Estimating the Energy Composition of Diets with Foods Prepared from Cereal/Tuber/Nut-Based Flours in Mukono Town, Uganda

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Research background

Obesity is known to be closely associated with diet. A key objective of this study was to examine the relationship between the energy composition of the diets and the high prevalence of obesity in the area. Data were collected on the usual quantities of food consumed by study participants. The participants were observed in two seasons, for 7 days at a time. To turn this information into energy intake data, the study relied on a set of food composition tables by Hotz et al., (2012). However, these tables show only the energy composition of the flours but not of the food items that are prepared with the flours.

Research purpose

The aim of this study, therefore, was to estimate the amount of flour that is used to make a portion of a food item so that the energy composition per 100 g of the cooked food portion could be estimated from the value of that of 100 g of the flour, which appeared in the food composition tables developed by Hotz et al., (2012). To achieve this, one of the study participants was invited to measure and prepare the food items in the same way as she would at home, and the ratios were determined. This information was then used to determine the energy compositions of the participants' diets.

Results/achievements

The energy composition of foods prepared with the flours and subsequently of the study participant's diet, was estimated. For example, it was determined that 100 g of maize flour could produce approximately 210 g of posho (ratio 2.1) (Table 1). Therefore, if 100 g of maize flour contained 369 kcal (Hotz et al., 2012), then so did 210 g of posho. If 210 g of posho contained 369 kcal, then 100 g of posho contained 369/210*100=175 kcal. This combined with the measured weight of posho eaten could be used to determine the participant's energy intake from posho (Table 2).

Table 1: Ratio of increase in weight from raw flour to cooked food items for different flour-based dishes

	R^1	C^2	Rt^3	R	C	Rt	R	C	Rt	Average Rt
Posho	323	872	**2.7**	724	1324	**1.8**	434	781	**1.8**	**2.1**
Ground nuts sauce	165	750	**4.55**	131	597	**4.56**	140	606	**4.33**	**4.48**

Source: Original research data by the author R^1 = Raw flour quantity in grams. C^2 = Cooked food item quantity in grams. Rt^3 = Ratio of increase in quantity from raw flour to cooked food item.

Table 2: Energy composition of a 1-day diet for one participant that included dishes made from cereal and nut-based flours

Time	Food item	Weight, g	Energy of the food item, Kcal/100g	Energy of consumed portion, Kcal	Total energy, Kcal
9:20	Tea with sugar (water)	437			588.2
	Sugar	36	387	139.3	
	Groundnut sauce	90	116	104.4	
	Rice	265	130	344.5	
13:47	Posho	201	175	351.8	921.0
	Boiled potatoes	348	86	299.3	
	Steamed greens steamed	115	23	26.5	
	Beans stew	179	136	243.4	
19:02	Boiled potatoes	185	86	159.1	159.1
	Water	326			
					1668.3

Source: Original research data by the author.

Plans for further research

I will use similar 'experiments' to estimate the energy and nutrient composition per 100 g of dishes comprised of several ingredients, such as groundnut sauce mixed with silver fish.

References

1. Hotz, C., Abdelrahman, L., Sison, C., Moursi, M., & Loechl, C. (2012). A Food Composition Table for Central and Eastern Uganda. http://r4d.dfid.gov.uk/Output/188904/Default.aspx. Accessed on October 21, 2019.

Photo 1: Measuring raw maize flour and posho (cooked maize meal). Clockwise: 1. empty cup, 42g; 2. cup and flour, 365g; 3. empty dish, 221g; 4. dish and posho, 1092g.

Photo 2: Measuring the lunch of one participant. Left to right-top to bottom: 1. empty plate, 128g; 2. plate and posho (cooked maize meal), 329g; 3. plate, posho, and potatoes, 677g; 4. plate, posho, potatoes, and greens, 795g; 5. dish alone, 53g; 6. dish and bean stew, 232g.