

Chambo: Is it taste or something else? Preference and acceptability of roasted, fried and boiled *Oreochromis* spp, (Chambo), *Rhamphochromis* spp (Ncheni) and *Bagrus meridionalis* (Kampango) from Lake Malawi

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Abstract

A study to determine preference and acceptability of roasted, fried and boiled *Oreochromis* spp, (Chambo), *Rhamphochromis* spp (Ncheni) and *Bagrus meridionalis* (Kampango) from Lake Malawi was conducted in October 2002, at Bunda College. A sensory panel of 73 people from Bunda College community responded to a structured questionnaire and carried out a sensory evaluation on unidentified fish samples to determine the most preferred fish species. Results from a structured questionnaire showed that Chambo was the most preferred species at the market, while the sensory evaluation revealed that most people (65% and 93%) ranked Ncheni as first choice for taste and preference, respectively. Results suggest that while people perceive Chambo as the best fish and hence escalating its demand and therefore its price, Chambo may not be the best in terms of taste.

Introduction

The bulk of fish in Malawi is supplied from Lakes Malawi and Malombe. Lake Malawi alone harbours more than 600 species most of which are endemic to the lake and are supplied through capture fisheries. *Oreochromis* spp (Chambo), *Rhamphochromis* spp (Ncheni) and *Bagrus meridionalis* (Kampango) are among the dominant species that are captured. Recently however, Chambo catches have dwindled and the Chambo fishery in Lake Malombe is said to have collapsed. High price of Chambo is said to encourage more entrants into the fishery (Turner, 1996). However, reasons for such demand are not known. This study was therefore conducted to determine if the appearance, aroma, tenderness, juiciness and taste of Chambo are exceptionally good enough to account for the high demand and therefore high market price.

Materials and Methods

The study was conducted at Bunda College of Agriculture, University of Malawi in the Home Economics and Human Nutrition cafeteria in November, 2002. Fillets of *Oreochromis* spp (Chambo) and *Bagrus meridionalis* (Kampango) and whole *Rhamphochromis* spp (Ncheni) were purchased from MALDECO Fisheries Ltd. *Rhamphochromis* spp was filleted at the cafeteria. The fillets were prepared using three cooking methods; roasting, frying and boiling. Samples that were boiled were first smoked. Structured questionnaires

were administered to an untrained sensory panel composed of 73 members. The panellists comprised of students and members of staff from Bunda College from 22 Districts of Malawi. Two students were from Zambia (Table 1). Names of fish samples were not disclosed to the panellists. Fish samples were evaluated against appearance, aroma/smell, taste, juiciness, tenderness and acceptability ranked on hedonic scale.

Results

Preferred meals

Twenty five percent (25%) of the respondents preferred nsima with fish while another 25 % favoured nsima with chicken (Table 2). Fish was said to be preferred because it is readily available, a delicacy and prepared in different ways. The other reason for its preference is that fish can also be preserved locally for a longer period of time.

Frequency of eating fish

Most respondents (69%) had eaten fish since their youth (Table 3). Most respondents (22 %) ate fish twice per week while others ate once a week (17.8%) and three times a week (16.4%) (Table 4).

Most respondents (58 %) bought fish from local markets while others got fish from MALDECO Fisheries Ltd.(27 %) and supermarkets (15 %) (Table 5).

Table 1: Districts of origin for respondents

District	Number of respondents	Percentage (%)
Lilongwe	7	10
Mulanje	3	4
Mzimba	9	12
Dowa	5	7
Chiradzulu	2	3
Likoma	2	3
Chipata, Zambia	2	3
Mchinji	1	1
Dedza	1	
Balaka	1	1
Nkhatabay	1	1
Nsanje	5	7
Mchinji	1	1
Blantyre	2	3
Mangochi	1	1
Kasungu	2	3
Thyolo	3	4
Zomba	6	8
Rumphu	5	7
Chitipa	4	5
Ntcheu	5	7
Karonga	4	5
Nchelenge, Zambia	1	1

Table 2: Meals that were preferred by panellists

Type of meal	Number of respondents	Percent
Chips with beef	3	4
Chips with chicken	5	7
Chips with fish	3	4
Chips with fried eggs	2	3
Kondowole with beans	2	3
Nsima with beef	2	3
Nsima with chicken	17	25
Nsima with fish	17	25
Nsima with therere	2	3
Nsima with turnips	2	3
Pasta with minced meat	1	1
Pasta with smoked fish	1	1
Rice with chicken	9	13
Rice with fried eggs	1	1
Rice with pork	2	3
Total	69	100

The preferred species

The majority of the respondents (68%) indicated that at a market they look for Chambo (Table 6), because it is delicious and popular compared to the other species. Usipa, Ncheni, Utaka and Kampango, are less preferred in that order (16.9, 7.6, 6.1 and 1.5 %, respectively). Respondents indicated that they also go for other species because they are affordable as opposed to Chambo, which is expensive and is becoming scarce.

Cooking methods

The majority of the respondents (92%) preferred frying while others liked boiling (63%) and roasting or grilling (48%) (Table 7). Respondents felt that frying added flavour and made fish look more appetising. Those that preferred boiling indicated that the method rendered the fish to be soft and left some gravy that could be enjoyed together with the fish. Boiling and roasting were said to result in retention of the natural flavour to fish.

Table 5. Time when respondents started eating fish

Period	No. of respondents	Percentage
Since youth	49	69
For over twenty-four years	4	5.6
For over fifteen years	9	12.7
For quite some time	9	12.7
Total	71	100

Table 4: Numbers and percentages of panellists indicating frequency of eating fish

Frequency	No. of respondents	Percentage
Once a week	13	17.8
Twice a week	16	22.5
Three times a week	12	16.4
Four times a week	4	5.5
Every day	4	5.5
Once a month	1	1.4
At least once a month	4	5.5
As often as fish become available	7	9.6
Frequently	7	9.6
Rarely	5	6.8
	73	

Table 5. Numbers and percentages of panellists indicating where they buy fish

Market	No. of respondents	Percentage
MALDECO fisheries	19	27
Local markets	41	58
PTC and other super-markets	11	15
TOTAL	71	100

Table 8. Numbers and percentages of panellists indicating preferred processing methods of different fish species

Processing	Chambo		Usipa		Ncheni		Utaka		Kampango		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Sundried	1	1.4	9	12.7	1	1.4	4	5.4	1	1.4	16	22.5
Smoked	5	6.8	3	4.1	5	6.8	6	8.2	3	4.1	22	30.9
Fresh	59	80	13	17.8	7	9.5	1	1.4	1	1.4	71	97.6

Table 6. The fish species preferred by respondents

Species	No. of respondents	Percentage
Chambo	44	67.8
Usipa	11	16.9
Ncheni	5	7.6
Utaka	4	6.1
Kampango	1	1.5
Total	65	100

Table 7. Fish cooking methods preferred by respondents

Cooking method	No. of respondents	Percentage
Frying	67	92
Boiling	46	63
Roasting	35	48
Steaming	1	1.4

Processing of fish

While sun-drying and smoking were mentioned as possible processing methods, the majority (97%) of the panellists preferred fresh fish (Table 8).

Preference and acceptability of Chambo, Ncheni and Kampango

There were differences in preference and acceptability of the three species based on appearance, taste, aroma and juiciness (Table 9).

The majority of respondents preferred the appearance (93%) and aroma (77%) of fried Ncheni. Smoked Kampango ranked high in terms of tenderness (77%). In terms of juiciness both smoked Chambo and roasted Ncheni were ranked first (68%). The majority (65%) commented that fried Ncheni was the most tasty seconded by Chambo (62%) (Table 9).

Table 9. Panellists' preference based on appearance, aroma, tenderness, juiciness and taste of the fish samples

Sample	Appearance	Aroma	Tenderness	Juiciness	Taste
	%	%	%	%	%
Fried chambo	75	54	48	55	52
Roasted chambo	67	50	44	60	62
*Smoked chambo	33	33	45	68	30
Fried ncheni	93	77	60	68	65
Roasted ncheni	55	54	66	62	56
*Smoked ncheni	25	15	45	55	18
Fried kampango	74	48	36	43	48
Roasted kampango	62	65	47	59	58
*Smoked kampango	43	38	78	44	53

Discussion

Fish seem to play an important role in the Malawian diet as is favoured as much as chicken. Unlike chicken, however, fish can be prepared or processed in various ways thereby adding diversity to diets of families.

The study showed that cooking and processing methods have an influence on preference and acceptance of fish species. While Chambo is popular among consumers and was ranked first at the market, the species was not the best in appearance, tenderness, juiciness and taste when prepared for consumption. Overall, Ncheni was ranked first. The results suggest that the consumer's decision to purchase a particular species at the market is not based on taste but other factors. For example, Ncheni, which was first choice for most panellists during organoleptic taste was only third during the questions. Indeed as suggested by Garber *et al.* (2003), favorable sensory and taste ratings do not directly translate to purchase,

consumption, or market success of a product. Results suggest that with proper market strategies, other species can replace Chambo as "the species" for Malawi, thereby reducing its demand and fishing pressure.

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