes among the extrudates from the composite blends evaluated by the panelists used in this study.

Table 1: Sensory and textural properties of extrudates from acha flour and Pigeon pea protein concentrate

Parameter	Control	A ₁₀₀	A ₉₈ PPC ₂	A ₉₆ PPC ₄	A ₉₄ PPC ₆	A ₉₂ PPC ₈	A ₉₀ PPC ₁₀
Appearance	... ^a ±1.33	...	5.80 ^b ±1.86	5.90 ^b ±1.46	5.90 ^b ±1.61	5.50 ^b ±1.66	5.50 ^b ±1.66
Taste	7.00 ^a ±1.71	5.00 ^b ±1.61	5.20 ^b ±1.52	5.50 ^b ±1.76	5.50 ^b ±1.59	5.80 ^b ±1.71	5.80 ^b ±1.71
Crunchiness	7.80 ^a ±1.48	5.00 ^b ±2.12	5.10 ^b ±1.99	5.30 ^b ±1.86	5.00 ^b ±2.12	5.40 ^b ±2.25	5.40 ^b ±2.25
Acceptability	7.30 ^a ±1.42	5.80 ^b ±1.61	5.70 ^b ±1.60	5.60 ^b ±1.45	5.60 ^b ±1.35	5.60 ^b ±1.50	5.90 ^b ±1.43
Total sensory score	29.70	21.40	21.80	22.30	22.00	22.30	23.10
Hardness (N)	2.46 ^c ±0.00	3.11 ^a ±0.01	2.86 ^b ±0.01	2.86 ^b ±0.01	2.79 ^c ±0.01	2.63 ^d ±0.00	2.58 ^c ±0.01

Mean and standard deviation of triplicates. Value in the same row with different superscripts are significantly different. A₉₆PPC₄= 96% acha flour and 4% Pigeon pea protein concentrate; A₉₄PPC₆= 94% acha flour and 6% Pigeon pea protein concentrate; A₉₂PPC₈=92% acha flour and 8% Pigeon pea protein concentrate; A₉₀PPC₁₀=90% acha flour and 10% Pigeon pea protein concentrate; control

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