



DETERMINANTS OF HOUSEHOLD CHOICE BETWEEN FRESH AND PROCESSED CITRUS FRUITS IN ABEOKUTA SOUTH LOCAL GOVERNMENT AREA, OGUN STATE, NIGERIA

Samuel, H. F., Tolorunju, E. T., Awolope, T. M., Kedo, O. G.

Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta, Ogun State, Nigeria.

Corresponding Author's Email: samuelhope014@gmail.com, **GSM:** +2347084742870.

ABSTRACT

The study investigated the determinants of household choices between fresh and processed citrus fruits in Abeokuta South Local Government Area, Ogun State, Nigeria. A two-stage sampling technique was used to select 150 respondents, and data were collected using a structured questionnaire. Descriptive statistics and inferential statistics such as binary logistic regression was used to analyse the collected data. Result showed that 55.33% of respondents were female, with a mean age of 33 years; 60.67% were unmarried, the average household size was 5, the mean years of education was 15, and 36% earned above 130,000 Naira. The most consumed fresh citrus fruits were orange (99.33%) and tangerine (82.67%), while the most consumed processed citrus products were packaged orange juice (83.33%) and citrus flavoured drinks (72.67%). Likert scale showed that households were more aware of citrus ability to prevent constipation (mean = 4.14), followed by being a rich source of vitamin C (mean = 3.99). Binary logistic regression indicated that household size (OR = 2.238, $p = 0.075$), education (OR = 0.601, $p = 0.076$), expenditure on processed citrus (OR = 1.008, $p = 0.003$), and family background habits (OR = 0.339, $p = 0.049$) were significant determinants of household choices between fresh and processed citrus fruits. The study concludes that household choices between fresh and processed citrus fruits are mainly determined by socio-economic factors, especially household size and expenditure. Based on these findings, the study recommends promoting nutritional education and encouraging affordable consumption of citrus products to support healthier household choices.

Keywords: Citrus, Fruits, Fresh, Processed, Household, Choices.

INTRODUCTION

Fruits are edible, seed-associated, fleshy products of plants that vary in taste, color, and texture, such as oranges, apples, and strawberries (Fadeiye *et al.*, 2019; Iqbal *et al.*, 2022). They were among the first foods consumed by humans (Khan *et al.*, 2021). Fruits are rich sources of nutrient and non-nutrient bioactive compounds (Kaparapu *et al.*, 2020; Mazzoni *et al.*, 2023) such as vitamins, minerals, phytochemicals, and fiber, which are vital in supporting the immune system, preventing nutrient deficiencies, and associated with reducing the risk of chronic and non-communicable diseases (Dada & Ebikeme, 2021; Turc *et al.*, 2024). Citrus (genus *Citrus* L.) is a common collective term for a set of closely related shrubs and evergreen trees within the Rutaceae family (Ajisola *et al.*, 2021; Riaz *et al.*, 2022). They are non-climacteric fruits, meaning they do not ripen further after harvest (Richa *et al.*, 2023), and are regarded as one of the most significant fruits globally due to their flavour and rich nutrient content (Saini *et al.*, 2022). Commonly consumed citrus fruits in Nigeria include sweet orange (*Citrus × sinensis*), grapefruit (*Citrus × paradisi*), lemon (*Citrus × limon*), lime (*Citrus × aurantifolia*), and tangerines/mandarins (*Citrus reticulata*). These fruits contain diverse chemical and nutritional compounds, including phytochemicals, vitamins, dietary fats, essential oils, dietary fiber, limonoids, and flavonoids, all of which have beneficial effects on human health (Ahmed & Azmat, 2019; Borghi & Pavanelli, 2023; Dhuique-Mayer & Servent, 2025).

Historically, citrus fruits were primarily sold and consumed in their fresh form (Ben Hsouna *et al.*, 2023), as the health benefits of fresh fruit were widely recognized and cherished (Di Vita *et al.*, 2020). However, processed fruits are gaining significant recognition (Dissanayake *et al.*, 2025), and with the increase in plantation areas and urbanization, the processing of citrus fruit became inevitable as they can be stored for a longer period of time (Suri *et al.*, 2022). Household choices regarding fruit



consumption are influenced by several factors, including demographic, socioeconomic, biological, physical, and physiological characteristics (Wallace *et al.*, 2020; Seidu *et al.*, 2022). Urban areas are particularly affected due to limited access to fresh fruit throughout the year, as well as concerns related to affordability and safety (Odukoya *et al.*, 2022).

Several studies have examined the determinants of fruit consumption (Obayelu *et al.*, 2019; Fadeyiye & Adekanmbi, 2020; Omodara *et al.*, 2022; Ojedokun & Bankole, 2022). However, studies specifically investigating household choices between fresh and processed fruits are limited (Ajisola *et al.*, 2021). Therefore, there is a need for further research to identify the determinants influencing household choices between fresh and processed fruits, with particular focus on citrus. This study specifically seeks to:

- i. describe the socio-economic characteristics of the respondents in Abeokuta South Local Government Area.
- ii. identify the types of fresh and processed citrus fruits consumed by households in the study area.
- iii. assess and rank the level of household awareness of the health benefits of citrus fruits.
- iv. determine the factors influencing household choice between fresh and processed citrus fruits in the study area.

MATERIALS AND METHODS

The Study Area

The location of this study is Abeokuta South Local Government Area (LGA), which is one of the twenty (20) LGAs in Ogun State, located in the southwestern region of Nigeria. It serves as the central urban hub of Abeokuta metropolis, the capital city of Ogun State. The LGA is bordered by Abeokuta North to the north and Obafemi-Owode to the east, with its administrative headquarters located at Ake, Abeokuta, lying approximately at latitude 7°09'00"N and longitude 3°21'00"E.

According to the 2006 National Population Census, Abeokuta South covers an estimated land area of 71 km² and had a population of 250,278, while City-Facts (2015) estimated the population to have increased to 308,206. Based on a 3% annual population growth rate, the population of Abeokuta South Local Government Area is projected to be approximately 451,000 in 2025. The area is largely inhabited by the Egba Ake people, a subgroup of the Egba ethnic group. The Yoruba language is predominantly spoken, and the major religions practiced are Christianity, Islam, and traditional belief systems.

The area hosts several tourist attractions and historical landmarks, including the Olumo Rock Tourist Centre, the National Museum of Abeokuta, the Olusegun Obasanjo Presidential Library (OOPL), and the Alake's Palace — the traditional seat of the Alake of Egbaland. The LGA is also known for its rich cultural heritage and annual traditional festivals such as the Lisabi Festival, Egungun Festival, Oro Festival, Olumo Festival, and Ogun Festival.

Administratively, Abeokuta South Local Government Area consists of fifteen (15) political wards, namely: Ake I, Ake II, Erunbe, Ijemo, Ijaye/Idi-Aba, Ibara I, Ibara II, Igbore, Ijeja, Iporo Ake, Itoku, Kenta-Adatan, Oke-Egunya, Saje/Ijeja, and Sodeke.

Although primarily urban and not recognized for large scale agricultural production, Abeokuta South benefits from its proximity to surrounding rural LGAs that supply various agricultural produce, including citrus fruits. As a result, both fresh and processed citrus products are readily available to residents through local markets, supermarkets, and street vendors across the metropolis.

Sampling Technique and Sample Size

A two-stage sampling technique was employed to select respondents for the study in Abeokuta South Local Government Area. In the first stage, ten (10) wards were randomly selected from the fifteen (15) wards in the LGA to ensure broad geographical representation. In the second stage, fifteen (15) households were randomly selected from each chosen ward, resulting in a total sample size of 150 households.

Method of Data Collection

Primary data were collected using a pre-tested and digitalized questionnaire administered to household heads or adult members knowledgeable about household food consumption. Data collected



included respondents' socioeconomic characteristics, household choice of fresh and processed citrus fruits, awareness of the health benefits of citrus, and factors influencing household choices between fresh and processed citrus products.

Method of Data Analysis

The data for this study were analysed using both descriptive and inferential statistics. The descriptive statistics used included frequency distribution, percentages, means, standard deviation, and charts. Likert scale responses on household awareness of the health benefits of citrus fruits were analysed using mean scores and ranked accordingly to assess the level of awareness. The inferential statistic used was binary logistic regression.

Binary Logistic Regression

Logistic regression is a statistical technique used to model the relationship between a dichotomous dependent variable and one or more independent variables (Rusliyadi *et al.*, 2022; Banerjee *et al.*, 2024). In this study, the dependent variable was dichotomised and coded as 1 for those who chooses processed citrus and 0 for those who chooses fresh citrus fruits.

The model is expressed in its logit form as:

$$\text{Logit}(P) = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \dots (1)$$

Where:

- P = Probability of choosing processed citrus fruit
- $1 - P$ = Probability of choosing fresh citrus fruit
- β_0 : Constant term.
- $\beta_1 \dots \beta_k$: Coefficients of the independent variables.
- X_1 : Age (years)
- X_2 : Household size (number of persons)
- X_3 : Education (number of years)
- X_4 : Expenditure on Processed (₦/month)
- X_5 : Health benefit Awareness (agree = 1, otherwise = 0)
- X_6 : Accessibility (agree = 1; otherwise = 0)
- X_7 : Affordability (agree = 1; otherwise = 0)
- X_8 : Family background habit (agree = 1, otherwise = 0).

The coefficients were interpreted using odds ratios (ORs), indicating the likelihood of a household choosing processed citrus fruits given changes in the independent variables.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Respondents

The socio-economic characteristics of the respondents are presented in Table 1. The results show that 55.33% of the respondents were female, while 44.67% were male. This may be attributed to the active role women play in household food choice and purchasing decisions. This aligns with Omodara (2022), who reported that a higher representation of females in households reflects their dominant role in food-related decision-making and better engagement in fruit consumption practices compared to their male counterparts. The age distribution indicates that the majority (54.67%) of respondents were aged 30 years and below, with a mean age of 33 years, while 60.67% were unmarried. This suggests that most respondents are within their economically active age group, which may influence their consumption patterns and choices. This finding is consistent with Omodara (2022). In terms of household size, the majority (72.67%) of respondents had between 4 and 6 household members, with an average household size of 5 persons. This suggests that most households have a moderate family size, which may influence food consumption decisions and quantity demanded. This is in line with the findings of Omodara (2022). Additionally, the results reveal that the majority of respondents were Christians, accounting for about four-fifths of the sample. This is similar to the findings of Olatona *et al.* (2018), who reported a high proportion of Christians in the study population. The mean years of



education was 15, indicating a relatively high level of educational attainment among respondents. This suggests a greater likelihood of awareness and the ability to receive information and make informed decisions regarding food choices and nutrition. This agrees with Olatona *et al.* (2019) and Omodara (2022), who noted that households with higher levels of education are more receptive to information on fruit consumption. Ajisola *et al.* (2021) further supported this, stating that higher educational attainment enhances dietary knowledge and motivation for healthy eating, while lower education levels may negatively affect food choices and purchasing behaviour. Regarding income, 36% of the respondents reported earning above ₦130,000 monthly. This relatively higher income level may enhance households' purchasing power and influence their ability to choose between fresh and processed citrus products. This agrees with Obayelu *et al.* (2022) and Solaja *et al.* (2025), who reported that income is a significant determinant of fruit and vegetable consumption, with higher income leading to increased intake.

Table 1: Distribution of Respondents by their Socio-economic Characteristics (n=150)

Socio-economic Characteristics	Frequency	Percentage	Mean	S.D.
Sex				
Female	83	55.33		
Male	67	44.67		
Age				
<30	82	54.67		
31-40	29	19.33		
41-50	21	14	33	12
51-60	14	9.33		
>60	4	2.67		
Marital status				
Married	59	39.33		
Otherwise	91	60.67		
Household size				
1-3	26	17.33		
4-6	109	72.67	5	1.6
>6	15	10		
Religion				
Christianity	120	80		
Islam	28	18.67		
traditional	2	1.33		
Education				
No formal	1	0.67		
1-6	9	6		
6-12	32	21.33		
13-16	52	34.67	15	3.7
>16	56	37.33		
Income				
<50,000	48	32		
50,000-89,999	25	16.67		
90,000-130,000	23	15.33		
>130,000	54	36		

Source: field survey, 2025

Type of Fresh and Processed Citrus Consumed by Households

The distribution of the types of fresh and processed citrus fruits consumed by households is presented in Figures 1 and 2. As shown in Figure 1, almost all households (99.33%) consume oranges, followed by tangerines (82.67%). This indicates that oranges are the most preferred fresh citrus fruit among respondents, and its high preference may be attributed to their wide availability, ease of access, affordability, and high nutritional value, particularly their vitamin C content, which is widely

recognized. This finding is consistent with Olatona *et al.* (2018), Fadeiye *et al.* (2019), and Ojedokun (2025), who reported that oranges are widely available and frequently consumed. It also agrees with Ajisola *et al.* (2021) and Wang *et al.* (2025), who observed that health-conscious households tend to prefer fresh oranges.

In contrast, Figure 2 shows that packaged orange juice (83.33%) and citrus-flavoured drinks (72.67%) are the most commonly consumed processed citrus products. This suggests that households tend to prefer processed citrus products that are more cost-effective, convenient and readily consumable, aligning with the findings of Olatana *et al.* 2019 and Ajisola *et al.* (2021), who highlighted that availability, convenience, and affordability are key factors influencing the choice of fruit.

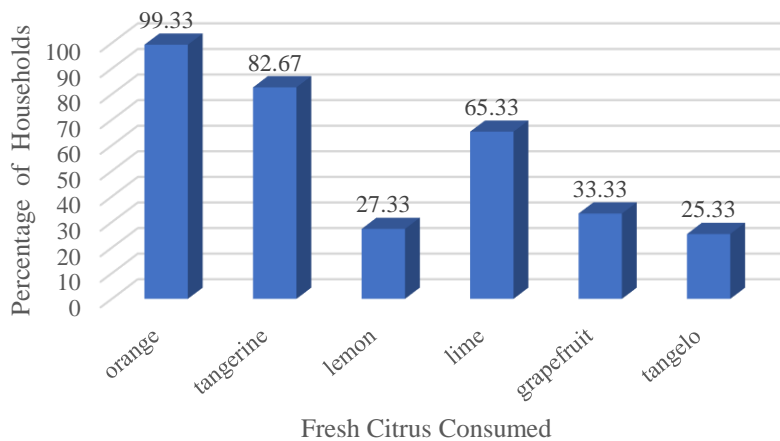


Figure 1: Type of Fresh Citrus (choice is not mutually exclusive)

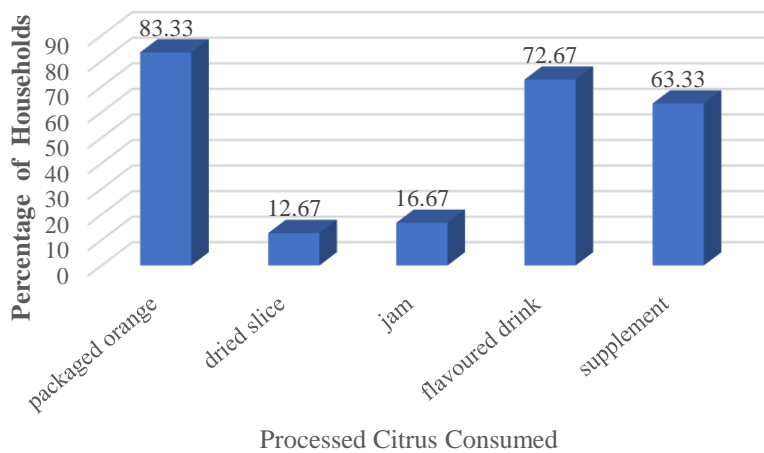


Figure 2: Type of Processed Citrus (choice is not mutually exclusive)

Source: field survey, 2025

Health Benefit Awareness of Citrus

The results on household awareness of the health benefits of citrus fruits are presented in Table 2. Reducing the risk of constipation ranked highest with a mean score of 4.14, followed by being a rich source of vitamin C (mean = 3.99). This suggests that respondents are highly aware of the digestive and immune-boosting benefits of citrus fruits, which may positively influence their consumption patterns. This finding agrees with Omodara (2022), who reported that a high proportion of respondents were aware of the nutritional benefits of fruits, with more than half indicating that dietary awareness increases their consumption. It is also consistent with Fadeiye *et al.* (2019) and Obayelu *et al.* (2022), who found that greater knowledge of the health benefits of fruits enhances their consumption.

Table 2: Distribution of Respondents by their Health Benefit Awareness of Citrus

Health Benefits	Mean	Rank
prevent constipation	4.14	1st
rich source of vitamin c	3.99	2nd
low in calories	3.75	3rd
support heart health	3.63	4th
contains nutrient	3.57	5th
improve skin health	3.45	6th
contain antioxidants	3.01	7th
prevent chronic diseases	2.77	8th
improve mood	2.71	9th
provide essential electrolyte	2.58	10th

Source: field survey, 2025

Determinants of Household Choice of Citrus Fruit

The results of the binary logistic regression analysis are presented in Table 3. Household size (OR = 2.238, $p = 0.075$) significantly increases the likelihood of consuming processed citrus fruits. This finding agrees with Ajisola *et al.* (2021), who reported that the number of dependents has a positive relationship with citrus consumption preferences. Education (OR = 0.601, $p = 0.076$) significantly reduces the likelihood of consuming processed citrus fruits, suggesting that more educated households tend to prefer fresh citrus due to better awareness of nutritional and health benefits. This finding aligns with Khanal *et al.* (2025), who noted that households with higher educational attainment generally have greater access to fresh produce, except in cases where homegrown produce is available. Similarly, Ajisola *et al.* (2021) found that preference for fresh citrus increases with higher levels of education. Expenditure on processed citrus (OR = 1.008, $p = 0.03$) significantly increases the likelihood of consumption, indicating that higher spending on processed citrus products raises the probability of their consumption. Family background habits (OR = 0.339, $p = 0.049$) significantly reduce the likelihood of consuming processed citrus fruits, suggesting that households with established dietary habits may favour fresh citrus consumption over processed alternatives. This finding is supported by Kähkönen *et al.* (2021), who emphasized that parental food preferences play a significant role in shaping long-term dietary behaviour.

Table 3: Determinants of Household Choice of Citrus Fruit

Processed	ORs	p-value	[95% Conf	Interval]	Sig
Age	.952	.49	.828	1.095	
Household size	2.238	.075	.922	5.436	*
Education	.601	.076	.342	1.055	*
Expenditure processed	1.008	.003	1.003	1.013	***
Accessibility	1.158	.88	.174	7.72	
Family background habit	.339	.049	.115	.996	**
Health benefit Awareness	.285	.185	.044	1.826	
Constant	6048.912	.178	.019	1.949e+09	
Mean dependent var	0.920	SD dependent var			0.272
Pseudo r-squared	0.672	Number of obs			150
Chi-square	56.200	Prob > chi2			0.000

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: field survey, 2025

CONCLUSION AND RECOMMENDATIONS

The study revealed that orange and tangerine were the most consumed fresh citrus fruits, while packaged orange juice and flavoured drinks were the most commonly consumed processed citrus products. Most households demonstrated awareness of the health benefits of citrus, particularly its ability to prevent constipation and its richness in vitamin C. The findings also showed that household



size, education, expenditure on processed citrus, and family background habits were significant determinants of household choice between fresh and processed citrus fruits in the study area. The study therefore concludes that household choices between fresh and processed citrus fruits in the study area are determined by socio-economic factors and consumption habits, with higher expenditure and larger household size playing key roles in shaping these choices.

Based on these findings, the following recommendations were made:

- i. Households with larger family sizes should be supported to have easier access to both fresh and processed citrus products, as larger households are more likely to consume processed citrus due to convenience and ease of distribution among members.
- ii. Awareness campaigns and educational programs should be implemented to inform households about the nutritional and health benefits of fresh citrus.
- iii. Policies or interventions that support household expenditure on processed citrus products, such as price incentives or promotional schemes, can encourage consumption when fresh citrus is unavailable.
- iv. Family and community-based nutrition education programs should be promoted to guide household dietary habits, emphasizing the benefits of fresh citrus and encouraging healthier consumption patterns.

REFERENCES

- Abobatta, W. F. (2019). Nutritional benefits of citrus fruits. *American Journal of Biomedical Science & Research*, **3**(4): 303–306. <https://doi.org/10.34297/AJBSR.2019.03.000681>
- Ahmed, W., & Azmat, R. (2019). Citrus: An ancient fruit of promise for health benefits. In *Citrus - Health benefits and production technology*. IntechOpen. <https://doi.org/10.5772/intechopen.79686>
- Ajisola, S., Olajide, O. A., & Agulanna, F. T. (2021). *Assessing consumer perception and preference for fresh or processed citrus fruits: Implications for the sweet orange supply chain in Oyo State, Nigeria. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development*, **21**(3): 69–80.
- Becker, G. S. (1965). A theory of the allocation of time. *The Economic Journal*, **75**(2): 493–517. <https://doi.org/10.2307/2228949>
- Banerjee, D., Kumar, R., Tripathi, S., & Murry, B. (2024). Application of binary logistic regression in biological studies. *Journal of the Practice of Cardiovascular Sciences*, **10**: 48–52. https://doi.org/10.4103/jpcs.jpcs_82_23
- Ben Hsouna, A., Sadaka, C., Generalić Mekinić, I., Garzoli, S., Švarc-Gajić, J., Rodrigues, F., Morais, S., Moreira, M. M., Ferreira, E., Spigno, G., et al. (2023). The chemical variability, nutraceutical value, and food-industry and cosmetic applications of citrus plants: A critical review. *Antioxidants*, **12**(2): 481. <https://doi.org/10.3390/antiox12020481>
- Borghi, S. M., & Pavanelli, W. R. (2023). Antioxidant compounds and health benefits of citrus fruits. *Antioxidants*, **12**(8): 1526. <https://doi.org/10.3390/antiox12081526>
- City-Facts. (2015). *Abeokuta South, Ogun, Nigeria – Population and demographics*. Retrieved February 23, 2026, from <https://www.city-facts.com/abeokuta-south/population> (city-facts.com)
- Dada, I. O., & Ebikeme, A. J. (2021). Association between fruit consumption, nutrition knowledge and sources of nutrition information among university students in Ekiti State, Nigeria. *Ife Journal of Agriculture*, **33**(2): 1–14. <https://ija.oauife.edu.ng/index.php/ija/article/view/607>
- Dhuique-Mayer, C., & Servent, A. (2025). An overview of the nutritional quality and health benefits linked to the world diversity of citrus fruits/juices. *Journal of Food Science*, **90**(1): e17576. <https://doi.org/10.1111/1750-3841.17576>
- Di Vita, G., Borrello, M., Vecchio, R., Gulisano, G., & D'Amico, M. (2020). Purchasing drivers of fresh citrus fruits in urban Italy: Is it all about taste? *Nutrients*, **12**(4): 979. <https://doi.org/10.3390/nu12040979>



- Dissanayake, A. K. A., Udari, U. D. R., & Wijesinghe, I. P. P. M. (2024). Factors influencing urban consumers' choice of processed fruit and vegetables in Sri Lanka. *Colombo Economic Journal*, *2*(2): 71–85
- Fadeiye, E. O., & Adekanmbi, E. T. (2020). *Fruit and vegetable consumption among primary school pupils of Egbeda Local Government Area, Oyo State, Nigeria. International Journal of Family and Consumer Sciences*, *9*: 103–115.
- Fadeiye, E. O., Popoola, B. R., Emuoke, D. K., Adeoye, T. A., & Ogundana, M. T. (2019). Factors influencing fruit consumption among undergraduates in Obafemi Awolowo University, Ile-Ife, Osun State, Nigeria. *Ife Journal of Agriculture*, *31*(2): 80–89.
- Iqbal, R. K. (2022). Health importance of fruits in humans. *Food Science & Nutrition Technology*, *4*(6): 1–7. <https://doi.org/10.23880/fsnt-16000204>
- Kähkönen, K., Sandell, M., Rönkä, A., Hujo, M., & Nuutinen, O. (2021). Children's fruit and vegetable preferences are associated with their mothers' and fathers' preferences. *Foods*, *10*(2): 261. <https://doi.org/10.3390/foods10020261>
- Kaparapu, J., Pragada, P. M., & Geddada, M. N. R. (2020). Fruits and vegetables and its nutritional benefits. In C. Egbuna & G. Dable Tupas (Eds.), *Functional foods and nutraceuticals: Bioactive components, formulations and innovations* (pp. 241–260). Springer, Cham. https://doi.org/10.1007/978-3-030-42319-3_14
- Khan, S., Arya, R., Pooja, Babli, Manju, Pahil, V. S., & Singh, I. (2021). A review paper on fruit nutrition and health benefits. *The Pharma Innovation Journal*, *10*(6): 119–123.
- Khanal, P., Illukpitiya, P., Illukpitiya, B., et al. (2025). Fresh fruit and vegetable choices: Analyzing influential factors in Tennessee households. *Agriculture & Food Security*, *14*: 47. <https://doi.org/10.1186/s40066-025-00568-7>
- Henley, K., Reeder, N., Persell, A., & Tolar-Peterson, T. (2023). Fruit and vegetable liking and intake among college students: A cross-sectional study. *Journal of American College Health*, *71*(6): 1815–1821. <https://doi.org/10.1080/07448481.2021.1947834>
- Le Turc, N., Silva, A. J., Florença, S. G., Raposo, A., Gonçalves, J. C., Lima, M. J., Teixeira-Lemos, E., & Guiné, R. P. F. (2024). Consumer knowledge about dietary relevance of fruits and vegetables: A study involving participants from Portugal and France. *Nutrients*, *16*(2): 287. <https://doi.org/10.3390/nu16020287>
- Mazzoni, L., Capocasa, F., & Ariza Fernández, M. T. (2023). Potential health benefits of fruits and vegetables II. *Applied Sciences*, *13*(14): 8524. <https://doi.org/10.3390/app13148524>
- Obayelu, A. E., Ogunnaike, M. G., & Omotoso, F. K. (2019). Socioeconomic determinants of fruits consumption among students of the Federal University of Agriculture, Abeokuta, Ogun State, Nigeria. *International Journal of Fruit Science*, *19*(2): 211–220. <https://doi.org/10.1080/15538362.2018.1528928>
- Obayelu, A. E., Aminu, R. O., Oyawole, F. P., & Taiwo, O. O. (2022). Determinants of fruits and vegetables consumption among civil servants in Lagos, Nigeria. *FUW Trends in Science & Technology Journal*, *8*(72): 867–871.
- Odukoya, O. O., Odediran, O., Rogers, C. R., Ogunsola, F., & Okuyemi, K. S. (2022). Barriers and facilitators of fruit and vegetable consumption among Nigerian adults in a faith-based setting: A pre-intervention qualitative inquiry. *Asian Pacific Journal of Cancer Prevention*, *23*(5): 1505–1511. <https://doi.org/10.31557/APJCP.2022.23.5.1505>
- Ojedokun, A. O., & Bankole, I. Y. (2025). Factors influencing the stated preference for fruits and vegetables: A case of young adults in Lagos State, Nigeria. *Nigerian Journal of Agriculture and Agricultural Technology*, *5*: 68–81. <https://doi.org/10.59331/njaat.v5i1A.970>
- Olatona, F. A., Sosanya, A., Sholeye, O. O., Obrutu, O. E., & Nnoaham, K. E. (2018). Knowledge of fruits and vegetables, consumption pattern and associated factors among adults in Lagos State, Nigeria. *Research Journal of Health Sciences*, *6*(2): 50–60. 10.4314/rejhs.v6i2.2.
- Omodara, O. D. (2022). Determinants of fruits and vegetables consumption among low-income earning households in Ibadan Metropolis. *Journal of Humanities, Social Science and Creative Arts*, *17*(1): 50–67.



- Riaz, S., Ahmad, A., Farooq, R., Hussain, N., Riaz, T., Hussain, K., & Mazahir, M. (2023). Citrus: An overview of food uses and health benefits. In *Citrus research: Horticultural and human health aspects*. IntechOpen. <https://doi.org/10.5772/intechopen.106420>
- Richa, R., Kohli, D., Vishwakarma, D., Mishra, A., Kabdal, B., Kothakota, A., Richa, S., Sirohi, R., Kumar, R., & Naik, B. (2023). Citrus fruit: Classification, value addition, nutritional and medicinal values, and relation with pandemic and hidden hunger. *Journal of Agriculture and Food Research*, **14**: 100718. <https://doi.org/10.1016/j.jafr.2023.100718>
- Rusliyadi, M., Ardi, Y., & Winarno, K. (2022). Binary logistics regression model to analyze factors influencing technology adoption process: Vegetable farmers case in Central Java, Indonesia. In *Proceedings of the 6th International Conference on Industrial and System Engineering* (pp. 408–417). Atlantis Press. https://doi.org/10.2991/978-94-6463-028-2_48
- Saini, R. K., Ranjit, A., Sharma, K., Prasad, P., Shang, X., Gowda, K. G. M., & Keum, Y.-S. (2022). Bioactive compounds of citrus fruits: A review of composition and health benefits of carotenoids, flavonoids, limonoids, and terpenes. *Antioxidants*, **11**(2): 239. <https://doi.org/10.3390/antiox11020239>
- Seidu, A.-A., Aboagye, R. G., Frimpong, J. B., Iddrisu, H., Agbaglo, E., Budu, E., Hagan, J. E., Jr., & Ahinkorah, B. O. (2021). Determinants of fruits and vegetables consumption among in-school adolescents in Ghana. *Adolescents*, **1**(2): 199–211. <https://doi.org/10.3390/adolescents1020016>
- Solaja, S. O., Bamiro, O. M., Ayeni, M. D., & Mohammed, G. (2025). Fruit and vegetable intake among Nigerian University students: patterns, preferences, and influencing factors. *Open Agriculture*, **10**(1): 20250468. <https://doi.org/10.1515/opag-2025-0468>
- Suri, S., Singh, A., & Nema, P. K. (2022). Current applications of citrus fruit processing waste: A scientific outlook. *Applied Food Research*, **2**(1): 100050. <https://doi.org/10.1016/j.afres.2022.100050>
- Wallace, T. C., Bailey, R. L., Blumberg, J. B., Burton-Freeman, B., Chen, C.-Y. O., Crowe-White, K. M., Drewnowski, A., Hooshmand, S., Johnson, E., Lewis, R., Murray, R., Shapses, S. A., Wang, D. D., & Weaver, C. M. (2020). Fruits, vegetables, and health: A comprehensive narrative, umbrella review of the science and recommendations for enhanced public policy to improve intake. *Critical Reviews in Food Science and Nutrition*, **60**(13): 2174–2211. <https://doi.org/10.1080/10408398.2019.1632258>
- Wang, Y., Liu, L., & Wei, Y. (2025). The Influence of Consumption Purpose on Consumer Preferences for Fruit Attributes: The Moderating Effect of Color Perception. *Foods* (Basel, Switzerland), **14**(11): 1902. <https://doi.org/10.3390/foods14111902>