



A Research on Reminiscence and Acclimation of Oryza Sativa Flakes Snacks Among Adolescents

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Abstract

The adolescents from this Z generation in India prefers to imitate the western culture, it is this scenario which has immensely changed the snacking habits from traditional healthy to unhealthy snacks among Indian adolescents. The study leads to an awareness of health consciousness among the adolescents on the search for traditional, nutritious and health promoting food options. This research's aim is to determine adolescent's preferences and specific attributes in the preparation of oryza sativa (red rice) flakes that drive acceptability through descriptive analysis and preference mapping on snacks with red rice flakes. The results exhibited a highly positive correlation in the preference of traditional snacks. Preference mapping and percentage showed higher overall liking scores for samples characterized by snacks made with red rice flakes. Overall, this study was successful in determining the adolescent's acceptability with red rice flakes snacks through preference mapping. This study proposes that the adolescents to minimise the consumption of westernized snacks in the contrary to develop a habit to consume more traditional ingredients with trendy and innovative red rice recipes. The study concludes that these standardized recipes will lure all the age groups to consume red rice in their diet.



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Keywords

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Introduction

Snacks are small portion for a quick meal which can be consumed by children, adolescent, adults and senior citizens to enable them to satisfy their hunger between lunch and dinner.

Snack can be termed for a small portion, light and quickly consumable food or drink; it is consumed between the regular meals¹. Eating healthy snacks fuels the body with energy, improves the brain power, regulates weight management, boosts up mood

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and makes the day pleasant². Our Indian traditional foods have been recognized as functional foods due to the presence of body healing chemicals, dietary fibres, high vitamins and mineral constituents. Adolescents consume more snacks than other age groups. Nowadays our healthy traditional snacks have been overwhelmed by modern westernized junks. These junk snacks constitute mere sugar, fat and calories which act as the origin for all major health problems³. Consuming these unhealthy junks makes the adolescent to skip their regular meals, ⁴ overeating and inactive life styles leads to overweight and obesity⁵.

Thus the study is an attempt to bring out traditional snacks into practice. The study formulates recipes of red flattened rice, the common healthy snacks. Red flattened rice is a wholesome food with high nutritious value and easily digestible form of rice variety commonly available across India. It is used to prepare light snacks and fast food varieties and consumed as a staple breakfast in north – eastern regions. Making of Red rice flakes constitutes a procedure of soaking the paddy for few days where a partial fermentation is done and the probiotic bacteria are developed⁵ then boiled, dried and pounded to loosens the hull from the paddy and makes it into a flattened rice flakes⁶.

Originally our ancestors had a strong faith that food was a gift from God and this food was consumed for its health benefits. Man in every community followed a separate food belief system. Additionally food had spiritual values. In India it has been included plain or with other dishes as an offering to their God and Goddess especially for Lord Murugan during Karthigai Deepam, Lord Krishna during Krishna Jayanthi. Many recipes have been made with flattened red rice flakes like uppuma, payasam, puttu, masala urundai, kolakatai etc. The *oryza sativa* (red rice) flakes is renowned for its very healthy and nutritionally strong benefits. They were highly recommended and consumed by our ancestors. Flattened rice sweetened with jaggery are still consumed in villages of Tamil Nadu, Red rice flake is unpolished so it is rich in carbohydrates (86.22 g). A 100 gm of flakes consist of minerals like sodium (763 mg), potassium (110 mg), Protein (6.69 g) Iron (5.5 mg) and also rich in Vitamin A and Vitamin C⁷. Red rice flakes are gluten and cholesterol free hence

can be consumed by diabetics as an alternative to wheat. The antioxidant present in the unpolished husk of red rice flakes improves metabolism and prevents colon cancer⁸. The Magnesium and other minerals present in red rice improve the bone strength, fights against asthma and reduces the risk of obesity⁹.

The Objective of The Study

To incorporate the Indian Snacks with *oryza sativa* (red rice) flakes. Ranking the preference of red rice incorporated snacks among the adolescents. To highlight the importance and nutritive value of incorporated snacks. Snack recipes are incorporated with the red rice flakes. Sensory evaluation of organoleptic qualities are analysed for the recipes.

Materials and Methods

The study comprises of developing Indian snack with selected recipes suitable for adolescents were incorporated with the red rice flakes. Recipes selected were the most commonly consumed and preferred by the adolescent age group.

Twenty five recipes were carefully selected to meet the pattern of consumption, health benefits and the preferences of the adolescents. The incorporation of recipes with red rice flakes were done and among the twenty five recipes fifteen recipes were selected, the criteria of selection were easy to prepare, constituting inexpensive and commonly available ingredients, nutritive in nature and acceptable preference by adolescents.

Collection of Ingredients

The ingredients for the recipes were bought from market and organic stores in and around Pallavaram Chennai. The quality of ingredients is inspected and considered for the best outcome of the products.

Preparation of Recipes

The recipes are prepared under their authentic methods of preparation; all recipes are formulated with the incorporation of *oryza sativa* (red rice) flakes as per the required proportions. The recipes were standardized and prepared at Advanced Training Kitchen in School of Hotel and Catering Management, Vels University under the guidance of Chef in charge by the final year students.

Table 1: Snacks with their Code

S. NO	NAME OF THE SNACKS	CODE
1	Aval Payasam	SNACK 1
2	Aval Kolukattai	SNACK 2
3	Aval Keerai Adai	SNACK 3
4	Aval Milagu Vathal	SNACK 4
5	Aval Kanji	SNACK 5
6	Aval sprout salad	SNACK 6
7	Aval Paruppu thanni	SNACK 7
8	Aval Coconut Milk	SNACK 8
9	Aval idli	SNACK 9
10	Aval ulundhu kali	SNACK 10
11	Aval Chakkarai Valli Urundai	SNACK 11
12	Kara Aval	SNACK 12
13	Aval Cutlet	SNACK 13
14	Aval Vellam Pongal	SNACK 14
15	Aval Urundai	SNACK 15
16	Aval Kesari	SNACK 16
17	Aval kothumai Maleetha	SNACK 17
18	Aval Halwa	SNACK 18
19	Aval Dosai	SNACK 19
20	Aval Upma	SNACK 20
21	Aval Puttu	SNACK 21
22	Aval Kheer	SNACK 22
23	Aval Pachadi	SNACK 23
24	Aval Somas	SNACK 24
25	Aval Vada	SNACK 25

Sensory Evaluation of Recipes

All the twenty five recipes are coded as SNACK 1 to SNACK 25 respectively; names of the recipes and their ingredient composition were not disclosed to the panellist members. The panel consist of 50 students

as members from Departments of Biochemistry, Engineering, Visual Communication, and Hotel & Catering Management at Vels University pursuing their under graduation. The age group and their own interest in participation to taste food were considered as the criteria in selecting the panellist members.

The panellist members were groups into ten and five snacks were served to a group per day at a perfect interval of time for the best output of result, hereby the evaluation was carried out for five days for all five groups to evaluate all twenty five snack varieties. The panellists were provided with the sensory evaluation (Table 2) score card to mark their score for the snacks served. The score ranges from 1- Dislike Extremely to 9- Like Extremely evaluating the organoleptic qualities of the snacks including the parameters like taste, texture, colour, flavour, and their acceptance of the snacks.

Statistical Analysis

All the recipes were incorporated with oryza sativa (red rice) flakes and served to the adolescents. This study selected the students as the panellist members so the opinion from the adolescent were collected through the sensory evaluation score card. The data collected are statistically analysed using the SPSS (21.0) software, initially the data are checked for their reliability. Upon the overall acceptance by the panellist the snacks are ranked using Friedman's ranking test, the test used to ranks a group with lesser number of variables¹⁰.

Table 2: Sensory Evaluation Score card

SAMPLE - HEDONIC SCORE CARD RATING FOR RED RICE FLAKE - SNACKS

DATE: _____ PANELIST NAME: _____
 SNACKS CODE : _____ PANELIST No: _____

Please taste the given coded mock tail and mark (✓) how much you like or dislike it on the point in the scale which best describes your opinion.

ORGANOLEPTIC QUALITIES

S.NO	HEDONIC SCORE	TASTE	TEXTURE	COLOR	FLAVOUR	ACCEPTANCE
1	DISLIKE EXTREMELY					
2	DISLIKE VERY MUCH					
3	DISLIKE MODERATELY					
4	DISLIKE SLIGHTLY					
5	NEITHER LIKE NOR DISLIKE					
6	LIKE SLIGHTLY					
7	LIKE MODERATELY					
8	LIKE VERY MUCH					
9	LIKE EXTREMELY					

Evaluation of Nutritive Value

Upon the preference ranking by the adolescents the snack taken the first ten positions are considered and their nutritive values are calculated using the book titled Nutritive Value of Indian Foods published by National Institute of Nutrition, ICMR published in the year 2015.

Result and Discussions

Sensory evaluation data were analysed using the SPSS (21.0) software, the data collected from the panellist are reliable (Table 3) with the Cronbach's Alpha value 0.782.

Table 3: Reliability test

No of items	N	Cronbach's Alpha
25	50	0.782

Friedman's Test

Friedman's test is done to find out the ranking position of the twenty five dishes overall acceptance among the panelist. The organoleptic qualities of the twenty five recipes were collected through the score data. Table 4(a) and Table 4(b) exhibit the ranking of preferences of the snacks by the panellist members. Since the p value is 0.000 is less than 0.05 ($p < 0.01$), there is a significant difference in the ranking of the rice flakes newly standardized recipes.

It is concluded that the panelist of Vels University have ranked the sensory evaluation of the twenty rice flakes recipes in a significantly different manner. Out of the twenty five recipes considered for analysis, Aval Coconut Milk has the lowest mean rank, followed by Aval Halwa and Aval Vellam Ponagal. Hence, it is concluded that the Aval Coconut Milk recipe is the most desired dish out of the twenty five standardized recipes.

The ranking positions are more significant (p- value is .000) and the value of chi-square value (167.524) is high.

Table 4(a) Friedman's Ranking test for the Snacks

SNACKS	CODE	MEAN	POSITION RANK
Aval Payasam	SNACK 1	13.42	14
Aval Kolukattai	SNACK 2	15.44	21
Aval Keerai Adai	SNACK 3	10.51	6
Aval Milagu Vathal	SNACK 4	16.62	25
Aval Kanji	SNACK 5	10.07	5
Aval sprout salad	SNACK 6	12.28	9
Aval Paruppu thanni	SNACK 7	12.98	12
Aval Coconut Milk	SNACK 8	8.27	1
Aval idli	SNACK 9	10.03	4
Aval ulundhu kali	SNACK 10	16.5	24
Aval Chakkarai	SNACK 11	12.96	11
Valli Urundai			
Kara Aval	SNACK 12	14.82	20
Aval Cutlet	SNACK 13	14.65	18
Aval Vellam	SNACK 14	9.56	3
Pongal			
Aval Urundai	SNACK 15	14.26	16
Aval Kesari	SNACK 16	14.32	17
Aval kothumai	SNACK 17	13.66	15
Maleetha			
Aval Halwa	SNACK 18	8.28	2
Aval Dosai	SNACK 19	13.19	13
Aval Upma	SNACK 20	15.91	22
Aval Puttu	SNACK 21	12.47	10
Aval Kheer	SNACK 22	12.16	8
Aval Pachadi	SNACK 23	11.72	7
Aval Somas	SNACK 24	16.31	23
Aval Vada	SNACK 25	14.78	19

Table 4 (b) Test Statistics

N	50
Chi-Square	167.524
Df	24
Asymp. Sig.	.000
a. Friedman Test	

The nutritive value of snacks is briefly exhibited in Table 5. It is prominent in the table that among the twenty five snacks recipe's nutritive values, selected recipes are discussed with special references to the high nutritive content in the snacks. The snack 6 is

high in protein, snack 9 contains energy, snack 22 is rich in calcium, snack 3 is high in phosphorous and snack 4 is contains iron. Thus the snacks incorporated with red rice flakes are more nutritive and meeting the requirements of the adolescents.

Table 5: Nutritive Values of the Snacks

SNACKS	CODE	MOISTURE (g)	PROTEIN (g)	FAT (g)	MINERALS (g)	FIBER (g)	CARBOHY-DRATES(g)	ENERGY (k cal)	CALCIUM (mg)	PHOSPOROUS (mg)	IRON (mg)
Aval Payasam	SNACK 1	969	35	38	7	4.72	75	787	443	479	5
Aval Kolukattai	SNACK 2	62	5	13	1	1	13	192	99	120	1
Aval Keerai Adai	SNACK 3	283	23	43	5	7	48	671	308	964	6
Aval Milagu Vathal	SNACK 4	43	30	48.03	3	6	51	695	199	426	28
Aval Kanji	SNACK 5	98	32	49	4	6	51	761	62	501	5
Aval sprout salad	SNACK 6	25	183	121	3	5.89	30	560	185	374	3
Aval Paruppu thanni	SNACK 7	3	21	26	1	3	15	317	90	187	2
Aval Coconut Milk	SNACK 8	113	10	16	2	1	52	407	225	234	1
Aval idli	SNACK 9	112	26	102.56	6	9	110	1481	187	704	8
Aval ulundhu kali	SNACK 10	21	19	28	3	4	129	765	175	191	9
Aval Chakkarai	SNACK 11	12	29	66	4	6	85	1076	160	575	6
Valli Urundai	SNACK 12	5	5	7.98	4	15	45	430	18	43	16
Kara Aval	SNACK 13	8	12	16.03	8	12	19	139	23	9	3
Aval Cutlet	SNACK 14	17	18.66	13.98	5	19	44	164	13	70	2
Aval Vellam Pongal	SNACK 15	12	15	6	12	5	51	143	43	30	0
Aval Urundai	SNACK 16	19	9	23.1	3	12	59	152	24	15	3
Aval Kesari	SNACK 17	154	91	18.9	6	29	30	176	12	76	2
Aval kothumai Maleetha	SNACK 18	164	14	17.76	11.8	8	15	155	42	36	1
Aval Haliwa	SNACK 19	12	6	15	1	11.03	82	193	52	25	3
Aval Dosai	SNACK 20	785	23	13	8	4	12	218	42	86	3
Aval Upma	SNACK 21	5	10.5	2	2	12	81	196	72	46	2
Aval Puttu	SNACK 22	162	19.45	67.12	19	29.05	56	176	675	34	2
Aval Kheer	SNACK 23	129	15	34	8	7.2	15	201	665	95	2
Aval Pachadi	SNACK 24	17	2	21	14.3	5	8	179	34	55	1
Aval Somas	SNACK 25	18	17	15.34	18	12.89	15	124	32	38	4

Table 6: Sensory Evaluation Result

S. NO.	SNACK NAME	CODE	FRIEDMAN'S RANKING		ORGANOLEPTIC QUALITIES			
			POSITION OF SNACKS	TASTE	TEXTURE	COLOUR	FLAVOUR	ACCEPTANCE
1	Aval Coconut Milk	Snack 8	1	8.3	8.07	8.9	7.69	8.77
2	Aval Halwa	Snack 18	2	8.41	7.4	8.29	7.98	8.5
3	Aval Vellam Pongal	Snack 14	3	8.33	8.01	7.62	8.2	8.05
4	Aval idli	Snack 9	4	8	7.98	8.04	8.03	8.12
5	Aval Kanji	Snack 5	5	7.63	8.46	7.12	8.9	8.02
6	Aval Keerai Adai	snack 3	6	8.44	7.98	7.59	8.59	7.42
7	Aval Pachadi	Snack 23	7	7.68	8.33	8.09	7.38	8.29
8	Aval Kheer	Snack 22	8	8.45	7.6	7.09	8.99	7.42
9	Aval sprout salad	Snack 6	9	7.02	8.12	8.01	7.09	8.1
10	Aval Puttu	Snack 21	10	7.66	7.28	7.89	8.28	7.19
11	Aval Chakkarai i Valli Urunda	Snack 11	11	7.08	6.97	8.45	8.61	7.01
12	Aval Paruppu thanni	Snack 7	12	8.09	8.21	6.88	6.79	8.04
13	Aval Dosai	Snack 19	13	6.77	8.59	7.09	7.05	7.9
14	Aval Payasam	Snack 1	14	7.51	7.3	7.31	7.29	7.51
15	Aval Kothumai Maleetha	Snack 17	15	7.45	7.29	7.3	7.21	7.49
16	Aval Urundai	Snack 15	16	7.42	7.88	6.9	7.11	7.01
17	Aval Kesari	Snack 16	17	8.09	6.7	6.12	7.44	7.09
18	Aval Cutlet	Snack 13	18	6.08	7.49	6.83	6.84	6.81
19	Aval Vada	Snack 25	19	7.83	5.98	6.01	7	7.11
20	Kara Aval	Snack 12	20	6.84	6.77	6.45	6.89	6.71
21	Aval Kolukattai	Snack 2	21	6.81	6.51	6.77	6.81	6.21
22	Aval Upma	Snack 20	22	7.05	5.32	6.14	5.99	6.91
23	Aval Somas	Snack 24	23	6.91	5.88	7.32	5.81	5.06
24	Aval ulundhu kali	Snack 10	24	5.27	6.81	5.99	5.91	6.01
25	Aval Milagu Vathal	Snack 4	25	5.82	6.78	5.14	5.26	6.82

Table 7 shows that there is a linear positive correlation between Quantity difference with friends and Street food consumption among the students. The correlation coefficient is .336 and it is statistically significant as a p value is lesser than 0.05. It is understood from the analysis that the adolescents consumption of street food is very much on the higher side when they are with their friends.

Table 8 shows that the Traditional snacks preference and liked more than sixteen snacks among the students are positively correlated and correlation coefficient .489 it is statistically significant ($p < 0.05$).

There is positive correlation between Traditional snacks preference and liked more than sixteen snacks. The consumption of snacks quantity is positively correlated with street food consumption at ($r = 0.336, p < 0.05$).

Among the students the Traditional snacks preference is positively correlated with students liking more than sixteen snacks at ($r = 0.489, p < 0.05$). The result exhibits that all constructs used to measure the students preferences to traditional snacks are associated and the correlation is significant at 0.05 level.

Table 7: Correlations between Quantity difference in snacks with friends, Street food, traditional snacks preference and more than sixteen snacks

		Snacks consumption increases being with friends	Street food consumption
Snacks consumption increases being with friends	Pearson Correlation	1	0.336
	Sig(2 – tailed)		0.05
Street food consumption	Pearson Correlation	0.336	1
	Sig(2 – tailed)	0.05	

** Correlation is significant at the 0.05(2tailed)

Table 8: Correlations between Traditional snacks preference and more than sixteen snacks

		Traditional Snack preference	Prefers more than 16 snacks incorporated with rice flakes
Traditional Snack preference	Pearson Correlation	1	0.489
	Sig(2 – tailed)		0.00
Prefers more than 16 snacks incorporated with rice flakes	Pearson Correlation	0.489	1
	Sig(2 – tailed)		0.00

*Correlation is significant at the 0.00(2-tailed) level

Conclusion

There is to a great extent of diversity in traditional healthy snacks in India because the regional healthy foods have originally evolved suitable to the climate, traditions, and cultivation practices of the individual state.

Additionally, certain foods have become more popular in certain state according to the health condition of a population.

This study confirms that the healthy nutrients of the *oryza sativa* (red rice) flakes is gluten free, it provides immediate energy to our system, improves the bowel movements and stabilizes the blood sugar level. Additionally it provides essential source of B1 vitamin to our human body. Red rice flakes prevents primary and secondary coronary disease, allergies, aids in digestion preventing constipation among adolescents.

This study concludes that the snacks incorporated with red rice flakes are considerable preferred by the adolescents for their freshness and nutritive values. More traditional ingredients can be incorporated into the daily meal pattern can reduce the consumption of junk and preserved food among the adolescents making a healthy generations.

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Conflict Of Interest

Nil

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