Original Research Article

ACCEPTABILITY OF MILLETS BASED FAST FOOD ITEMS AMONGST STUDENTS

Abstract

The present study investigated the impact of attributes of millets based fast food items on creating memorable food experience for students and acceptability of students towards millets based fast food items. The data for the study was collected from 110 students who attended EAT RIGHT MILLET fest, jointly organized by Food Safety and Standards Authority of India (FSSAI) and Department of Hotel management, Maharishi Markandeshwar deemed to be University, Mullana, India on 18th march 2023 and consumed millets based fast food items from different stalls. The results of the study proved that attributes of millets based fast food items had a significant impact on creating memorable food experiences for students. Furthermore, a significant relationship was found between these attributes and acceptability of students towards millets based fast food items postulating that millets based fast food items were acceptable to the students.

Key words: Millets, Fast food, Students, Food experiences, Acceptability

Introduction

Understanding the attributes of foods that contribute to acceptability and consumption will lead to better formulations of healthy products to build in those attributes that increase liking/consumption and eliminate those attributes that decrease liking. Quality is a broad term, and its definition depends on the context. Quality is a set of attributes that correspond to consumer expectations. According to Steenkamp (1990), quality attributes are the functional and psychosocial benefits provided by the product. Furthermore, quality attributes are distinguished between experience and credit. The former is determined by consumers' experience with the product (e.g., taste), which is difficult to determine even after frequent consumption. However, quality attributes are not known prior to consumption, and consumers have to rely on some indicators, known as quality cues, to predict food quality, the expected quality, or quality expectations. Quality cues are any informational stimuli that the senses

can determine prior to consumption and are either intrinsic or extrinsic (Steenkamp, 1990). The liking of a product and its acceptability are measured by various scales, the most common being the 9-point hedonic scale (Childa and Drake, Markey et al., Nguyen et al., Ganesan*et al*.). To determine the intensity of a particular trait, the JAR (Just About Right) scale is the most appropriate (Biguzzi*et al*., Markey *et al*., Nguyen and Wismer, Chollet*et al*). The CATA (Check All That Apply) method is most often used in consumer studies to profile product characteristics. It consists of a list of words, with the consumer asked to select those appropriate to describe the product (Vidal *et al*,). RATA or (Rate All That Apply) is a version of CATA questions, with the added intensity rating of selected descriptors (Nguyen et al., Vidal et al.).

There is increasing prevalence of obesity, type-2 diabetes, coronary heart disease and other non-communicable diseases related to over-consumption of energy-dense foods high in fat, sugar and salt (Ng M *et al* 2013). As a preventive measure, the World Health Organization (WHO) strategy addresses the problem through the reformulation of food products, thereby creating an environment that encourages healthier consumer choices (WHO, 2013).

Nutri-cereals or Millets are the powerhouses of nutrients; they also play an important role against food, fiber, fodder and health insecurities (Alekhya and Shravanthi, 2019). Millet is a cumulative name used for various diverse little grained cereal grasses. Millets are generally partitioned into "huge millets" (sorghum and pearl millet) and "little millets" (finger-, farm, little-, kodo-, foxtail-and proso millet). In Europe and the United States, millet is developed predominantly as search for poultry and as bird feed (Robert, 2004). Finger millet is regularly referenced independently from other little millets (Bommy and Maheswari, 2016). Indian millets produce numerous protections like protections in food, nourishment, grub, fiber, wellbeing, occupation and biology (Bommy and Maheswari, 2016). Ongoing concentrate by National Nutrition Monitoring Bureau (NNMB) on dietary profile of metropolitan Indians [from the Chennai Urban Rural Epidemiology Study (CURES)] uncovered that just 2% of the total calories (6.7 g/d) were contributed by the millets (Radhika*et al*., 2011). Generally, millets are small-grained, annual, warm-weather cereals belonging to the grass family. They are highly tolerant of drought and other extreme weather conditions and have a similar nutrient content to other major cereals. (Fahad et al.), 2017).

Millets are a group of highly variable small-seeded grasses, widely grown around the world as cereal crops/grains. Millets are very high in their nutrition content. Millets are rich in B vitamins, calcium,

iron, potassium, magnesium, zinc, also gluten-free and has low-GI (Glycemic index) thus millets are suitable for people allergies/intolerance of wheat. Also for diabetic, weight loss millets are excellent.

The main purpose is to enhance the visibility and total acceptance of Millet based products in the rural and urban populations. The acceptance or rejection of food entirely depends on whether it corresponds to consumer expectations and needs (Mosca*et al*., 2015). Food acceptability directly relates to the interaction it has with the consumer at a given moment in time. The key factors that determine food acceptability are the sensory characteristics of food since consumers seek foods with specific sensory properties. Other critical factors that directly dictate food acceptability are consumer characteristics and enjoyment of food.

Objectives

The present study was aimed at achieving the two main objectives i.e. 1) to determine the impact of attributes of millets based fast food items on creating memorable food experience for students, and 2) to determine the acceptability level of students towards millets based fast food items based on their food experiences. To achieve these two objective two null hypotheses were framed. These two null hypothesis were: a) **$H_0$1:** *There is no significant impact of attributes of millets based fast food items on creating memorable food experience for students,* and *b)* **$H_0$2:***The millets based fast food items, based on their food experiences are not acceptable to the students.*

Review of literature

The acceptability of foods and beverages is determined by how they are perceived in sensory, utilitarian, imagery and attitudinal terms, coupled with the consumer's reaction to and trading-off of these various perceived characteristics [Thomson 1988]. If manufacturers are to produce successful products it is important that they understand the factors influencing this personal world, they must know how their products are being perceived, how the consumer relates to them, what other products are viewed in a similar light in the marketplace and how these compare sensorially, functionally and in an imagery sense with their own products (Williams and Atkin, 1983). Without such information and without understanding how it relates to product acceptance and choice on the one hand and to technical, chemical and physical information on the other, developing new markets and new products, designing advertising and promotion and even establishing quality control criteria becomes a hit-and-miss operation. To understand acceptance, it is essential to be able to measure product

acceptability and preference and provide some evaluation of the underlying factors that influence them.

2023 is 'International Year of Millets' and India has ambitious plans to boost the production, consumption and exports of millet-based products. Millets could become the new yoga for Indian exports. The United Nations declared 2023 as the 'International Year of Millets' after an initiative led by the Indian government, supported by 72 countries. It's also one of three themes for the Republic Day Parade tableaux this year. Ahead of Jan 26, several government departments are serving millets-based dishes during multiple large-scale events. The grain was among the "first crops to be domesticated in India with several evidence of its consumption during the Indus valley civilization", the agriculture ministry said in a statement. Millets are a varied group of small-seeded nutritional grains such as Jowar, Bajra, Ragi, Kangni, Kuttu, and Jhangora, among others. For their therapeutic properties, millets are also used in Ayurvedic medicines. India is one of the largest producers and exporters of millets, which can also be grown in non-irrigated conditions and require minimal use of chemical fertilizers. By bringing attention to the highly resilient and self-sufficient properties of this crop, India aims to position millets as the 'crop of the future' and become a 'global hub' for its production. Several home-grown SMB brands and start-ups are bringing the heritage crop or 'miracle grains' in the form of easy-to-cook products for the modern consumer.

In the past few years, there has been a dramatic revolution in the food choices of people. More and more people are increasingly opting for nutrient-rich foods like cereals, grains, seeds and superfoods over everything else. Millets have stood the test of time and have long been favored for their many health benefits. It is a traditional grain, very popular in Indian subcontinent where it has been grown and eaten for the past 5000 years. The primary reason behind such a vast popularity of this hardy grain is that it requires low amount of water and fertility as compared to other grains or cereals.

Traditionally fermented foods and beverages obtained from millet or millet mixed with other cereals (corn and sorghum) include koko (millet porridge), fura, mangishi, jandh, uji, burukutu, kunu-zaki, ogi, and bushera. Unfermented millet-based products include dambu, masvusvu, and roti. Steeping, milling, slurrying, sieving, fermentation, sedimentation, and cooking are the basic processes used to produce many fermented foods, while malting, mashing, and fermentation of extracts are important steps in the manufacture of fermented beverages. In most cases natural, uncontrolled fermentation is employed; only in a few cases are starter cultures used. Lactic acid-producing microorganisms, yeasts, and molds are the predominant organisms found in fermentation processes. Final fermented

products include porridge, gruel, bread, paste, mash, and beer and are consumed by adults and children as meals, weaning foods, and beverages.

Popularly grown in Africa and Southeast Asia, pearl millet (bajra) is the most common millet out of the entire lot. India is one of the leading producers of millet, with 36 per cent of the world total produced in India. Millet is commonly of two types; naked grains and husked grains where ragi, jowar and bajra, the three most popular and major millets, fall under the category of naked grains. These do not need to be processed after harvesting, they can be just cleaned and used, which makes them so popular. On the other hand, foxtail, little and kodo millet are husked grains because of an indigestible seed coat (husk) over them that needs to be removed before consumption.

The incredibly rich nutrient composition is simply enough to add millets to your diet. Millets are gluten-free and can be easily absorbed by the body besides being a rich source of fibre, copper, calcium, iron, manganese, phosphorus, and magnesium. These are slow in digestion and do not cause spike in blood sugar levels therefore making it beneficial for diabetics. Apart from the many health benefits, millets come with a unique taste that ups the flavour quotient of any dish. With many culinary innovations in the recent past, major millets like ragi, bajra and jowar are being used to prepare heart-warming snacks and meals such as bajra tarts, khichdi, ragidosas, etc. We have got the best of millet recipes that are a perfect mix of healthy, tasty, easy and quick so that you can prepare them at home.

Millets contain high level of proteins, minerals, vitamins, antioxidants, and they are non-glutinous and non-acid forming diets compared to other cereals and therefore called as ‘nutritious millets’ or ‘nutricereals’. Specifically, pearl millet and finger millets provide protein at the rate of 11.8 and 7.4g per 100-gram grain, respectively, and the fat content is low in these millets (around 1.3 g per100 g grain) (Sakamoto, 1982; Muthamilarasan et al. 2015). Besides, millets have higher levels of low Glycemic Index (GI) non-starch polysaccharides and dietary fibers which protects against diabetes. The important millets cultivated and consumed in India include sorghum, pearl millet, finger millet(ragi), foxtail millet (kangni), kodo millet (kodo), proso millet (cheena), barnyard millet (sawan)and little millet (kutki) (NAAS,2013)

Ballolli*et al*., (2001) has developed barnyard millet cookies enriched with nutraceuticals by incorporating nuts and dry fruits. The barnyard millet cookies were highly acceptable with light and crisp texture, pleasant aroma and excellent taste. Varnashree*et al*., (2008) found that idlis prepared by

using ragi flour along with parboiled rice and black gram dhal flour in different ratio had enhanced nutritional quality without considerable effect on the quality parameters of idli. Vijayakumar*et al*., (2009) carried out a study to expand the utility of Kodo (Pasapalumscrobiculatum) and Barnyard (Echinochloacolona) millets by incorporating them in whole wheat flour and defatted soy flour mixture and studied the impact of millet flour blend on different quality characteristics of chapathi. Kalidas and Mahendran (2017) in their study they suggested that for increasing in sales of millet products extra quantity should be offered with the normal pack or freebies like the items useful for kitchen should be offered with the pack or reducing the prices will make the consumers to purchase more quantities.

Shukla and Srivastava (2011) they have developed noodles for diabetic patients that which is having finger millet as an ingredient. The Glycemic Index (GI) of 30% finger millet incorporated noodles was observed significantly lower (45.13) than control noodles (62.59). It was found that finger millet flour incorporated noodles to be nutritious and showed hypoglycemic effect. Geeta*et al.,* (2012) conducted a study on nutritional scenario of fast food among women in Bhagalpur Town, Bihar. The women with higher educational qualifications, younger age group and high income level are consuming more fast food. The consumption of Sodium chloride was higher due to consumption of fast food.

Earlier millets were considered inferior grains than cereals, therefore they very priced low. Due to increasing consumer awareness on health because of various health complications such as obesity, diabetes, calcium deficiency, constipation, gastric issues etc. the demand for millets and millet based products has risen up in cities and towns and places with higher educated population. Taking advantage of this scenario, the food processing companies have raised the prices of their branded millet products, mostly sold through organized retailing. Therefore, steps should be taken to reduce the prices of millet and millet based products. One major lacuna observed in millet based products was increased amount of impurities such as waste material and stones. Proper processing should be encouraged by the popular brand of millets.

Primary data on factors influencing buying behaviour of millets and consumer acceptance of millet based products was collected from the respondents in the study area which was purposively selected for the current study. Consumer perception about the millets is that they are good for health, easy for digestion, helps in weight reduction. Price of the millet based products were high when compared with other food products.

Fitrizal, Elfiswandi and Sanjaya (2021) conducted a study in Sumatra, Indonesia to study the impact of culinary tourism on tourist satisfaction and destination loyalty and found that quality of food items, portion sizes, food authenticity, variety and cleanliness are the culinary components that attract the tourists to a destination with authentic food being the strongest factor in this regard. Determinants of consumer satisfaction include facilities provided at the destination, knowledge about local food and culture and novel cuisine experience. Showkat, Mehraj and Qureshi, (2021) took up a study in Jammu and Kashmir, India and explained that factors like price and quality of food items along with dining environment determine the levels of overall satisfaction.

Harthy, Karim, and Rahid (2021) conducted a study on street food in Malaysia, to explore the street food preferences of tourists and examine the role of street food in growth of tourism in Malaysia. Study found that street food has the capability to attract consumers. Street food is preferred because it is cheap, offers diverse flavours and facilitates the connection with the local culture. Study further revealed that service quality positively impacts consumer satisfaction. Factors like product quality and physical environment do not impact customer satisfaction directly. The mediating factor that relates the attributes of product quality, physical environment and service quality and leads to tourist satisfaction is the attitude of the tourist towards these attributes. It was recommended that stakeholders need to formulate strategies for strengthening street food through branding and promoting local street food.

Zhang, Chen and Hu (2019) conducted a study in china on local food to understand the relationship between food authenticity and food quality and how they affect tourist satisfaction and loyalty. Study asserts that local food represents the culture of a place and tourists' consumption of authentic local food items facilitates the experience of daily life and traditional culture of that place apart from the local taste. This experience stems from the dining environment and food service provided which in turn positively impact customer satisfaction and consumer loyalty.

Research methodology

The study was conducted in offline mode on 143 students from different streams who attended EAT RIGHT MILLET fest, jointly organized by Food Safety and Standards Authority of India (FSSAI) and Department of Hotel management, Maharishi Markandeshwar deemed to be University, Mullana, India on 18th march 2023. Students who had tried different millets based fast food items from the different stall at the fest were approached and administered with a survey questionnaire to obtain the data. The language of the questionnaire was selected as English given the fact that the medium of

learning for all the students was English. All the filled questionnaires received were checked for missing values, incompleteness or if they were wrongly filled and it was found that a total of 33 questionnaires out of 143 were having such inconsistencies. Such questionnaires were not included in the further analysis in order to obtain accurate and meaningful results. Hence the final sample size considered for the analysis further was 110.

Data analysis

After checking all the data, the data was fed into SPSS software version 26 and analysed to test the framed hypotheses. In order to test the 1st hypothesis **$H_0$1,** a multiple linear regression was applied on the15 variables defining the attributes of millet based fast food items. However, before applying the test, data was tested for all the assumptions of regression analysis, which included assumptions of no outliers, normal distribution, data linearity, homoscedasticity and no autocorrelations. Residual statistics analysis for outliers (Table 1) showed that the minimum value of standard residual was -1.632 and maximum value was 5.673 postulating that the collected data had very few outliers. It was confirmed from the bell shaped and symmetrical histogram for regression standard residual and normal P-P plot for regression standard residual (Figure1) that residuals were normally distributed. A scatterplot showing a random array of dots (Figure 1) indicated almost straight-line linear relationship between the variables and a constant variance of the residuals in the regression model, which meant that the data met the assumptions of linearity and homoscedasticity. To check the lack of autocorrelations, the values of test statistic for Durbin Watson test analysis were observed. The value of Durbin Watson test (Table 2) was 1.441, which was closer to 2 confirming that the residuals had no autocorrelation among them. After testing the data for all assumptions, a multiple linear regression was applied to determine the impact of attributes of millet based fast food items on creating memorable food experiences for students. The 15 attributes of millets based fast food items were taken as independent variables and statement "I got memorable food experiences from consuming millets based fast food items" was taken as dependent variable.

Table 1: Residual statistics for Multiple Linear Regression betweenattributes of millets based fast food items and food experiences of students

	Minimum	***Maximum***	***Mean***	***Std. Deviation***	***N***
Predicted Value	2.3582	4.9434	4.2369	.48870	110

Residual	-.18461	.64178	.00000	.10505	110
Std. Predicted Value	-3.844	1.446	.000	1.000	110
Std. Residual	-1.632	5.673	.000	.929	110

Table 2: Multiple Linear Regression model used for determining the impact of attributes of millets based fast food items on creating memorable food experiences for students

Regression Model 1 equation	$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \beta_{13}X_{13} + \beta_{14}X_{14} + \beta_{15}X_{15}$
Y = Dependent variable (Memorable food experiences), X = Independent variable (Attributes of millets based fast food items), α or Alpha, a constant (coefficient of intercept) equals the value of Y when the value of $X = 0$, β or Beta, the coefficient of X that represents the slope of the regression line (how much Y changes for each one-unit change in X)	

Figure 1: Histogram, Normal P-P plot and Scatterplot for Multiple Linear Regression between attributes of millets based fast food items and food experiences of students

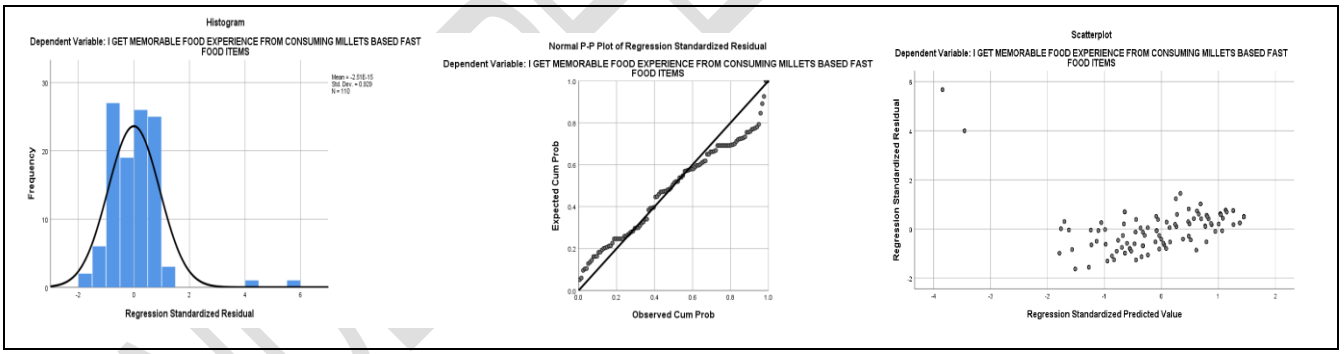


Table 3: Model summary for Multiple Linear Regression between attributes of millets based fast food items and food experiences of students

Model	***R***	***R Square***	***Adjusted R Square***	***Std. Error of the Estimate***	***Durbin-Watson***
1	.978	.956	.949	.11312	**1.441**

It is evident from table 3 above that the regression model having R^2 = .956, contains all attributes that describe 95.6% of the total variance in the food experiences of students. Furthermore, the value of F-statistic [F (15, 94) = 135.618, p < .05] is significant with p-value = 0.000 which indicates that the regression model is statistically significant (Table 4).

Table 4: ANOVA model for Multiple Linear Regression between attributes of millets based fast food items and food experiences of students

Model		***Sum of Squares***	***df***	***Mean Square***	***F***	***Sig.***
1	***Regression***	26.032	15	1.735	**135.618**	**.000**
	Residual	1.203	94	.013		
	Total	27.235	109			

It is revealed from table 4 above that in the regression model, the value of sum of squares of mean is 26.032 and the value of sum of squares of residual is 1.203 which indicates that regression model explained a significant amount of variance in establishing the impact of attributes of millet based fast food items on creating memorable food experiences for students.

Table 5: Individual impact of each attribute of millets based fast food items on creating memorable food experiences for students

Attributes of millets based fast food items		***B***	***Std. Error***	***Beta (ß)***	***t***	***p***
Model 1	*(Constant)*	.614	.094		6.503	.000
	A1 - Food looks & smells good	.034	.017	.060	1.940	.050
	A2 -Texture	.044	.026	.056	1.680	.096
	A3 -New and unique	.055	.020	.093	2.718	.008
	A4 -Taste and flavors	.091	.016	.170	5.578	.000
	A5 -Food items are safe to consume	.054	.023	.087	2.371	.020
	A6 -Convenient to consume	.065	.019	.121	3.406	.001
	A7 -Ingredient combination	.090	.022	.146	4.007	.000

	A8 -Food items are easy to digest	.063	.022	.090	2.838	.006
	A9 -Food items are healthy and nutritious	.051	.020	.088	2.490	.015
	A10 -Portion sizes are sufficient	.051	.021	.082	2.384	.019
	A11 -Meal combination is exciting	.040	.026	.064	1.527	.001
	A12 -Food items have good color combination	.039	.024	.067	1.625	.010
	A13 -Food items are economical	.038	.023	.060	1.693	.094*
	A14 –Wide variety in menu	.072	.015	.134	4.827	.000
	A15 -Value for money	.080	.028	.119	2.890	.005

To understand the individual contribution of each attribute of millets based fast food items on creating memorable food experiences for students, standardized beta values from the regression model were observed (Table 5). The p-value (0.000) of the slope coefficients of t statistics (6.503) is less than 5% significance level (p=.000) which means that significant relationship has been observed between the attributes. By looking into the values of standardized coefficients, for every one-unit increase in the independent variable A4 "Taste and flavors", there is 0.17unit increase in the dependent variable, followed by attribute A7 "Ingredient combination", (B=0.146); A14 "Wide variety in menu", (B=0.134); A6 "Convenient to consume", (B=0.121); A15 "Value for money", (B=0.119); A3 "New and unique", (B=0.093); A8 "Food items are easy to digest", (B=0.09); A9 "Food items are healthy and nutritious", (B=0.088); A5 "Food items are safe to consume", (B=0.087); A10 "Portion sizes are sufficient", (B=0.082); A12 "Food items have good color combination", (B=0.067); A11"Meal combination is exciting", (B=0.064); A1 "Food looks & smells good", (B=0.06); A13 "Food items are economical", (B=0.06) and A2 "Texture", (B=0.056). This proved that 13 out of 15 attributes had a significant p-value ($p < 0.05$), meaning that there is a significant relationship between these attributes and food experiences of the students. The attributes that did not have a significant impact on creating memorable food experiences for students were A13 ["Food items are moderately priced"; p=.094] and A2["Texture"; p=.096]. Thus *the results of the multiple linear regression analysis implied that our null hypothesis* ***$H_0$1*** *was rejected in principle meaning that the millets based fast food items created memorable food experiences for students.*

Similarly, to test the 2nd hypothesis **$H_0$2,** againa multiple linear regression was applied on the15 attributes of millet based fast food items. However, before applying the test, data was tested for all

the assumptions of regression analysis, which included assumptions of no outliers, normal distribution, data linearity, homoscedasticity and no autocorrelations.

Table 6: Residual statistics for Multiple Linear Regression betweenattributes of millets based fast food items and acceptability of students towards millets based fast food items

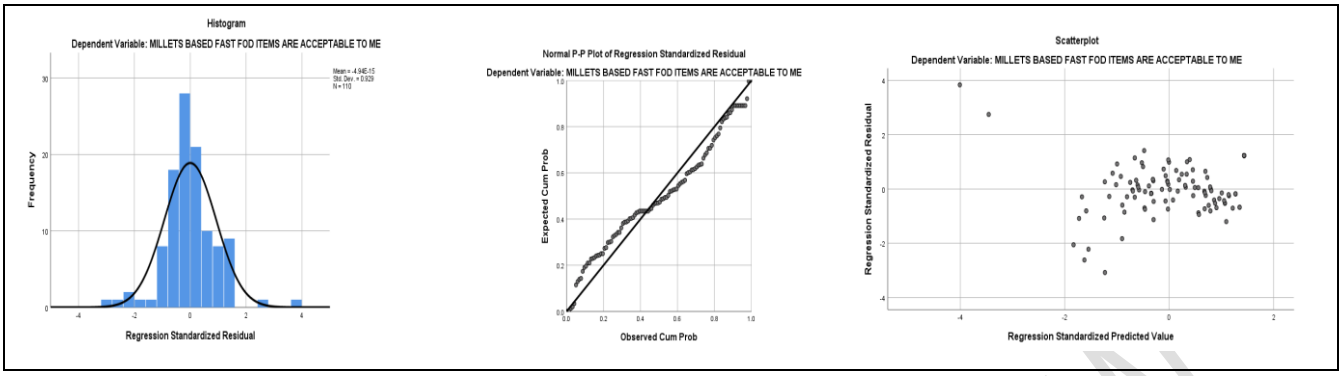
	Minimum	***Maximum***	***Mean***	***Std. Deviation***	***N***
Predicted Value	2.1360	4.8915	4.1662	.50629	110
Residual	-.24637	.30715	.00000	.07434	110
Std. Predicted Value	-4.010	1.433	.000	1.000	110
Std. Residual	-3.077	3.837	.000	.929	110

Residual statistics analysis for outliers (Table 6) showed that the minimum value of standard residual was -3.077 and maximum value was 3.837 postulating that the collected data had very few outliers.

Table 7: Multiple Linear Regression model between attributes of millets based fast food items and acceptability of students towards millets based fast food items

Regression Model 2 equation	$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \beta_{13}X_{13} + \beta_{14}X_{14} + \beta_{15}X_{15}$
Y = Dependent variable (Acceptability of students towards millets based fast food items), X = Independent variable (Attributes of millets based fast food items), α or Alpha, a constant (coefficient of intercept) equals the value of Y when the value of $X = 0$, β or Beta, the coefficient of X that represents the slope of the regression line (how much Y changes for each one-unit change in X)	

Figure 2: Histogram, Normal P-P plot and Scatterplot for Multiple Linear Regression between attributes of millets based fast food items and acceptability of students towards millets based fast food items



It was confirmed from the bell shaped and symmetrical histogram for regression standard residual and normal P-P plot for regression standard residual (Figure 2) that residuals were normally distributed. A scatterplot showing a random array of dots (Figure 2) indicated almost straight-line linear relationship between the variables and a constant variance of the residuals in the regression model, which meant that the data met the assumptions of linearity and homoscedasticity. To check the lack of autocorrelations, the values of test statistic for Durbin Watson test analysis were observed. The value of Durbin Watson test (Table 8) was 1.600, which was closer to 2 confirming that the residuals had no autocorrelation among them. After testing the data for all assumptions, again a multiple linear regression was applied to determine if the millets based fast food items were acceptable to the students. The 15 attributes of millets based fast food items were taken as independent variables and statement "Millets based fast food items are acceptable to me" was taken as dependent variable.

Table 8: Model summary for Multiple Linear Regression between attributes of millets based fast food items and acceptability of students towards millets based fast food items

Model	***R***	***R Square***	***Adjusted R Square***	***Std. Error of the Estimate***	***Durbin-Watson***
2	.989	.979	.976	.08006	**1.600**

It is evident from table 8 above that the regression model having R^2 = .979, contains all attributes that describe 97.9% of the total variance in acceptability of students towards millets based fast food items. Furthermore, the value of F-statistic [F (15, 94) = 290.635, $p < .05$] is significant with p-value = 0.000 which indicates that the regression model is statistically significant (Table 9).

Table 9: ANOVA model for Multiple Linear Regression between attributes of millets based fast food items and acceptability of students towards millets based fast food items

Model		Sum of Squares	df	Mean Square	F	Sig.
2	***Regression***	27.940	15	1.863	**290.635**	**.000**
	Residual	.602	94	.006		
	Total	28.543	109			

It is revealed from table 9 above that in the regression model, the value of sum of squares of mean is 27.940 and the value of sum of squares of residual is .602 which indicates that regression model explained a significant amount of variance in establishing the impact of attributes of millet based fast food items on acceptability of students towards millets based fast food items.

Table 10: Individual impact of each attribute of millets based fast food items on acceptability of students towards millets based fast food items

Attributes of millets based fast food items		B	Std. Error	Beta (ß)	t	p
Model 2	*(Constant)*	.389	.067		5.819	.000
	A1 - Food looks & smells good	.044	.012	.076	3.552	.001
	A2 -Texture	.039	.018	.048	2.098	.039
	A3 -New and unique	.066	.014	.110	4.646	.000
	A4 -Taste and flavors	.084	.012	.152	7.203	.000
	A5 -Food items are safe to consume	.051	.016	.080	3.153	.002
	A6 -Convenient to consume	.063	.013	.115	4.709	.000
	A7 -Ingredient combination	.083	.016	.131	5.218	.000
	A8 -Food items are easy to digest	.083	.016	.116	5.257	.000
	A9 -Food items are healthy and nutritious	.061	.014	.103	4.206	.000
	A10 -Portion sizes are sufficient	.044	.015	.069	2.909	.005
	A11 -Meal combination is exciting	.049	.019	.077	2.628	.010
	A12 -Food items have good color combination	.036	.017	.060	2.121	.037
	A13 -Food items are economical	.054	.016	.083	3.381	.001

	A14 - Wide variety in menu	.060	.011	.109	5.665	.000
	A15 -Value for money	.086	.020	.124	4.372	.000

To understand the individual contribution of each attribute of millets based fast food items on acceptability of students towards millets based fast food items, standardized beta values from the regression model were observed (Table 10). The p-value (0.000) of the slope coefficients of t statistics (5.819) is less than 5% significance level (p=.000) which means that significant relationship has been observed between the attributes. By looking into the values of standardized coefficients, for every one-unit increase in the independent variable A4 "Taste and flavors" there was 0.152 unit increase in the dependent variable, followed by variable A7 "Ingredient combination", (B=0.131); A15 "Value for money", (B=0.124); A8 "Food items are easy to digest", (B=0.116); A6 "Convenient to consume", (B=0.115); A3 "New and unique", (B=0.11); A14 "Wide variety in menu", (B=0.109); A9 "Food items are healthy and nutritious", (B=0.103); A13 "Food items are economical", (B=0.083); A5 "Food items are safe to consume", (B=0.08); A11 "Meal combination is exciting", (B=0.077); A1 "Food looks & smells good", (B=0.076); A10 "Portion sizes are sufficient", (B=0.069); A12 "Food items have good color combination", (B=0.06) and A2 "Texture", (B=0.048). This showed that all attributes had a positive impact on the acceptability of students towards millets based fast food items. Apart from this, all 15 attributes had a significant p-value ($p < 0.05$), meaning that there is a significant relationship between these attributes and acceptability of students towards millets based fast food items. Thus *the results of the multiple linear regression analysis implied that our null hypothesis* ***$H_0 2$*** *was rejected meaning that the millets based fast food items, based on their food experiences were acceptable to the students.*

Conclusion

The study aimed to determine the impact of attributes of millet-based fast food items on creating memorable food experiences for students and to assess the acceptability of students towards these millet-based food items. Two null hypotheses were framed, and the results provide valuable insights. The first hypothesis ($H_0 1$) explored the impact of millet-based fast food attributes on creating memorable food experiences for students. The analysis revealed a significant relationship between the attributes of these food items and the memorable food experiences of students. The majority of the 15 attributes studied, such as taste, ingredient combination, convenience, healthiness, and variety in the menu, were found to have a positive impact on creating memorable food experiences. This

indicated that millet-based fast food items do indeed contribute to creating memorable culinary experiences for students. The second hypothesis ($H_0$2) investigated the acceptability of millet-based fast food items among students based on their food experiences. The results indicated a strong relationship between the attributes of these food items and the acceptability of students. All 15 attributes were found to have a positive impact on the acceptability of millet-based fast food items, with attributes like taste, ingredient combination, value for money, and ease of digestion being particularly influential. This suggests that millet-based fast food items are not only acceptable but also preferred by students.

Overall, the findings of this study highlight the potential of millet-based fast food items to create memorable food experiences and gain acceptance among students. As India promotes millets as a "crop of the future," these results provide valuable insights for both food manufacturers and policymakers looking to boost the production, consumption, and exports of millet-based products. The study contributes to the broader goals of promoting healthier and sustainable food choices, aligning with the objectives of the 'International Year of Millets.'

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