

SUSPLUS – Innovative Education towards Sustainable Food Systems

Final Assignment - A personal approach to sustainable diets

A Ghanaian staple meal: Fried Plantain and Beans (Red-Red)

By: Tracy Kamerlaing Phillips (University of Kassel, Mat. Nr. 33424190)

Table of contents

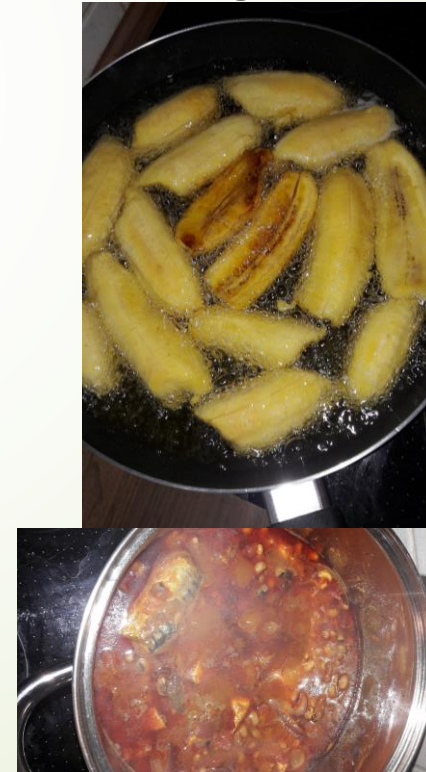
- Description of Meal
- Details about Ingredients
- Sustainability and Health Aspects of the Meal
- Potential Improvements towards Enhanced Sustainability
- Learning Outcomes
- References

Description of Meal

2

- ▶ Fried plantain, palm-oil base beans sauce with fish and meat. This meal is usually prepared for a family, eaten for dinner.
 - ▶ popular now at lunchtime because of high-energy density.
- ▶ Ghana is a tropical country: abundance of plantain, abundance of palm trees, close to the sea thus easier access to fish, access to fresh tomatoes, onions and chilis.
- ▶ Palm oil consumption is encouraged because of the presence of β -carotene.
- ▶ The meal meets various aspects of the Ghanaian dietary guidelines.

Country of origin	Food Item
Germany	Pork
Ghana	Palm oil*; Dried, milled shrimp; Dried, milled fish; Red Chili Powder
Guatemala	Plantain
Italy	Canned diced tomatoes
Madagascar	Black-eyed Peas
Spain	Onion
United Kingdom	Canned Mackerel



Details about ingredients

3

- Plantain: usually grown in a mixed cropping system. It is highly perishable => High postharvest losses (Tchango *et al.* 1999 p. 1-2).
 - *Rainforest Alliance certified
- Black-eyed peas: usually grown in a mixed cropping system. It is the 2nd most nutritious source of plant protein and is widely adaptable (Gómez, 2004, p. 6; 8)
- Palm oil: richest food source of carotenoids, equally rich in vitamin E (Edem p. 324; 327).



	Pre-processing details	Product-related qualities
Plantain	Treated with fungicides. Exported on ships in plastic bags & cartons (Tchango <i>et al.</i> 1999, p. 14)	Fried, sweet, firm
Black-eyed peas	Bean-soaking (consumer level)	Cooks fast
Palm oil	Produced by palm oil mills; leads to harmful effluents (Edem p. 320; Rupani <i>et al.</i> 2010, p. 1191))	Orange-red, does not solidify quickly
Canned goods	Addition of preservatives, acid regulators etc.	Easy-to-use, readily available

Sustainability and Health Aspects of the Meal

4

Food Item	Energy (kcal)	Protein (g)	Fats (g)	Sugar (g)	Sodium (g)
Black-eyed Peas (250g)	290 (http://nutritiondata.self.com/ (2014))	55 (Gómez, 2004, p. 8)	1.25 (http://nutritiondata.self.com/ (2014))	8.25 (http://nutritiondata.self.com/ (2014))	0.01 (http://nutritiondata.self.com/ (2014))
Plantain without peel (863g)	1182.31 (http://www.foodnutritiontable.com/ (2017))	30.21 (Ketiku 1973, p. 705)	8.63 (Rojas-Gonzalez et al. 2006, p.128)	149.3 (Ketiku 1973, p. 705)	0.04 (http://www.foodnutritiontable.com/ (2017))
Palm oil (125 ml)	1092.5 http://www.foodnutritiontable.com/ (2017)	0	125	0	0
Mackerel (400g)	888	13	18	1.2	0.59
Pork(250g)	267.5	50	7.5	0	0.13
Diced Tomatoes	80	4.8	0.8	12	0.16
Total (Entire Meal)	3800.31	153.01	161.18	170.75	0.93
Per person	760.06	30.602	32.24	34.15	0.19*

Vegetable/Animal Protein Ratio – 1.43

	Plastic & Cans	Biodegradable
Waste/g	36 + 100 = 136	32 + 22 = 54

Potential Improvements towards Enhanced Sustainability

5

Nutritional

- Food should not be kept in the fridge for so long; leads to loss of quality.
- If palm oil is used, it should be in small quantities due to its high caloric value.
- Palm oil can be swapped for vegetable oil like rape seed oil, which is abundant in Germany.
- The vegetable-animal protein ratio for this meal is quite high. However, it can be further increased by eliminating the pork.
- Lower sodium and sugar intake by avoiding canned foods.
- Plantains can be substituted for a less sugary alternative.



Environmental

- Palm oil mill effluent is harmful to the environment when untreated. Rupani *et al.* (2010, p. 1191) suggested vermicomposting as a sustainable waste management option.
- Use (fresh) fish that is caught closer to my current location to reduce food miles.
- Beans could be sourced closer to Germany to reduce food miles.
- Use fresh tomatoes, ensure they are organically-produced.
- Enhance traceability of ingredients with labels or information on packages.
- Governments should support farmers in producing countries so that food losses are reduced (e.g. better roads).
- Reduce exports because minerals and organic matter are lost from the indigenous soils.

Learning Outcomes

6

- The lack of fresh vegetables in our usual diets became more glaring. We should eat more fresh ingredients to reduce energy use (in cooking).
- Labels/brands can be deceptive (palm oil and black-eyed peas).
- Trying to access familiar tastes may be causing some countries to go into monocultures (eg. plantain which is usually grown in mixed farms; and the issue with palm oil).
- To reduce the food miles involved, develop tastes that are more sustainably met while in a foreign land.
- Tracing back to find some details of the food products were impossible (e.g. the cultivar of plantain and peas, especially in relation to the biodiversity of food consumption).
- In my country, none of the ingredients are labelled nor allude to sustainability. It was interesting to find sustainable versions here instead, where these ingredients are not widely consumed.
- Compared to the Mediterranean diet, this meal does not adhere very closely.
- Nutritional data was hard to find in one source, and there were disparities between sources.

References

- ▶ Edem, D. O. (2002). Palm oil: Biochemical, physiological, nutritional, hematological, and toxicological aspects: A review. *Plant Foods for Human Nutrition: Vol. 57*, p. 319–341.
- ▶ <http://www.foodnutritiontable.com/> (2017). Nutritional Information. Retrieved on 19.07.2017.
- ▶ Gómez, C. (2004). Cowpea: Post-harvest Operations – Post-harvest Compendium. Ed.: Mejía, D. FAO.
- ▶ Ketiku, A. O. (1973). Chemical Composition of Unripe (Green) and Ripe Plantain (*Musa paradisiaca*). *Journal of the Science of Food and Agriculture: Vol. 24*, p. 703-707.
- ▶ <http://nutritiondata.self.com/> (2014). Cowpeas, common (blackeyes, crowder, southern), mature seeds, cooked, boiled, without salt. Retrieved on 19.07.2017.
- ▶ Rojas-Gonzalez, J. A., Avallone, S., Brat, P., Trystram, G., & Bohuon, P. (2006). Effect of deep-fat frying on ascorbic acid, carotenoids and potassium contents of plantain cylinders. *International Journal of Food Sciences and Nutrition: Vol. 57(1/2)*, p. 123-136.
- ▶ Rupani, P. F., Singh, R. P., Ibrahim, M. H., & Esa, N. (2010). Review of Current Palm Oil Mill Effluent (POME) Treatment Methods: Vermicomposting as a Sustainable Practice. *World Applied Sciences Journal: Vol. 10 (10)*, p. 1190-1201.
- ▶ Tchango, J. T., Bikoï, A., Achard, R., Escalant J.V., & Ngalani, J.A. (1999). Plantain: Post-harvest Operations – Post-harvest Compendium. FAO.