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Plant Fats and Health in The Caribbean: The Cost Factor

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Introduction

The importance of three popular plant foods to health in the Caribbean has been highlighted previously [1]. It was argued that the products of coconut (*Cocos nucifera*), avacado (*Persea americana*) and ackee (*Blighia sapida*) should not be excluded from the Caribbean diet simply because of their fat content. Evidence was presented showing that these fats should be part of the national dietary guideline and assessed in the context of their use, quantity and type because all fats are not equal. But beyond their contribution to the traditional nutritionally balanced diet, do these plant foods confer additional health benefits? If so, what are their comparative costs?

Many plant-based diets have components other than traditional nutrients that can reduce the risk of several chronic diseases. More than a dozen classes of these biologically active plant chemicals, known as phytochemicals, have been identified [2]. For example, on cancers, overwhelming evidence from hundreds of studies indicates that cancer risk in people consuming diets high in fruits and vegetables was only one-half that in those consuming few of these foods [3]. For over two decades health professionals have recognized the role of phytochemicals in health enhancement [4]. Beyond cancer, some key phytochemicals have several other benefits: Isoflavones are known to have antidiabetic, antioxidant and anticancer effects. Flavonols in general promote heart health and may help reduce stroke risk. Flavonols such as quercetin decrease oxidative stress and have anti-cancer activity. Catecholamines help with anti-inflammatory activity [5,6]. For the three plant fats in this analysis (Table 1) shows the main phytochemicals identified in the literature and the added potential health benefits.

Table 1: Plant fats showing potential health benefits.

Foods	Scientific Name	Some Phytochemical Constituents	Overall Therapeutic Indications
Ackee	Blighia sapida	Alkaloids, tannins, saponins, flavonoids and phenols	Antioxidant activity
Avocado	Persea Americana	Isoflavones, Lutein, zeaxanthin, saponin, genestein, glutathione, beta-sitosterol	helps support cardiovascular health; anti-cancer activity; boost immune system
Coconut	Cocos Nucifera	Terpenoids, alkaloids, lauric acid, glycosides and steroids; flavanoids, phenols, steroids	Glucose homeostasis and antioxidant activity; controls severe hyperglycemia

To better assess plant fats in the context of the Caribbean diet seventeen commonly consumed plant foods were compared using classical, phytochemical and cost indicators.

Methods

The prices of commonly consumed foods were obtained from six parishes in Jamaica during the month of June 2014. These prices were collected from popular supermarkets, wholesale and open markets. To increase the applicability of the findings, prices were obtained from densely populated areas and from vendors which were most popular among consumers in each parish. These foods were then ranked according to their health benefits using classical criteria. Unlike other studies that merely compared high and low energy dense foods [7], this study included type of fat, vitamin, mineral and fiber content, and others, in classifying foods as healthy and less healthy. The criteria utilized were associated with major chronic diseases prevalent in the Caribbean [8]. Food composition data were used to determine the quantities of the relevant nutrients contained therein. Scores were allocated for each nutrient and then totaled to develop a cumulative rank. Note that several criteria items were combined to develop the rank. The average cost was calculated using the costs of the commodity in each parish. This approach also avoided the methodological weakness of comparing energy density with energy cost [7]. In addition to the classical criteria, selected foods were also assessed according to their phytochemical content. Fruits and vegetables

are well known for their high phytochemical profiles [9,10]. Hence, fruits and vegetables were not included in this analysis. For this paper 17 of popular Caribbean staples and other plant foods were analyzed.

Results and Discussion

Using classical criteria (Table 2) shows that legumes such as pigeon peas, kidney beans and split peas are highly ranked whereas the plant fats such as ackee, coconut and avocado are lower in the ranking. These legumes also have high potential to confer additional health benefits but they are also among the most expensive foods. Tubers such as dasheen and cassava are lower ranked than sweet potato and breadfruit. Further, the latter have much higher potential for added health benefits and they are among the cheapest foods. Plant fats such as avocado have high potential for additional health gains [11] but are costly, whereas coconut and ackee are cheaper but ranked lower (Table 2).

Table 2: Ranking and cost of selected foods based on classical criteria and other health benefits.

Food	Classical Rank	Cost US$/Kg	Potential for added health benefits*
Pigeon (gungo) peas	1	4.06	xxxx
Red Kidney beans	2	2.34	xxx
Green /ripe Plantain	3	1.38	xx
Green / ripe Banana	4	0.45	xx
Yam	5	1.33	xx
Split peas	6	3.29	xx
Brown Rice	7	2.49	xx
Rolled Oats	8	3.32	xxxx
Sweet Potato-purple	9	0.99	xxx
Breadfruit	10	1.1	xxx
Irish Potato	11	1.53	xx
Avocado	12	3.36	xxx
Dasheen/Eddo	13	1.24	x
Cassava	14	1.28	x
Coconut	15	1.34	xx
Corn	16	1.8	xxx
Ackee	17	1.9	x

*Potential health benefits based on strength of evidence and range of activity.
xxxx = convincing; xxx = very strong; xx = strong; x = probable.

These findings highlight the health benefits of several Caribbean staples such as breadfruit, sweet potato, yam, banana, plantain, among others. These foods are low-cost and have good health profiles. It is noted that while plant fats are not the highest ranked in health and cost criteria there is no evidence to exclude them from the traditional Caribbean diet. The health positive and negative effects of fat are well documented [12]. It was shown that while coconut oil is a saturated fat and the fat in ackee and avocado are mainly unsaturated, they all contain unique characteristics that can promote health [1]. We contend that Caribbean agriculture and food security strategy must include cost and health as imperatives in advancing the food policy in the region. And plant fats should be an important component of that strategy.

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