Seasonal Availability of Lysine and Tryptophan in a Sanambelean Diet

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Children in a fallowed field in Sanambele

Sanambelean children eating tou

Peanuts

Bambara Ground nuts

Seasonal Availability of Sanambele Foods

	Dry Season				Wet Season				End of Wet Season			
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tou												
Maize										Harvest		
Millet										Harvest		
Sorghum												
Grain/Legume												
Rice												
Peanuts									Harvest			
Cowpeas												
Bambara Ground Nut												
Fruit/Nuts												
Mango												
Orange												
Cashew												
Vegetable												
Tomato												
Onion												
Okra												
Animal												
Grasshopper												
Chicken												
Cow (Milk)												
Beef												
Fish												

Indicate availability — Indicate the availability through storage (variable depending on storage quality)

Lysine / Tryptophan Content of Sanambele Foods

Amounts of Lysine and Tryptophan in Common foods in Sanambele

	Total Protein	Lysine	Tryptophan	Informational Source
Tou	g/100g	g/100g		
Maize (CC)	9.5	0.254	0.067	http://www.fao.org/DOCREP/005/AC854T/AC854T04.htm
Millet (CC)	9.7	0.332	0.189	http://www.fao.org/DOCREP/005/AC854T/AC854T04.htm
Sorghum (CC)	10.1	0.204	0.123	http://www.fao.org/DOCREP/005/AC854T/AC854T06.htm
Grain/Legume				
Rice brown or husked (CC)	7.5	0.299	0.098	http://www.fao.org/DOCREP/005/AC854T/AC854T05.htm
Peanuts				
Cowpeas	23.4	1.599	0.254	http://www.fao.org/DOCREP/005/AC854T/AC854T12.htm
Bambara Ground Nut (CC)	17.7	1.141	0.192	http://www.fao.org/DOCREP/005/AC854T/AC854T11.htm
Fruit/Nuts				
Mango	0.6	0.065	0.012	http://www.fao.org/DOCREP/005/AC854T/AC854T41.htm
Orange	0.8	0.043	0.006	http://www.fao.org/DOCREP/005/AC854T/AC854T41.htm
Cashew (M)	17.4	0.942	0.378	http://www.fao.org/DOCREP/005/AC854T/AC854T18.htm
Veg				
Tomato	1.1	0.032	0	http://www.fao.org/DOCREP/005/AC854T/AC854T38.htm
Onion	1.4	0.063	0.02	http://www.fao.org/DOCREP/005/AC854T/AC854T35.htm
Okra	4.4	0.217	0	http://www.fao.org/DOCREP/005/AC854T/AC854T35.htm
Animal (not including offals)				
Grasshopper	7.6	0.484	3.75	El Adeyeye, 2005 p. 142
Chicken edible flesh	20	1.59	0.205	http://www.fao.org/DOCREP/005/AC854T/AC854T43.htm
Cow (Milk untreated)	3.5	0.268	0.048	http://www.fao.org/DOCREP/005/AC854T/AC854T51.htm
Beef edible flesh (CC)	17.7	1.573	0.198	http://www.fao.org/DOCREP/005/AC854T/AC854T43.htm
Fish (all kinds)	18.8	1.713	0.211	http://www.fao.org/DOCREP/005/AC854T/AC854T47.htm

Notes: CC - Column chromatographic method; M - Microbiological method

Estimated Daily Amino Acid Requirements for Children (2-8 years)

	Estimated Average Daily Requirements for Children	
	Ages 1-3 years	Ages 4-8 years
Amino Acids	mg/kg/day	mg/kg/day
Tryptophan	**6**	5
Threonine	24	19
Isoleucine	22	18
Leucine	48	40
Lysine	**45**	37
Methionine	22	18
Phenylalanine	41	33
Tyrosine	41	33
Valine	28	23
Histidine	16	13

Conclusion

We rejected our hypothesis. In a minimum cereal diet (using only one: maize, millet, sorghum) a two year old child would not be receiving the estimated recommended amount of lysine and/or tryptophan which are both necessary in avoiding kwashiorkor (Williams 1935). However there are other foods such as peanuts, Bambara ground nuts, grasshoppers, milk, mangoes, okra, and cashews that can be added into the child's diet on a seasonal basis in order to help fill the void and to bring the children closer to the required amounts of lysine and tryptophan.

Recommendations

- Implement high protein snacks such as peanuts and grasshoppers on a daily basis into the children's diet.
- When possible, allow the children to eat more animal protein.
- Add Milk in the diet to provide necessary amino acids as well as other important nutrients.
- Examine ways to better store seasonal items that are high in amino acids so they can be utilized throughout the year.

The Holistic Process

The holistic process is a way of learning in which people from different trends of life come together in order to solve a problem. This method of learning is a combination of traditional ecological knowledge, place-based knowledge and formal education. It is based on an ethnorelative attitude where it is crucial to listen, understand, and accept different cultural boundaries and yet work around them without encroaching on one's beliefs and still finding the desired results.

The first step in forming a holistic relationship is to listen and learn from each other in order to build a rapport full of trust and understanding. Next, key values and goals must be recognized (Savory and Butterfield 1999). Once this fundamental core is established the resource base and tools can be developed along with the way these tools can be implemented in order to produce results. Finally, future resources along with a maintenance and management plan must be developed in order to have long term, lasting results.

Hypothesis Tested:

The amounts of lysine and tryptophan in a standard Sanambelean diet meet the minimal requirements that are needed by a 2 year old child.

Sorghum

Millet

Methods

- Interviews with Florence Dunkel (2011) and Malian mentors (Coulibaly 2011, Tamboura 2011)
- Peer Reviewed Journal Articles
- The FAO
- Past PSPP 465R student papers (Fejes 2009, Taylor 2010)
- Spreadsheets combining all the information into an organized format.
- Experiments to determine cereal to water ratio in making tou.

Ground Millet

Okra

Discussion/Results

The results of my research shows that the main and most common food items in a Sanambelean diet include lysine and tryptophan even if only in small amounts.

The three cereals that are available all year and are the main ingredients in tou were examined further and measured after having been cooked. This was done in order to better assess the lysine and tryptophan amounts after some of the nutritional value may have been lost in the cooking process.

Maize, millet, and sorghum each lacked in either lysine or tryptophan or both and did not meet the estimated average daily requirements.

% of Estimated Average Daily Requirements		
Tou	lysine	tryptophan
maize	29.6%	58.3%
millet	33.8%	144.0%
sorghum	25.7%	116.0%

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