



Acceptability of Products Fried in Fresh and Reheated Flaxseed Oil"

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ABSTRACT

The present investigation was carried out to study the effect of fresh and reheated Flaxseed oils on the palatability characteristics and acceptability of products fried in it. The product viz. Puri, PyajPakoda and Shakkarpura were selected. These products were also fried in fresh and reheated Groundnut oil for comparison. Results of the study showed that among the three products, Shakkarpuras fried in fresh groundnut oil and fresh flaxseed oil showed significant difference with respect to taste (4.37, $p < 0.01$) and aroma (4.42, $p < 0.01$) and the rest two products fried in fresh Flaxseed oil and fresh Groundnut oil did not show a significant difference in the palatability characteristics. The products fried in reheated Flaxseed oil and reheated Groundnut oil did not show any significant difference with respect to palatability characteristics. Similarly the products fried in fresh and reheated Groundnut oil also did not show any significant difference with respect to palatability characteristics. The product fried in fresh and reheated Flaxseed oil did not show any significant difference except Puri, which showed a significant difference with respect to appearance (2.33, $P < 0.05$), taste (4.32, $P < 0.01$), doneness (2.96, $P < 0.05$) and acceptability (3.60, $P < 0.05$). It was also observed that products fried in fresh oils were more acceptable than fried in reheated oils. Products fried in groundnut oils were more acceptable than fried in flaxseed oils.

KEYWORDS : Flaxseed oil, Groundnut oil, acceptability, Puree, Pyaz Pakoda, Shakkarpura

INTRODUCTION

Flaxseed oil which is popularly known as Linseed oil, is a highly recommended product for the general well being of a person. It has properties very close to that of a multivitamin. Flaxseed oil has qualities of the two fatty acids: omega 6 and omega 9. It also contains some essential fatty acids, and also some other elements such as Vitamin B, Potassium, Lecithin, Magnesium, Fiber, Protein and Zinc. It also provides almost a 50 % larger quantity of more omega 3 oils than the quantity of that would possibly be available by taking fish oil. It can also help in different diseases in humans related to stress or free radicals and can be examined in individual diseases for the best suitability as therapeutic or prophylactic (Rajesh A. 2006).

In India, about 50% of the edible oils are used for frying purpose. Oil is subjected to heat treatment (180°C), cooling and again heating to above temperature repeatedly in an open atmosphere (Nasirullah et al, 1998). The reactions that occur during the frying process are due to heat, air and moisture by way of polymerization, oxidation and hydrolysis, resulting in degradation of the frying oil. The position of the frying oils plays a major aspect. The thermally degraded oil contains many toxic constituents and has harmful effects upon consumptions (Surjit Kumar Saha, 2001). The decomposition products and the rate of their formation vary with the nature of the fat used, the surface volume ratio, the excess of air, the nature of fried food, and interval of heating. Experiments have shown that the rate of oxidation deterioration is accelerated by an increase in temperature and increased in degree of unstauration (Nasirullah et al. 1998). Flavour, oxidative stability and fatty acid composition are important parameters for judging the quality of oil (Singh et al. 2001).

Several researchers have carried out studies on physicochemical properties of edible oils or shelf life of products fried in almost all edible oils or blended oils but the studies on acceptability of products fried in edible oils are few (Lakshmi B, Sarojini G 1998, Chopra et al 2004, Waghay and S. Gulla, 2011) but specially on flaxseed oil are negligible. Flaxseed oil has a flavor component because of which its

consumers do not use it but due to its low cost, it is popular among the poor population in India. Hence the present investigation was undertaken to study the acceptability of products fried in fresh and reheated flaxseed oil.

METHODOLOGY

For the present study three recipes viz., Puri, PyajPakoda and Shakkarpura were selected. These recipes were standardized and were than fried in flax seed oil. The products were also fried in Groundnut oil for comparison. The products were subjected to palatability test trials.

Sensory Evaluation : For the present study six judges were selected from Post Graduate Teaching Department of Home Science by triangular test. In order of assess the palatability and acceptability of the products, score cards were designed so as to include all the desired characteristics and qualities of puri, pyajpakoda and shakarpara. The various characteristics were- colour, texture, taste, doneness, acceptability and aroma. In a rating test, judges were asked to give scores to the products according to the palatability characteristic. Three trials of each recipe were conducted. First day the recipes prepared in the fresh oil were served and on the second day (after 24 hours) the recipes prepared in the same reheated oil were served.

Analysis of data: The data obtained for palatability characteristics of three products, were analysed by F test, correlated t test and student's t test (Kothari. 2007).

RESULTS AND DISCUSSION

PURI :

The mean palatability scores of puries fried in fresh and reheated groundnut and flaxseed oil is presented in Table I .

Puries Fried in Fresh Flax seed oil and Groundnut oil

The data presented in Table I showed that puries fried in fresh groundnut oil obtained better scores for palatability characteristics than puries fried in fresh flaxseed oil. The puries fried in Groundnut oil scored higher scores for appearance (9.03) texture (9.08) and ac-

ceptability (9.3). The greatest difference was observed in taste of the puries. However data analyzed by students' t' test did not show any significant difference between the characteristics of puries fried in fresh groundnut oil and fresh flaxseed oil. The taste of puries fried in flaxseed oil was affected to a great extent and hence scored less scores (7.6%) as compared to groundnut oil (9.13) scores. However the doneness of puries fried in flaxseed oil (9.1) was comparable with groundnut oil (9.53). The appearance, texture, and acceptability of puries fried in fresh groundnut oil showed 9.03, 9.08 and 9.3 scores respectively whereas puries fried in flaxseed oil showed 8.85, 8.25, and 8.1 scores for appearance, texture and acceptability respectively. The palatability characteristics of puries fried in fresh flaxseed oil (F= 1.89) and groundnut oil (F= 0.41) did not show any significant difference with respect to their palatability characteristics.

Puries Fried In Reheated Flaxseed Oil And Groundnut Oil

The data presented in Table I shows a significant difference observed in puries fried in reheated flaxseed oil with respect to palatability characteristics. However, no significant difference between the palatability characteristic of puries fried in reheated groundnut oil (F= 0.03). Puries fried in reheated groundnut oil showed better palatability scores as compared to puries fried in reheated flaxseed oil. However data analysed by student' t' test did not show any significant difference between the palatability characteristic of puries fried in reheated groundnut oil and reheated flaxseed oil. The score obtained for taste (6.6) and the acceptability (6.7) of puries fried in flaxseed oil were found to be greatly affected.

Puries Fried In Fresh And Reheated Flaxseed Oil

The data presented in Table I shows that there was no significant difference in the palatability characteristics of puries fried in fresh flaxseed oil (F= 1.89). However puries fried in reheated flaxseed oil showed a significant difference in the palatability characteristics (F= 3.60). When the palatability characteristics of puries fried in fresh and reheated flaxseed oil were compared, significant difference was observed with respect to appearance, taste, doneness and acceptability of puries. The palatability characteristics of puries fried in fresh flaxseed oil were better as compared to puries fried in reheated flax seed oil.

Puries Fried in Fresh And Reheated Groundnut Oil

It is clear that the palatability characteristics of puries fried in fresh groundnut oil were better as compared to puries in reheated groundnut oil. However no significant difference was observed between the two with respect to their palatability characteristic when analysed by correlated' t' test. The F scores of puries fried in fresh groundnut oil (0.41) and reheated oil (0.03) did not show any significant difference in their palatability characteristics.

PYAJ PAKODA :

In the present investigation PyajPakoda were fried in fresh as well as reheated flaxseed oil i.e. after 24 hrs. PyajPakodawere also fried in groundnut oil for comparison. The mean palatability scores of PyajPakoda fried in fresh groundnut and fresh flaxseed oil is presented in Table II.

PyajPakoda Fried in Fresh Flex seed oil and Groundnut oil

The palatability characteristics of PyajPakoda fried in fresh flaxseed oil (F= 4.63) as well as groundnut oil (F= 4.19) showed significant difference. Results of the study showed that PyajPakoda fried in fresh groundnut oil obtained better scores for palatability characteristics than PyajPakoda fried in fresh flaxseed oil. However data analysed by student ' t' test did not show any significant difference between the PyajPakoda fried in fresh groundnut oil and fresh flaxseed oil except for the taste (t= 2.44). The taste and texture of PyajPakoda fried in fresh flaxseed oil were greatly affected and hence scores less score viz, 8.15 and 8.7 respectively.

PyajPakodasFried In Reheated Flaxseed Oil And Groundnut Oil.

The data shows no significant difference between the palatability characteristic of Pakoda fried in reheated groundnut oil(F=0-04) as well as Pakodas fried in reheated flaxseed oil (F= 0.36) . PyajPako-

da fried in reheated groundnut oil showed better palatability scores as compared to Pakoda fried in reheated flaxseed oil. However data analysed by student' t' test did not show any significant difference between the palatability characteristics of Pakoda fried in reheated groundnut oil and reheated flaxseed oil. The taste (6.9) and texture (7.04) of Pakoda fried in flaxseed oil were found to be least acceptable.

PyajPakodas Fried In Fresh And Reheated Flaxseed Oil

There was a significant difference in the palatability characteristics of Pakoda fried in fresh flaxseed oil (F=4.63). However Pakoda fried in reheated flaxseed oil did not show significant difference in the palatability characteristics (F = 0.36). When the palatability characteristics of Pakoda fried in fresh and reheated flaxseed oil were compared, no significant differences were observed with respect to their palatability characteristics. Though the palatability characteristics of Pakoda fried in fresh flaxseed oil were better as compared to PyajPakodas fried in reheated flaxseed oil. Pakoda fried in fresh groundnut oil and fresh flaxseed oil except for the taste (t= 2.44). The taste and texture of PyajPakoda fried in fresh flaxseed oil were greatly affected and hence scores less score viz, 8.15 and 8.7 respectively.

PyajPakodas Fried In Fresh And Reheated Groundnut Oil

It is clear from Table II that the palatability characteristic of PyajPakoda fried in fresh groundnut oil were better as compared to Pakodas fried in reheated groundnut oil. However no significant difference was observed, between the two with respect to their palatability characteristics, when analysed through correlated' t' test. The palatability characteristics of PyajPakoda fried in fresh groundnut oil (4.19) showed significant difference whereas PyajPakoda fried in reheated groundnut oil (0.04) did not show any significant difference with respect to their palatability characteristic.

SHAKKARPARA :-

In the present investigation Shakkarpas were fried in fresh as well as reheated oil i.e. after 24 hrs. and for comparison Shakkarpara were also fried in groundnut oil. The mean palatability scores of Shakkarpara fried in fresh groundnut oil and fresh flaxseed oil is presented in Table III.

ShakkarparaFried In Fresh Flaxseed Oil And Groundnut Oil

The data presented in Table III showed that Shakkarpara fried in fresh groundnut oil obtained better scores than Shakkarpas fried in fresh flaxseed oil. Data analysed by students' t' test showed significant difference in taste (4.37) and aroma (4.42) of the Shakkarpas fried in fresh groundnut oil and fresh flaxseed oil. The tests and aroma of Shakkarpas fried in flaxseed oil were affected to a greater extent and hence scored very less scores (6.8 and 7.15) respectively as compared to Shakkarpara fried in groundnut oil (8.96 and 9.4) respectively. However the appearance, texture and doneness of Shakkarpas fried in flaxseed oil (9.5, 9.65 and 9.38) was comparable to Shakkarpara fried in groundnut oil (9.93, 10, and 9.76). The palatability characteristics of Shakkarpara fried in fresh flaxseed oil(F= 15.61) and groundnut oil (F= 5.83) showed significant difference.

Shakkarpara Fried In Reheated Flaxseed Oil And Groundnut Oil

The data presented in Table III shows no significant difference between the palatability characteristics of Shakkarpara fried in reheated groundnut oil (F= 0.18) and flaxseed oil (1.07). Shakkarpara fried in reheated groundnut oil showed better palatability scores as compared to Shakkarpara fried in reheated flaxseed oil. The data analysed by student' t' test did not show any significant difference between the palatability characteristics of Shakkarpara fried in reheated groundnut oil and reheated flaxseed oil. The taste and aroma (5.46 and 6.92) of Shakkarpara fried in flaxseed oil were found to be greatly affected

Shakkarpara Fried In Fresh And Reheated Flaxseed Oil

The data presented in Table III shows that there is a significant difference in the palatability characteristics of Shakkarpara fried in fresh flaxseed oil (F=15.61) but Shakkarpara fried in reheated flaxseed oil (F= 1.07) did not show any significant difference. When the palatability characteristics of Shakkarpara fried in fresh and reheated difference

was observed. The palatability characteristics of Shakkarpara fried in fresh flaxseed oil were better as compared to Shakkarpas fried in reheated flaxseed oil.

Shakkarpara Fried In Fresh And Reheated Groundnut Oil

It is clear from Table III that the palatability characteristics of Shakkarpara fried in fresh groundnut oil were better as compared to Shakkarpas fried in reheated groundnut oil. However no significant difference was observed between the two with respect to their palatability characteristic when analysed by corrected 't' test. The F scores of Shakkarpara fried in fresh groundnut oil (F=5.83) showed a significant difference in their palatability characteristics. Whereas Shakkarpas fried in reheated groundnut oil did not show any significant difference with respect to their palatability characteristics.

CONCLUSION

The following conclusions were made:

1. Except Puri rest two products fried in fresh Flaxseed oil and fresh Groundnut oil showed a significant difference in the palatability characteristics with respect to taste and aroma.

acteristics with respect to taste and aroma.

2. The product fried in reheated Flaxseed oil and reheated Groundnut oil did not show any significant difference with respect to palatability characteristics.
3. The product fried in fresh and reheated Flaxseed oil did not show any significant difference except Puri, which shows a significant difference to respect to acceptability, taste, doneness and appearance.
4. The product fried in fresh and reheated Groundnut oil also did not show any significant difference with respect to palatability characteristics.

Thus, it can be concluded from the study that products fried in fresh Flaxseed oil are not as acceptable as products fried in fresh Groundnut oil. But product fried in reheated Flaxseed oil and Groundnut oil are equally acceptable.

Table I : Mean Palatability scores of puries fried in fresh and reheated flaxseed oil and groundnutoil.

Sr. No.	Palatability Characteristics	FGO	FFO	RGO	RFO	't' Score between FGO and FFO	't' score between RGO and RFO	't' score between FFO and RFO	't' score between FGO and RGO
1.	Appearance	9.03	8.85	8.9	8.3	0.60	0.63	2.33*	1.04
2.	Texture	9.08	8.25	8.92	7.6	1.61	0.14	1.30	0.98
3.	Taste	9.13	7.6	8.62	6.6	2.10	0.37	4.32**	1.13
4.	Doneness	9.53	9.1	9.3	8.4	1.22	0.42	2.96*	1.07
5.	Acceptability	9.3	8.1	8.36	6.7	1.76	0.12	3.60*	1.47
	'F' Ratio	0.41	1.89	0.03	3.60*				

* p<0.05, ** P<0.01

FGO- Fresh Groundnut oil

FFO- Fresh flaxseed oil

RGO- Reheated Ground nut oil

RFO -Reheated flaxseed oil

Table II : Mean Palatability Scores Of Pyaj Pakoda Fried In Fresh And Reheated Flaxseed Oil And Groundnut Oil

Sr. No.	Palatability Characteristics	FGO	FFO	RGO	RFO	't' Score between FGO and FFO	't' score between RGO and RFO	't' score between FFO and RFO	't' score between FGO and RGO
1.	Appearance	9.93	9.65	9.72	8.9	1.66	0.30	1.41	1.11
2.	Texture	9.01	8.7	8.64	7.04	0.81	0.69	2.09	1.09
3.	Taste	9.41	8.15	8.9	6.9	2.44	0.86	1.52	1.23
4.	Doneness	10	9.55	9.3	9.04	1.36	0.09	1.24	1.43
	'F' Ratio	4.19**	4.63**	0.04	0.36				

* p<0.05, ** P<0.01

FGO- Fresh Groundnut oil

FFO- Fresh flaxseed oil

RGO- Reheated Ground nut oil

RFO -Reheated flaxseed oil

Table III : Mean Palatability Scores Of Shakkarpas Fried In Fresh And Reheated Flaxseed Oil And Groundnut Oil

Sr. No.	Palatability Characteristics	FGO	FFO	RGO	RFO	't' Score between FGO and FFO	't' score between RGO and RFO	't' score between FFO and RFO	't' score between FGO and RGO
1.	Appearance	9.83	9.5	9.32	9.4	1.04	0.04	1	1.29
2.	Texture	10	9.65	9.72	9.44	1.46	0.10	1.08	1.16
3.	Taste	8.96	6.8	7.84	5.46	4.37**	1.21	1.80	1.83
4.	Doneness	9.76	9.38	9.18	8.52	1.06	0.24	1.65	1.28
5.	Aroma	9.4	7.15	8.24	6.92	4.42**	0.58	1.00	1.60
	'F' Ratio	5.83**	15.61**	0.18	1.07				

* p<0.05, ** P<0.01

FGO- Fresh Groundnut oil

FFO- Fresh flaxseed oil

RGO- Reheated Ground nut oil

RFO -Reheated flaxseed oil

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