

Review Form 1.6

Journal Name:	Current Journal of Applied Science and Technology
Manuscript Number:	Ms_CJAST_79556
Title of the Manuscript:	Assessment of Radionuclide Concentration Associated With Locally Produced Palm Kernel Oil in Osun State, Nigeria
Type of the Article	Original Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound. To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

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PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
<u>Compulsory</u> REVISION comments	<p>The manuscript needs revision and cannot be published within current format.</p> <ul style="list-style-type: none">• My major issue with the paper is that, the obtained results are not analyzed statistically to know the level of significance (p values). So, I recommend employing some statistical methods like one-way repeated ANOVA to know such differences among different areas and different factories.• Why only 16 samples are used and not more? Since 16 (sample size) is small?• What about of effects of background radiation on your measurements?• I suggested to present results of the specific activity concentration of ⁴⁰K, ²³²Th and ²³⁸U for study areas in a Table not like this format of presenting in Radioactivity Content section of results and discussion.• Remove <i>“This study has provided information on radionuclides as well as their derived health implication associated with locally produced palm kernel oil collected from various producing factories in specified areas in Osun state, Nigeria.”</i> From concluding points of the study, which in opinion is not necessary.	<p>1. As far as we are concerned the study's methodology as well as the sample and data analyses complied with the international guidelines on measurement of radionuclides in food and environmental samples published by IAEA and approved by other authorities in this field such as UNSCEAR, ICRP, WHO and US EPA, all duly referenced in the work. Using gamma ray spectrometry, a very accurate and reliable, non-destructive nuclear analytical technique. For fat checking, a copy of the guide to the measurement of radionuclide in food and environmental samples published in the Agency's (IAEA) Technical Reports series has been attached. And there was no place statistical analysis by ANOVA was mentioned.</p> <p>Secondly, in food and environmental studies like this, the absolute concentration of elements in itself is not useful unless it is normalized. The common practice is to normalize the observed concentrations of the different elements with a known standard source or calculate enrichment factors with respect to a normalizing matrix such as the composition of average unpolluted soil for environmental samples or comparison with the world average values or recommended benchmark worldwide in the case of food samples. E.g. WHO guidelines on the concentration of metals in drinking-water quality or radiological/health impact parameters in contaminated foods or environmental sample. That is exactly what was done in this study.</p> <p>2. On the number of samples collected. Generally, it is impracticable to use the whole population in most studies, so samples are used and in the design of the sampling programme, consideration is given to the manpower requirements, the expense, and the need to avoid overloading limited radiochemical laboratory facilities without compromising the need for the sample size to be sufficiently large enough to be truly representative of the population. In this study, the study area - Osun State is one of the 36 states in Nigeria. It is an average state by population and landmass with about 7 major towns and about 12 villages/farm settlements. More importantly, it is largely an agrarian community producing diverse food and cash crops one of which is palm oil and its auxiliary (ancillary) product - palm kernel oil from palm plantations. Unfortunately most of the processing of the palm oil and palm kernel oil are done locally on a small scale by peasant farmers without recourse to use of installed machines in a factory. However, there are pockets of industrialists who invested in commercial production of these produce. Though they produce in large quantities on a commercial scale, they are far fewer in number. And some of the palm oil processing factories treat palm kernel as a waste product. So the 16 samples collected from eight of the major factories in the four towns namely; Modakeke, Ife, Sekona and Ede in the State forms a large chunk (more than 50%) of the palm kernel oil factories and are representative enough, Besides, the samples were also collected from 4 of the 7 major towns in the state.</p> <p>3. Background radiation has been taken care of in two ways and how it was done was clearly spelt out in section 2.3. I herein highlight the ways it was done: (a) Firstly, it was explicitly stated twice in section 2.3. that the detector was enclosed in 5 cm thick lead shield to reduce background radiation and it was also in the first paragraph of section 2.3.1 that the Nal (TI) detector</p>

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		<p>crystal used was lead-shielded. The essence of the shielding with lead is to reduce the effect of the background radiation.</p> <p>(b) Secondly, it was also stated in the same section 2.3.1 that an empty container of the same geometry and dimension was counted for the same counting time (as the samples) in order to determine the background distribution spectrum in the environment around the detector.</p> <p>(c) Equation 1 used for calculating the specific radioactivity for each element also contained a term A_b which is the background radiation.</p> <p>Usually, the initialization and calibration of a detector prior to being used for routine analysis includes (i) blank counts for an empty vial (cylindrical plastic container) to determine the background radiation in order to enable the spectrometer determine the net count rates from the gross using a dedicated software. (ii) energy and photo peak detection efficiency calibrations of the spectrometer using standard gamma-ray calibration sources whose activities are well known. All these were done for the spectrometer used for the analysis. So background radiation has absolutely no effect whatsoever on the measurements or better still, the effect has been reduced by lead-shielding of the detector and also compensated for by using the net count rates obtained by deducting the background from the gross peak area.</p> <p>4. The results of the specific activity concentration of ^{40}K, ^{232}Th and ^{238}U for the study areas have already been properly presented in a Table format in Table 1. and Figure 2.</p> <p>5. The following part has been removed from concluding points of the study as suggested. “This study has provided information on radionuclides as well as their derived health implication associated with locally produced palm kernel oil collected from various producing factories in specified areas in Osun state, Nigeria.”</p>
Minor REVISION comments	<ul style="list-style-type: none"> <i>The samples were then sealed and kept for at least twenty eight (28) days (from Gamma Spectrometric Analysis section), either remove 28 or twenty eight, keep one of them.</i> <i>The result ranged between 6.05 to 19.45 Bq L-1 (with a mean of 10.94 Bq L-1) for Ife, 6.99 to 33.7 Bq L-1 (with a mean of 15.20 Bq L-1) for Modakeke, 18.91 to 47.10 Bq L-1 (with a mean of 30.46 Bq L-1) for Sekona, 2.43 to 6.01 Bq L-1 (with a mean of 4.59 Bq L-1) for Ede with an overall mean of 4.27 Bq L-1. (from 3.2.2 Radium Equivalent Activity Index section). Either replace the word (between) with (from) or replace the word (to) with (and) for the whole sentence.</i> <i>The external radiation hazard (H_{ext}) ranged between 0.02 to 0.05 with a mean of 0.04 for Ife, 0.02 to 0.09 with a mean of 0.04 for Modakeke, 0.05 to 0.13 with a mean of 0.09 for Sekona, 0.01 to 0.02 with a mean of 0.02 for Ede while the internal radiation hazard index (H_{int}) ranged between 0.02 to 0.05 with a mean of 0.04 for Ife, 0.02 to 0.10 with a mean of 0.05 for Modakeke, 0.07 to 0.19 with a mean 0.13 for Sekona, 0.01 to 0.02 with a mean of 0.02 for Ede. (from 3.2.3 Radiation Hazard Indices section). Do the same above, either replace the word (between) with (from) or replace the word (to) with (and) for the whole sentence.</i> 	<p>6. (28) has been removed from the Gamma Spectrometric Analysis section has suggested.</p> <p>7. The word (between) has been replaced with (from) for the whole sentence in section 3.2.2 Radium Equivalent Activity Index.</p> <p>8. The word (between) has been replaced with (from) for the whole sentence in section 3.2.3 Radiation Hazard Indices section.</p> <p>9. For uniformity, unit of measurement in Table 1 (Bq L^{-1}) has been transferred from the caption into the heading just like it was done in Table 2.</p>

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	<ul style="list-style-type: none">Please keep one format of presenting unit in Tables. In Table 3.1 unit of measurement is written in caption of the Table, but in Table 3.1 it is written in the Table not caption of the it.	
Optional/General comments	<ul style="list-style-type: none">Authors in this study assessed the natural radioactivity and their derived health implication in locally produced palm kernel oil in Osun State, Nigeria from 16 samples which were collected from four major factories in four towns via using Thallium-doped sodium iodide (NaI (TI)) scintillation detector.The study findings showed that the detected and quantified radionuclides were the naturally-occurring radionuclides ²³⁸U and ²³²Th decay series, and non-series ⁴⁰K. Variations were observed in the measured activities in the palm kernel oil even within the same factory, which is attributed to production processes.Authors reported that, the impact parameters of all radiological were lower than their respective world average values. In addition, they concluded that, low values of impact parameters of all radiological of imply that the probability of suffering serious radiation hazards is low in the study areas.The paper is well written, and the chapters of the review are discussed in light of previous relevant studies.	

PART 2:

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Are there ethical issues in this manuscript?	<i>(If yes, Kindly please write down the ethical issues here in details)</i>	All suggested corrections except one (further statistical analysis with ANOVA) have been effected and appropriate responses and explanations given to every comment by this reviewer and the other two reviewers and the Editor as well. And thank you all for the good contributions which has led to improvement in the quality of the paper.