ASSESSMENT OF THE PRESENCE OF SELECTED METALS IN THREE TYPES OF BOILED EGG ALBUMEN AND WINES.

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Abstract.
Three species of egg from (poultry foul, native foul and guinea fowl) and wines (red and green). were assessed for the present of selected metal, (dietry essential elements). constituent with respect to there co-enzymes activities in relation to scavanging and chain radical properties, using standard methods. The results of the analysis shows, Fe: range between 1.039±0.01mg/l - 16.50±0.02mg/l, Cu: range between 0.019±0.01mg/l -- 0.116±0.01mg/l, Zn: range between 0.241±0.01mg/l --- 0.575±0.02mg/l and Se: were not detected, and the red wine has values; Cu: 0.01±0.01mg/l, Fe: 0.01±0.01mg/l and the green wine with all the selected metals were not detectable. The I R spectrum indicated five peaks for red wine and three peaks for green wine and both reveal, the present of 0 ----H, > C = 0 and N – H functional group and it indicate, the present of ester, phenols and alcohol with the resveratriol and selantinon characteristics, that are polyphenols and antioxidants. In conclusion, the present of these transition elements, polyphenols and serotonin indicate the antioxidant properties of these samples and therefore their, consumption should be encouraged, and that, the fowls feed should be supplemented with food containing Cu, Se, Zn and Fe, and the wines during production which, must be within the maximum allowable limit, because of there healthy functional important benefits in the area of healing, and resistance to diseases and cancer.

Key words: Essential elements egg albumin, wine, and Instrumental analysis.

INTRODUCTION
Agriculture occupies a key position in the Nigeria economy, judging by its critical role in employment and revenue generations as well as in the provision of raw materials for industrial development and food security,[4]. Nevertheless, the nations agricultural potential are far from being fully realized and this, has unpalatable implication for food security and sustainable economy development [9]. The development and improvement of poultry industry has been a major focus of Nigeirias Federal Government because, apart from the fact that, it contributes tremendously to the protein intake of individuals, it also serve as a ready source of income to the small scale famers. [1]. Nigerian markets are filled with various methods of operating marketing strategies at different level of buying and selling for their Agricultural product, both standard and sub-standard. Including some imported drinks, despite that, human survival still continue, and a safe environment is anticipated, which is the highest priority guide. The buying and selling of different egg types and wines are among the agric product that are very common in the market all over the country. The departmental store, retailing, pharmaceutical stores and shops are some of the major area where they are marketed and found in various forms both as fresh, boiled, prepared as egg row and used in various flour processing bread making, and wines are serve as drinks both at home, churches and event centres. The present common eggs especially the agric type this days, indicated that the challenge of our Agricultural expert has been addressed and thereby commending them for such efforts and encourage them on how the other types can be improved and be a good source of nutrients to the common man in our environment. Even though, the colour different of the egg: brown and white and are graded AA, A and B, is a physical ways of identification but the nutrient derived are the same with different concentration but the wines are easily observed in all departmental shops also and the nutrient constituents are different, therefore the need for research into this natural source of healing provision from the
wines and egg in other to actualize there important and pressing need in our environment. Moreover, observing the poultry fowl, guinea and domestic fowls, all are involve in the egg production, and possess the potential to lay egg at almost the same way and time therefore, there is need to look at the best way, the Hen and guinea fowls can be made to lay eggs as the agric fowls, in other to compete favourably with one another, complementing there nutrients for economy improvement, since poultry is the quickest sources of meat and its production, involve the least hazardous and oridious process in relation to other live stock enterprise, as reported by [9, 5].

Furthermore, egg contain an embryonic dish with germinal cell on the surface of the yolk. The embryonic disk is surrounded by great amount of reserve nutritive material. The egg shell has protein based that contain many calcium carbonate crystals, the yolk contain greatest concentration of nutrients within the egg. its principal content are protein, fats, mineral and vitamins A, D, E. and B. [10, 9]. The yellow colour of the yolk is attributed to xanthophylls, a non nutritive carotenoids, an intense yolk indicate that the, hen/fowl has been naturally and healthfully feed with corn and other vegetable containing natural pigment. Today, however, this may not always be the case, industrially, poultry feeds, were added xanthophylls and other pigments. in this way, the eggs produce all the desire color, inspite of the way they have been feed and the egg white formed almost entirely of water and protein, predominantly albumins. [9, 8, 10]. This albumin bonds transition metals ion present and localized or absorb their oxidative effect that may produce reactive oxygen species, and act as scavanging and enzymatic antioxidant. Moreover, the present of dietary essential elements such as, selenium, copper, and iron are one of the transition elements present in foods, in which the selenium is proved to be a significant antioxidant. Selenium works with vitamin E in fighting free radicals. It functions as an important antioxidant enzymes called gluthaione peroxidase. Selenium concentration in tissues, also involve in the immune response to lymph, nodes, liver and spleen. Its natural deficiencies have been describe in China as inherent endermic heart and bone diseases and were linked to selenium deficiency, [6]. In addition Zinc play an incredible versatile and vital role in multiple functions in the body. The human body contain 2g of zinc found in all human tissue and fluids, in which bone hold 5% of Zn, 25% are found in tissue and fluids, 20% in the skin, nail and hair, eye retina and the male sex organ [prostrate and gonads] contain about three times as much as other soft tissues. Zinc is also important for synthesis of key tissue protein and repaired of basic genetic controller of life. In addition, Zinc is associated with protein in the body and also fund associated with protein in food, oyster has the highest source of zinc : 959mg/kg. its concentrated in the cell are thought to serve as phagocytic defense factor. Zinc is distributed throughout the body with muscle and bone, constituting the largest pool and a controlled amount is lost in urine, copper has similar properties. [10,12, 2]. A follow up study demonstrates that food supplemented with zinc and selenium shows improved antibody response to the flu vaccine, [4]. In addition wines are liquids juice solution with low alcohol content and some with none, they are identified by different brands and colour i.e red, green and white. This normally depend on the source of production, and the label on their container gives enough information of the content with the accredited body that permit the sales e.g NAFDAC, SON etc. Red wine contain a compound called resveratrol which is an antioxidant compound, especially if the origin is from grape. The compound is a polyphenol derivatives of aromatic hydrocarbon called stilbene. It also contain copper, seleium, and zinc which are also present in egg as antioxidants together with serotonin, [10, 6]. Finally, co-enzymes are cofactor like metals such as: Zn, Fe, Cu, and Se usually forming peptide bond with protein, the reaction check the oxidation of radicals that curses diseases.
**Justification:** Several reports have been known about egg and wines from various agricultural sources, but the present of dietary essential elements in the albumin and wines like: Zn, Se, Cu and Fe, and their co-enzymes effect has not been properly addressed very well in terms of reports, and their sensitivity to their functions. Therefore, these papers seek to study the assessment of the present of selected metals in three types of boiled egg albumen and wines, with respect to their antioxidant properties, healing abilities and reproductive purposes, using standard methods. The ashed samples were allowed to cool in the Laboratory inside a dessicator and then dissolve with 0.1M nitric acid, later filtered with whatman no 41 filtered paper inside 100ml volumetric flask, and made up to mark with the acid solution. The filtered solution was taken to the Laboratory FAT LAB opposite U. I Ibadan, all analysis are in triplicate, chemical use are BDH chemical, and central research laboratory Federal University of Technology Akure, for A.A.S. analysis and I R specturm scanning analysis for wines respectively.

**EXPERIMENTAL**

**MATERIAL AND METHODS.**

**Sample preparation:** Three species of egg were purchased from Oja - Oba market located in Ondo State and Erekesan market located in Ilesha Osun State Nigeria. The three samples were identified in soil and pest Department Federal University of Technology Akure, then later preserved in a refrigerator at 5°C until when needed.

**Methods:** The three egg types were boiled with distilled water for 30 minutes, on hot plate and later cooled at room temperature for four hours. The outer shell was removed separately for each species, then the succulent white section called egg albumin was cut and 0.5g each were weighed on a mettler balance inside a clean dried crucible, together with 1.0g of the wines, making them ready for ashing in a muffle furnace at 550°C for 2 – 4 hours.

**RESULTS, DISCUSSION AND CONCLUSION.**

| Parameters       | Cooked egg | Fe mg/l | Cu mg/l | Zn mg/l | Se mg/l |
|------------------|------------|---------|---------|---------|---------|
| poultry fowls    | 1.265±0.01 | 0.02±0.01 | 0.159±0.02 | ND      |
| Native fowls (Hen)| 1.039±0.01 | 0.019±0.01 | 0.241±0.01 | ND      |
| Awo fowl         | 16.501±0.02 | 0.116±0.01 | 0.575±0.02 | ND      |
| Red wine         | 0.01±0.01  | 0.01±0.01  | 0.00     | ND      |
| Light Green wine | 0.00       | 0.00       | 0.00     | ND      |
| WHO Limit mg/l | 20.0       | 10.0      | 50.0     |         |

*STD.*
EVA
EVA Sample
The table (I) above shows the elemental (Fe, Cu, Zn, and Se) analysis results of all the investigated samples for the dietary essential element that serve as co-factor and antioxidants present in the samples. The copper constituent range from 0.02±0.01mg/l for poultry fowl to 0.116±0.01mg/l for guinea fowl and 0.019±0.01mg/l for native hen, and that, iron content range from 1.039±0.01mg/l for native hen to 16.501±0.02mg/l for guinea fowl and 1.265±0.01mg/l for poultry fowl. While, the Zinc content range from 0.159±0.02mg/l for poultry fowl to 0.575±0.02mg/l for guinea fowl and 0.241±0.01mg/l for native hen and selenium was not detected for all the samples. The present of this essential metals in the samples indicate their antioxidant properties in relation to their reaction with co-enzymes, and forms one of the factors that determine the quality of the eggs and their grades. These metals present are the key components of antioxidant enzymes. Moreover, the value observed for zinc in all the boiled egg is lower to that of honey (0.662±0.01mg/l) as reported by [7,8, 11] but it is within the ((WHO) world health organization limit. In addition, the value observed for zinc in the boiled egg is also much more lower than, that reported for fish (8.999±1.795mg/l) by [8]. Also, the highest values observed for copper, and it was for poultry fowls was lower to that value reported for fish (0.397±0.039mg/l) by [4,8] and much more lower than values reported for carpolobia lutea fruit by [9]. but they are within the wold health organisation limit value. Further more, the highest observed value for iron, is for guinea fowls (16.501±0.02mg/l) and was lower to the value reported for ripe mangoes (48.00±1.00mg/l) by [3] but is much more higher than that reported for Ocimum gratissium (2.73±0.01%) by [15] and wheat bread value:(5.20ppm) as reported by [9]. And that, there is a large significant different between iron observed value for Guinean fowl and other fowl samples. (agric and domestic fowls) It was noted that a wide varieties of inorganic element exist in the dissociated and bond forms but the elemental composition of the albumen is extremely variable, though the mineral content of the hens or fowls diet is the most important factor influencing the amount of specific minerals in the albumen, other factors such as environment, temperature, season and age of birds are involve as reported by [9, 7]. Moreover, the wine samples indicated the present of copper, iron for red wines, with zero for zinc and none for green wines. The values observed for them were: 0.01±0.01mg/l and are lower than value reported for all the boiled egg albumin, as observed on the result table1. The IR spectrum peaks at different vibrations such that the first sample red wine, 3268.44.561cm⁻¹, 33360.44.781cm⁻¹, 2117.4.95.519cm⁻¹, 1636.3.66.436cm⁻¹, 1423.8.87.308cm⁻¹ and the second sample at 3336.0.44.781cm⁻¹, 2113.4.95.402cm⁻¹, and 1636.3.65.140cm⁻¹ respectively. The present of a broad bond stretching at 3268.44.56cm⁻¹ and 3336.0.44.721cm⁻¹ in the two samples are within the standard for alcohol and phenol (3200cm⁻¹ - 3550cm⁻¹). It is majorly o - H stretching. It also indicate the present of a compound in wine called revertriol and contain polyphenol derivative of aromatic hydrocarbon that is responsible for its antioxidant properties, the compound is named Resveratriol. Moreover peaks at 1636.3.65.464cm⁻¹ and 1636.3.66.436cm⁻¹ that is present in the two samples with C = C, and C = O indicate the presence of benzene ring, esters and some important amide with N –H stretching vibration, peaks at 1636.3.66.436cm⁻¹ and 1636.3.65.645cm⁻¹ respectively indicate the presence of serotonin which is an hormone compound that is important in maintaining a stable mental process. Further more the absent of some of these essential element in the boiled albumen depends on the hens diets which is the most important factors influencing the amount of specific minerals in the albumen, and that the observed different in the boiled eggs and wines indicate their level of antioxidant properties and preference will be given to consumption of eggs than wine as a source of antioxidant but the wine has other compound that boast its antioxidant potential,
such as transveratriol and other polyphenol together with serotonin which is a neurotransmitter that are responsible for brain stability, therefore the deficient of essential minerals is compensated by the polyphenol and serotonin present in wine.

In conclusion, poultry production has been seen as a major strategy of bridging the animal protein gap to the teeming populace within the short run consideration as reported by [10, 2], the research also confirm the present of antioxidant, which add to more benefit derived from poultry production apart from the animal proteins, and that the scavenging and radical chain elimination potential is confirmed, therefore egg albumin are good food for older people and those who sometimes have difficulty in chewing certain type of food as reported by [7,8] and that, the application of the improvement on the other two fowls (domestic and guinea fowls) like the Agric fowls may explore to discovery and scientific investigations. It should be noted also that, the consumption of the three types of eggs as part of our diets makes a meal complete because. Undernourished children becomes easily susceptible to diseases and poor mental development since zinc and selenium supplement cut the number of infectionsby nearly two third compare to drug as reported by [11]. The consumption of wine is highly encourage other than strong alchololic drinks as health is more important.

References.
1 I. A. Afolabi. (2002), An introduction of factors affecting production of livestock farmers in Ondo State Nigeria. A paper present at 27th Annual conference of Nig. Society of Animal production. F U T A Akure.
2 A. O. Ani and I. L. Adiegwu (2005), The feeding value of relevant beans (Mucuna pruriosa) to weaner rabbits. Proceeding of 30th Annual conference of Nig. Society of Animal production (NSAP) 20th -- 24th March University of Nsukka Nigeria,pp 186 – 189.
3 G. Owooye, and I. A. Amoo (2006), Determination of some element in mango fruits. J. Chem. Soc. Nigeria, 31,(1&2). Pp 165 - 167.
4 H. I. Kille, E. O. Ngbede, Ogezu veronica, Uju Ibekwe. Fidelis Chukwuene (2018), Determination of heavy metals in fish, (Clarias garpeinus) organ from Asaba major market Delta state Nigeria. J. Chem. soc. Nigeria. Vol 43, no 1 pp 55 – 66.
5 J. O. Idoka, K. o. Ijege, B. S. Harona, P. A. Tifiwa and W. O Musa (2018), Evaluation of Heavy metals in Honey from Binin Gwari. Nigeria. J. Chem. Soc. Nigeria. Vol. 43, no 1 pp 88 – 92.
6 K. Arun Ray, and Samit Ray (2012), Biodiversity and Biotechnology a text book Pub. New Gessler book ltd. London pp 190 – 194.
7 K. Asada (2006), Production and scavaging of reactive oxygen spicies in chloroplast and their functions. Plant physiology. 141, 391 – 396. pMId:16760493.
8 I. L. Dofwang (1990), Poultry production in Nigeria. A paper presented at a workshop organized by the College of Agriculture Lafia Nig. Farming milter formerly known as LEIS magazine unpacking poultry myth small scale Agriculture for sustainable society. Pp 22 – 23.
9 M.A. Lauji, S. Agboire, E. A. Maaji, M. A. Ukwugwu, M. A. Adagba, A. A. Victoria and S. T. 10 Rachel (2014), Improvement and Nutritional content of wheat flour with soyflour. Journal of Laboratory Science. Vol. 2 no 1. Pp 36 – 40.
10 N. S. Najarajana, N. Murugesh N. Thirupathy P. Kwmarescanc N. Radhad and A. Murald (2005), Antidiabetic and anthyperlipemic effect of clemeo felin. fitoterapia. Pp 310 – 315.12. F. C. Obioha (1998), A guide to poultry production in the tropics ACENA publisher. Pp. 15 - 105.
11 G. Paploma. (2005): Food health and Healing. A text book, 5th edition, New York pp 238 - 254
12 G. O. Sokoya, (1998), Extension in the service of small scale farmers I Nigeria. A participating approach for sustainable Agricultural extension proceeding of 4th annual National conference of the Agricultural extension society of Nig. 17th - 19th june. Pp 26 - 32.
15 O. E. Okwu (2006), The potential of Ocimum gratissimum, pengliria extensa and Tetrapleuria tetraptera As spices and flavouring agent. *J. chem. Soc. Nigeria. Vol. 3r a 1 (1&2). Pp 38 - 42.*

16 Solomon (2005), Organi chemistry text book 6th edition Pub. John Willey New York pp 910 – 925.

17 XU, W, Shi, W, Lau, F, A. Ueda and Takebe (2018) Enhanced Zinc and Cadmium tolerance and accumulation in transgenic arabidopsis plant constitutively over expressing a barley gene that encoder a peroxisomal ascorbate peroxidase. *Botany : 86 (6), 567 - 575.*