



# FEDERAL UNIVERSITY OF TECHNOLOGY MINNA

CARE FOR FISH OUT OF WATER:  
A VERITABLE POST HARVEST  
STRATEGY FOR FOOD  
SECURITY IN NIGERIA

*By*

**PROFESSOR OYERO, JOHNSON OLUSEGUN**

*B.Sc, M.Sc, (Ibadan), PhD (Minna)*

*Professor of Water Resources, Aquaculture  
and Fisheries Technology*

INAUGURAL LECTURE SERIES 63

29<sup>TH</sup> MARCH, 2018

DEAN  
Sch. of Sci. & Tech. Education  
Federal University of Technology  
Minna  
Date



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**University Seminar and Colloquium Committee**

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This 63<sup>rd</sup> Inaugural Lecture was delivered under  
the Distinguished Chairmanship of:

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*Vice-Chancellor*

Federal University of Technology, Minna

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ISSN 2550 - 7087

*Published by:*

**University Seminar and Colloquium Committee,**

Federal University of Technology, Minna.

**29<sup>th</sup> March, 2018**

*Design + Print:*

**Global Links Communications, Nigeria**

©: 08056074844, 07036446818



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A handwritten signature in black ink, appearing to read "Johnson Olusegun Oyero".

# INTRODUCTION

*Let us then approach God's throne of grace with confidence, so that we may receive mercy and find grace to help us in our time of need. Hebrews 4.<sup>16</sup>*

*M*r. Vice Chancellor Sir, it is by the grace of God that I am standing at this "Town and Gown meeting" to present the 63<sup>rd</sup> Inaugural lecture of this great University Federal University of Technology, Minna today. This is the sixteenth from the School of Agriculture and Agricultural Technology and fourth from the Department of Water Resources, Aquaculture and Fisheries Technology. My academic progression has been a long but sure footed one. However, according to the Psalmists in His song of Ascent *"When the Lord restored the fortunes of Zion we were like those who dreamed. Our mouths were filled with laughter, our tongues with songs of joy."* Psalms 126:<sup>1-2</sup> God re-established me and filled my heart with joy today to present this Inaugural Lecture, exactly the 12<sup>th</sup> year anniversary of my PhD defence (29<sup>th</sup> March, 2006: Eclipse day) and four months and twenty seven days after being appointed Professor of Water Resources, Aquaculture and Fisheries Technology: the shortest period in the history of Inaugural presentation in the Federal University of Technology. Coincidentally, my 27 years of stewardship in the University and half my current existence on earth.

Today's lecture focuses on "henceforward" of dead fish. According to Lagler *et al.* (1977) stated what water is to fish. Its birth place, highway, byway, communication medium, nursery,

playground, school, room, bed, board, drink, toilet and grave. However, dead fish can still be beneficial and contribute the needed fish nutrient in human nutrition, if care is adequately given to it when out of water. Sadiku (2014), classified fish nutrient as the first class miracle for all stating that fish has been the richest source of nutrients especially essential nutrients – amino acids, fatty acids, vitamin and mineral and arguably unidentified growth factor (UGF), needed for body metabolism for growth, reproduction, body repairs, body activity and specific dynamic action (SDA) in all animal life, including man. Of all animal protein sources, it is the only one that can be eaten at all ages of life (infancy to old age), *ad-libitum* or to satiation without threat to life. It is widely eaten, except for obligatory vegetarians, widely used as fishmeal in feeds of poultry, livestock and aquaculture species, hence fish and fishmeal.

Fishes are diverse cold-blooded animals, typically with backbones, gills and primarily in water with over 20,500 species known to exist (Lagler *et al.*, 1977). Freshwater and sea fish constitute important sources of food for large segments of the populations of developing countries worldwide. According to Lamai (2011), fish is perhaps the most valuable item in water as far as man is concerned. It is generally observed that when there is a crowd near any water body the element of fish is the main object. However, fish is one of the most perishable foods.

Fish quality deteriorates rapidly immediately it is out of water. Just as any other dead tissue and biological materials and the potential keeping time is shortened, if they are not processed or preserved or stored properly. Substantial physical, economic and nutritional post-harvest losses occur at different points of capture, pre-processing (sorting, grading, de-scaling, gutting, washing and filleting), processing (open-air drying, oven drying, solar drying, smoking, salting, canning *etc.*), packaging, storage at low temperature (freezing, icing and refrigeration.) for fresh

fish and ambient temperature for dried fish products, transportation and marketing. These losses result from intrinsic and extrinsic factors.

These include the concentration of the substrates and metabolites in the tissues of live fish, the activity of the endogenous enzymes, the microbial contamination and the condition after catch (Sikorski *et al.*, 1990). In addition, the ambient temperature, handling on the boat, the hygiene of the processing area, equipment and the personal hygiene of the workers, the method of waste disposal, methods of packaging and storage and the mode of transportation, hasten spoilage by accelerating the activities of bacteria, enzymes and chemical oxidation of fat in fish flesh (Johnson and Clucas, 1996). Prevention of these losses will increase availability of fish protein, enhance the nutritional status of the people, and reduce fish importation, thereby conserving the Country's foreign exchange earnings.

## 2.0 FISH AS FOOD

Fish is regarded as an excellent source of dietary protein, fat, vitamins and minerals that are important to the human diet for the maintenance of good health. The nutritive value of protein is expressed in terms of the types of amino acids content present. Amino acids are regarded as the building blocks of protein and about 20 types of amino acids have been isolated from protein. Certain types of these amino acids are essential to the human diet for the maintenance of good health. If the basic materials (carbon and nitrogen) are provided in the diet, the body can synthesize some amino acids. These are termed non-essential or dispensable amino acids. They include alanine, proline, glycine, serine, tyrosine, asparagines, glutamic acid, aspartic acid, hydroxyproline and arginine. The remaining amino acids must be provided in the diet. These are termed essential amino acids.

They are lysine, methionine, tryptophan, isoleucine, leucine, threonine, valine, phenylalanine, arginine and histidine. The increased requirements for growth make one more amino acid, histidine essential for children (Ihekoronye and Ngoddy, 1985). Fish contains all the amino acids necessary for the development, health, repairs and the growth of human body that could not be synthesized by the body (Clucas, 1990). Also fish remains the cheapest source of good protein in the diet of a greater population of Nigerians, and its quality, in terms of the nutritional value is impressive because of its rich display of amino acids (protein/body builder). Of even greater impact is the affordability of the protein source, as it is cheaper than beef, pork and other meat sources. In developing countries including Nigeria, about 60 per cent of the protein requirement comes from fish (The Guardian, 2016).

Lipids are important dietary constituents. They contain fat-soluble vitamins A, D, E and K and essential fatty acids, which are found with the fat of natural food. The chemical composition of fish lipids differs from that of other naturally occurring fats and oils. They contain a greater proportion of highly unsaturated fatty acids, primarily of the *n*-3 family with chain length greater than 18 carbons (Bligh *et al.* (1988). Fish oils are rich in highly unsaturated fatty acids (HUFA<sub>s</sub>) especially eicosanpentaenoic acid which, has 20 carbon atoms in the chain, 5 double bonds (20; 5) and dodecahexaenoic acid (22; 6). Both acids belong to the *n*-3 series, meaning that the first unsaturated linkage is at the third carbon atom along the carbon chain from the methyl group (Love, 1992). Alais and Linden (1999) stated that the HUFA in fish oils influence the blood lipids in two ways. They lead to a lowering of the cholesterol level accompanied by a fall in the triglycerides level, which contribute to good health. Heart attacks and strokes are usually caused by hardening of the arteries and a contributory cause of this is the formation of blood clots, which eventually clog the coronary artery (Lands, 1986). Once



