



## Comparative HPLC Evaluation of the Effect of Roasting and Deep Frying Cooking on Vitamins Content of Unripe Plantain (*Musa x paradisiaca*)

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**Abstract:** *Musa x paradisiaca* (plantain) is among the major tropical staple foods. This study was designed to compare roasting and deep frying method cooking plantain. The fat soluble vitamins constituent of unripe plantain was determined fried with three different oils (*canola* oil, *soya* oil and *vegetable* oil). The vitamins content were determined using High Performance Liquid Chromatography. Roasted plantain samples gave a higher value of vitamins A ( $0.08 \pm 0.01\text{mg/g}$ ), D ( $0.02 \pm 0.01\text{mg/g}$ ), E ( $0.01 \pm 0.00\text{mg/g}$ ) and K ( $0.05 \pm 0.00\text{mg/g}$ ) compared to plantain samples fried with *canola* oil which gave low level of vitamin D ( $0.03 \pm 0.00\text{mg/g}$ ), E ( $0.25 \pm 0.00\text{mg/g}$ ) and K ( $0.03 \pm 0.00\text{mg/g}$ ). However, *canola* oil gave a very high level of vitamin A ( $0.72 \pm 0.02\text{mg/g}$ ). The result showed that roasting plantain in oven retains the vitamin contents compared to deep fat frying. *Canola* oil is recommended for frying although *soya* oil can also be used.

**Key words:** Plantain, Roasting, Deep-frying, Fat soluble vitamins, *Canola* oil, *Soya* oil.

### Introduction

Plantain is among the major tropical staple foods [1]. It is known that cooking methods or processing techniques of foods often lead to losses of vitamins and other nutrients such as vitamin up to 90% depending of the cooking or processing used [2]. In Nigeria, steaming, roasting and frying are the most commonly used cooking methods for plantain. Cooking of foods leads to the improvement of microbiological and

organoleptic qualities, destroy toxins and anti-nutritional factors, increase digestibility and nutrients bioavailability [3], unfortunately these procedures cause the loss of some of the micronutrients in foods [4], micronutrients such as the water soluble vitamin and the fat soluble vitamins though thermo sensitive are important in the stimulation of immune system, liver disorder, fight against cancer and cardiovascular diseases [5]. In view of their

importance in human health, this work was initiated to evaluate the effects of frying in boiling oil bath on the fat soluble vitamins (A, D, E and K) contents of plantains.

### Materials and Methods

**Plant Material:** Plantain fruits were purchased from Covenant University farm, Ota, Nigeria. Fig. 1 shows the picture of *Musa x paradisiaca*.



Fig. 1: The exterior view of the plantain (Covenant University farm)

**Preparation of Sample:** The Plantain fruits were peeled and washed in distilled water. After which they were cut into thin circular slices just like the locally sold “Plantain” chips. Three different oils: *canola* oil, *soya* oil, and vegetable oil, were used in the frying of the chips. A deep fryer was used for this, and the plantain fruits were fried at a temperature of 190°C for 10 minutes. After cooling, the samples were grinded into powder form using mortar and pestle. After grinding the different plantain fruits powder samples that were fried with the different oils were kept in Ziploc bags and labeled accordingly.

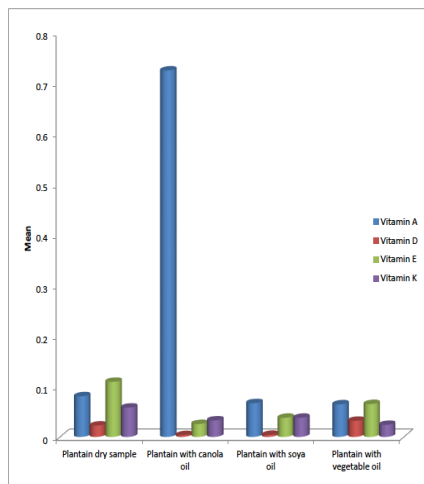
### Analysis of Fat Soluble Vitamins:

This was done using the HPLC method and had been described previously by [6].

**Statistical Analysis:** All the experimental results were the mean ( $\pm$ standard deviation) of three parallel measurements. Data were evaluated by using Excel 97 as a tool for the analysis.

### Results and Discussion

**Vitamin Content:** Fig. 2 shows that there are low levels of fat soluble vitamins in the varieties of samples with vitamin A levels in plantain dry sample (0.08) was very low, plantain with canola oil (0.725) has the highest level of vitamin A with plantain with soya oil (0.06), plantain with vegetable oil, (0.064) showing no significant difference. Vitamin D levels in the varieties of samples were relatively low with little or no significant difference. Vitamin E level on the plantain dry sample was higher (0.11), plantain with canola oil and soya oil was lower with no significant difference. Vitamin k was relatively low with no significant difference although the values were very low Vitamin A is more present in any of the cooking methods or techniques, it can also be stated that cooking with canola oil is an ideal way of keeping Vitamin A which is an important vitamin in the body system. [7], reported that steamed fruits had the highest concentration of  $\beta$ -carotene and fruits roasted at the semi-ripe stages had the highest concentration of nutrients.



**Fig. 2: Graphical representation of vitamin contents of unripe Plantain**

## References

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## Conclusion

The results of the study suggest that most vitamins are lost during the frying processing of plantain. Vitamin A was present in most of the cooking methods although statistically it can be said that some of its nutrient and other vital vitamins were lost due to the cooking method used and oven-drying method retained more nutrient. In conclusion, roasting of plantain in oven retains the vitamins A, D, E, and K content of plantain compared to deep fat frying. Canola oil is recommended for frying although vegetable oil can also be used.

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