

## DETERMINANTS OF SOURSOP FRUITS CONSUMPTION AMONG RESIDENTS OF OYO STATE, NIGERIA

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### ABSTRACT

Soursop (*Annona muricata*) is a nutritious fruit, beneficial to all human race but under-consumed due to various factors. Hence, this study investigated the determinants of soursop fruits consumption among residents of Oyo state, Nigeria. A multistage sampling procedure was used to select 241 respondents and an interview schedule to obtain data on respondents' socioeconomic characteristics, purchasing pattern, consumption level and constraints to consumption of the fruit. Data were analysed using percentage, mean, Weighted Score (WS), Pearson Product Moment Correlation and regression analysis. Results show that mean age was 35 years, 52.7% were male, while 26.1% and 55.2% were traders and had tertiary education, respectively and 70.5% earned less than ₦200,000 per month. Majority (78.4%) had never purchased soursop fruits, had low level of consumption (58.5%), while limited promotion and marketing (WS = 176.3), seasonal variability (WS = 170.2) and accessibility issues (WS = 167.6) were severe constraints to consumption of soursop fruits. Significant relationships existed between the respondents' age ( $r = 0.186$ ,  $p = 0.004$ ), monthly income ( $r = -0.186$ ,  $p = 0.004$ ) and consumption of soursop fruits. Residents' age ( $\beta = 0.44$ ;  $p = 0.00$ ) and price of soursop fruits ( $\beta = 0.26$ ;  $p = 0.01$ ) determined their consumption of soursop fruits. It is concluded that despite the accrued benefits in soursop fruits, majority of the residents do not consume the fruits probably because of their age and price of the fruits. Therefore, a campaign on benefits accrued in soursop fruits should be embarked upon with collaborative efforts from stakeholders in agriculture, health practitioners and communication development experts.

**Keywords:** Soursop fruits, consumption level, benefits accrued, residents

### INTRODUCTION

Soursop (*Annona muricata*) is widely recognised for its nutritional and medicinal benefits. It is rich in carbohydrates, vitamins, minerals, and antioxidants, with evidence of diuretic, anticancer, antibacterial, sedative, and anti-inflammatory properties (Abiona & Adegoke, 2021; Odojie & Oluwatoyin, 2022). Its culinary use further adds to its value, as it can be consumed fresh or processed into custards, juices, ice creams, jams, vinegars, and other food products with high consumer acceptability (Muhammad et al., 2022; Ho et al., 2021). Despite its potentials as both a food security crop and a medicinal resource, soursop remains an underutilised fruit in Nigeria where its consumption is still relatively low.

Several challenges like its seasonality and highly perishable nature make it difficult to ensure it is available all year-round in local markets. Also, cultivation challenges exist as soursop trees are sparse bearers, producing only 12–20 fruits per tree, and require specific climatic and soil conditions that limit large-scale farming (Quemems, 2023). According to Nguyen et al. (2019) pre-harvest deterioration is another major issue as soursop fruits are frequently affected by fungal pathogens which lead to nutrient losses and reduced market value. This discourages both farmers and consumers from investing in fruit.

In addition to production and storage challenges, Soursop receives little research attention compared to other tropical fruits, and the available scientific knowledge does not translate into commercialisation and public awareness of the fruit because it remains largely within academic circles

(Akib et al., 2023). The absence of effective policies for sour-sop promotion, coupled with inadequate marketing strategies, has limited the integration of soursop into mainstream agriculture and food industries. Consequently, soursop cultivation in Nigeria remains largely subsistence-based and small-scale, making the fruit scarce and expensive. This price barrier, alongside limited awareness of its nutritional and medicinal benefits, discourages its widespread consumption.

With growing concerns about food security, malnutrition, and the rising burden of non-communicable diseases, fruits like soursop could play an important role in diversifying diets, boosting immunity, and supporting livelihoods. However, the specific factors influencing its consumption remain poorly understood among residents of Oyo State. This knowledge gap limits the ability of policymakers, researchers, and agricultural stakeholders to design interventions that can promote the cultivation and consumption of soursop as a sustainable food and health resource.

Therefore, this study sought to investigate the determinants of soursop fruit consumption among residents of Oyo State. The following specific objectives guided the study:

1. to identify residents' socioeconomic characteristics,
2. to describe the purchasing pattern of soursop fruits among the residents
3. to determine residents' consumption level of soursop
4. to ascertain residents' constraints to consumption of soursop fruits.

The study has the following hypotheses of the study:

- H<sub>0</sub>1: There is no significant relationship between selected socioeconomic characteristics of the respondents and their consumption of soursop fruits.
- H<sub>0</sub>2: There is no significant contribution of selected socioeconomic characteristics of the respondents to the consumption of soursop fruits.

## METHODOLOGY

This study was carried out in Oyo State. Oyo State is a state in the southwestern region of Nigeria and has Ibadan as its capital. It is bordered by Kwara State to the North, Osun State to the East, Ogun State to the South and the Republic of Benin to the West. The state's geographical diversity ranges from rolling hills and plains to the lush forests of the Oke-Ogun region.

A multi-stage sampling procedure was used to sample 241 respondents in the study area. The respondents were selected using their local area zones.

The first stage involved the selection of 3 zones; Ibadan, Ogbomoso and Oyo (Zone I, III and IV) from the five local area zones in the state using a purposive sampling technique. This purposive selection was due to the fact that the 3 selected zones have many urban LGAs within them and the study assumed that urban residents are likely to have knowledge of soursop benefits and are likely to consume fruits more compared with other residents from the state. In the second stage a selection of 10% of LGAs from zone I (Ibadan) and 30% of LGAs were selected from the other two zones using simple random sampling techniques. Therefore, 1 LGA each was selected from Zone I – (Ibadan Areas), Zone III (Ogbomoso Areas), and Zone IV (Oyo Areas). In all, 3 LGAs were selected. Then, in the third stage, one major community each was selected from the selected 3 Local Government Areas using a purposive sampling technique. The selection was based on the fact that these communities again are from urban center areas. Therefore, University of Ibadan/ Abadina community was selected to represent zone I (Ibadan area), Apake community to represent zone III (Ogbomoso) and Alagbon community for zone IV (Oyo area). The fourth and the last stage involved the use of a systematic sampling technique to select 84 households from University of Ibadan/ Abadina community, 88 from Apake community and 69 from Alagbon community. This was determined by Yamane's formula for sample size. Hence, a total of 241 residents from the selected households.

Level of consumption of soursop was measured by asking the residents to respond to a 12 item statements in order to indicate the frequency at which they consume soursop. The response options were "More like me"; "Like me"; "Undecided" and "Never like me". These response options were assigned scores 4, 3, 2, and 1 respectively. The maximum obtained score was 48 while the minimum was 0. Thereafter, The mean score ( $24.90 \pm 12.48$ ) was used as the benchmark to group respondents into two. The group of respondents that fell within mean score (24.90) and above were categorised as high level of consumption and those group that fell below the mean score were categorised as low level of consumption. In the same vein, constraints to consumption of soursop fruits were measured by asking the respondents to indicate the severity of constraints they encountered from a list of 12 constraints provided. The response options were "Severe constraint"; "Mild constraint" and "Not a constraint". The options were assigned scores of 2, 1 and 0 respectively. The maximum obtained score was 24 and 0 was the minimum. Then, scores for each response options were converted to weighted scores. Thereafter, the mean score ( $17.67 \pm 5.64$ ) was used to group respondents into having a low and high level of constraint. Respondents with scores below the mean score (17.67) were categorised as having low level of constraint and those with mean score (17.67) and above had high level of constraints.

Frequency counts, percentage, mean, Weighted Score (WS), Pearson Product Moment Correlation and regression analysis were used to analyse.

## RESULTS AND DISCUSSION

### Socioeconomic characteristics

Results in Table 1 show that majority (52.7%) of the respondents were male with mean age of 36 years, 55.2% had tertiary education, while 56.8% were married. This implies that more than half of the respondents are male, young adult according to Akhmet (2017), married and literates. A higher number of respondents being married could have a negative effect on consumption of soursop because married people have more mouth to feed. They would thereby prefer to spend on other major food items while either intentionally or unintentionally neglecting to purchase soursop. Also, 70.5% of the respondents earned less than ₦200,000 per month, while a few of them were traders (26.1%) and students (24.9%). This corroborates the findings of Adesina (2018) that a large percentage of the people in Ibadan metropolis are self-employed (traders and artisans).

**Table 1: Distribution of respondents based on socioeconomic characteristics (n=241)**

| Variables                 | Options              | Frequency | Percentage | Mean       |
|---------------------------|----------------------|-----------|------------|------------|
| Sex                       | Male                 | 127       | 52.7       |            |
|                           | Female               | 114       | 47.3       |            |
| Age                       | < 30 years           | 118       | 49.0       | 35.93      |
|                           | 31-45 years          | 71        | 29.5       |            |
|                           | 46-60 years          | 43        | 17.8       |            |
|                           | > 61 years           | 9         | 3.7        |            |
| Educational qualification | No formal education  | 6         | 2.5        |            |
|                           | Vocational education | 6         | 2.5        |            |
|                           | Primary education    | 18        | 7.5        |            |
|                           | Secondary education  | 78        | 32.4       |            |
| Occupation                | Tertiary             | 133       | 55.2       |            |
|                           | Student              | 60        | 24.9       |            |
|                           | Trader               | 63        | 26.1       |            |
|                           | Artisan              | 44        | 18.3       |            |
|                           | Civil servant        | 39        | 16.2       |            |
| Marital status            | Private worker       | 35        | 14.5       |            |
|                           | Single               | 99        | 41.1       |            |
|                           | Separated            | 2         | 0.8        |            |
|                           | Married              | 137       | 56.8       |            |
| Income                    | Divorced             | 3         | 1.2        |            |
|                           | < 200,000            | 170       | 70.5       | 289,858.92 |
|                           | 200,001 - 400,000    | 29        | 12.0       |            |
|                           | 400,001 - 600,000    | 19        | 7.9        |            |
|                           | 600,001 - 800,000    | 2         | 0.8        |            |
| > 800,001                 | 21                   | 8.7       |            |            |

Source: Field survey, 2024

**Purchasing pattern of soursop fruits**

The results on Table 2 reveal that the majority (78.4%) of the respondents had never purchased soursop, among those that purchased 14.1% bought it at the rate between ₦500 and ₦1,100 per fruit, while 12.9% agreed that the fruits were not affordable. This implies that many residents do not

consume soursop fruits while those that consumed the fruit felt it is not affordable, hence might not be considered worthy consumption on a daily basis. This is contrary to the findings of Del Carmen, Esguerra, and Gerance (2020) that soursop is purchased due to its affordable price.

**Table 2: Distribution of respondents based on purchasing pattern of soursop (n=241)**

| Variables  | Options                   | Frequency | Percentage |
|--|---------------------------|-----------|------------|
| How often do you purchase soursop?                       | Never                     | 189       | 78.4       |
|  | Annually (rarely)         | 21        | 8.7        |
|  | Monthly (less frequently) | 17        | 7.1        |
|  | Weekly (frequently)       | 11        | 4.6        |
|  | Daily (always)            | 3         | 1.2        |
| How much do you purchase sour-sop in Naira per one fruit | None                      | 197       | 81.7       |
|  | 500 - 1,100               | 34        | 14.1       |
|  | 1,101 - 1,700             | 2         | 0.8        |
|  | 1,701 - 2,300             | 2         | 0.8        |
|  | > 2,301                   | 2         | 0.8        |
| Extent of affordability of soursop                       | Not applicable            | 16        | 67.6       |
|  | Not affordable            | 31        | 12.9       |
|  | Least affordable          | 23        | 9.5        |
|  | Affordable                | 17        | 7.1        |
|  | Very affordable           | 7         | 2.9        |

Source: Field survey, 2024

**Level of consumption of soursop**

Results on Table 3 reveal that almost half (49.8%) of the respondents claimed that they had never consumed soursop fruits, did not include soursop in their diet (59.3%), never bought soursop fruits for personal consumption in the past six months (74.3%), nor purchased soursop products, such as juices or supplements (75.9%). This means that majority of the residents have never consume soursop fruits and its products. This confirms the *a priori* expectation that soursop fruits are under-consumed fruits. Considering the high level of literacy of the respondents, one would have expected that they would have acquired knowledge about the numerous benefits in consuming the fruits and therefore take it as part of their diet. This aligns with Abiona & Adegoke, (2021) that soursop is one of the underutilised varieties of wild fruits in Nigeria despite its abundance.

However, among the few that consumed soursop, 18.3% indicated that they recommended soursop to others for its health benefits, 9.1% considered soursop as a part of their overall health and wellness routine, while 7.1% also involved in the cultivation of soursop for easy and regular consumption. This implies that, respondents that consumed soursop suggest that if regularly consumed, soursop is truly a beneficial fruits and can improve one’s health on a long term.

Table 3 also shows that more than half (58.5%) of the respondents had a low level of consumption of soursop. This supports Afzaal et al. (2022) that despite its significant nutritional profile and therapeutic potential, which can be utilized for developing nutraceuticals and medicines, the fruit is still underutilised.

**Table 3: Distribution of respondents based on their consumption of sour-sop (n=241)**

| Statements   | MLM (%)          | LM (%)   | U (%)             | NLM (%)           |                |
|--|------------------|----------|-------------------|-------------------|----------------|
| I have never consumed soursop.   | 49.8             | 5.4      | 2.5               | 42.4              |                |
| I do not consume soursop because too much of it is detrimental to my health.                   | 31.5             | 0.0      | 3.3               | 65.1              |                |
| I have bought soursop for personal consumption in the past six months.                         | 2.9              | 10.0     | 2.9               | 84.3              |                |
| I include soursop in my regular diet.  | 4.6              | 19.5     | 5.4               | 70.5              |                |
| I actively seek information about the nutritional benefits of soursop.                         | 5.4              | 19.1     | 8.3               | 67.3              |                |
| I have used soursop in preparing meals or beverages at home.                                   | 2.1              | 14.1     | 7.5               | 76.4              |                |
| I consider soursop as a part of my overall health and wellness routine.                        | 9.1              | 21.6     | 6.6               | 62.7              |                |
| I have recommended soursop to others for its health benefits.                                  | 18.3             | 11.6     | 6.6               | 63.5              |                |
| I consume soursop products, such as juices or supplements.                                     | 2.5              | 6.2      | 3.3               | 87.9              |                |
| I am involved in the cultivation of soursop for easy and regular consumption.                  | 7.1              | 8.7      | 2.9               | 81.3              |                |
| I actively participate in community initiatives promoting soursop consumption and cultivation. | 3.3              | 12.0     | 5.8               | 78.8              |                |
| Soursop consumption is a regular part of cultural or traditional practices in my community.    | 7.1              | 7.1      | 9.5               | 76.3              |                |
| <b>Level of consumption</b>  | <b>Frequency</b> | <b>%</b> | <b>Min. value</b> | <b>Max. value</b> | <b>Mean±SD</b> |
| Low level (12.0-24.0)  | 141.0            | 58.5     | 12.00             | 57.00             | 24.90±12.48    |
| High level (25.0-57.0)   | 100.0            | 41.5     |                   |                   |                |

Source: Field survey, 2024

**Constraints affecting respondents’ consumption of sour-sop**

Result in Table 4 reveals that limited promotion and marketing (WS = 176.3), seasonal variability (WS = 170.2), accessibility issues (WS = 167.6), limited awareness (WS=166.4), and limited culinary knowledge about the use of soursop (WS=161.4) were the major constraints to the consumption of soursop as they ranked 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup>,

respectively. This means that respondents would consume soursop if there is unlimited promotion on soursop and, if they could get and have access to the fruit all season. This aligns with Mohan *et al* (2023) that major challenges faced by sour-sop growers, producers and consumers is the limited promotion and marketing efforts, which has severely constrained the commercialisation and consumption of the fruit and its products. This result also supports

Araújo *et al* (2021), who found that majority are constrained due to lack of proper storage facilities, limited knowledge about value-addition and inadequate promotion and marketing efforts.

Table 4 still reveals that majority (64.7%) were highly constrained in the consumption of soursop. This implies constraints are severe and enormous. This could be one of the reasons for their low level of consumption of soursop.

**Table 4: Distribution of respondents based on the constraints affecting their consumption of sour-sop (n=241)**

| Constraint items                | Major constraint | Lesser constraint | Not a constraint  | Weighted score |
|---------------------------------|------------------|-------------------|-------------------|----------------|
| Limited promotion and marketing | 84.2             | 7.9               | 7.9               | 176.3          |
| Seasonal variability            | 80.1             | 10.0              | 10.0              | 170.2          |
| Accessibility issues            | 78.0             | 11.6              | 10.4              | 167.6          |
| Limited awareness               | 77.2             | 12.0              | 10.8              | 166.4          |
| Competing preferences           | 75.1             | 12.4              | 12.4              | 162.6          |
| Limited culinary knowledge      | 74.7             | 12.0              | 13.3              | 161.4          |
| Environmental concerns          | 73.9             | 11.6              | 14.5              | 159.4          |
| Health and safety regulations   | 73.4             | 12.0              | 14.5              | 158.8          |
| Infrastructure challenges       | 72.6             | 12.0              | 15.4              | 157.2          |
| Perceived health risks          | 55.6             | 10.4              | 34.0              | 121.6          |
| Cost and affordability          | 49.8             | 12.9              | 37.3              | 112.5          |
| Cultural beliefs and practices  | 19.9             | 13.7              | 66.4              | 53.5           |
| <b>Constraint category</b>      | <b>%</b>         | <b>Min. value</b> | <b>Max. value</b> | <b>Mean±SD</b> |
| Low (0.0-17.0)                  | 35.3             | 0.00              | 24.00             | 17.67±5.64     |
| High (18.0-24.0)                | 64.7             |                   |                   |                |

Source: Field survey, 2024 (%= Percentage, Min. = Minimum and Max. = Maximum)

**Relationship between selected socioeconomic characteristics and consumption of soursop**

Table 5 shows that there was significant relationship between respondents’ sex ( $\chi^2 = 1.47$ ,  $p = 0.03$ ), age ( $r = 0.186$ ,  $p = 0.004$ ), monthly income ( $r = -0.186$ ,  $p = 0.004$ ) and consumption of soursop fruit. The implication is that respondents’ gender, age and monthly income are related to consumption of soursop.

Gender relationship corroborates the findings of Lemos *et al* (2020) that men used the fruits due to their involvement in agricultural activities and management of fruit trees, including sour-sop. Also,

the inverse relationship that is observed between respondents’ monthly income and consumption of soursop indicates that respondents with higher monthly income tend to consume less soursop and vice versa. That is, low-income earners tend to consume soursop more. This supports the findings of Ramkissoon and Ali (2018) that the utilisation of soursop decreases with increase in the income of the respondents. This could be attributed to the fact that high-income earners have more access to exotic fruits and may therefore not depend on soursop as a major source of fruit consumption.

**Table 5: Chi-square and PPMC analysis showing relationship between selected socioeconomic characteristics and consumption of sour-sop (n=241)**

| Variables               | $\chi^2$ values | df | p-value        |
|-------------------------|-----------------|----|----------------|
| Sex                     | 1.47            | 1  | 0.030          |
| Education qualification | 3.35            | 4  | 0.714          |
| Occupation              | 2.69            | 4  | 0.098          |
| Religion                | 1.58            | 2  | 0.108          |
| Marital status          | 2.18            | 3  | 0.213          |
| <b>Variables</b>        | <b>r-value</b>  |    | <b>p-value</b> |
| Age                     | 0.186           | -  | 0.004          |
| Monthly income          | -0.186          | -  | 0.004          |

Source: Field survey, 2024

**Determinants of soursop fruits consumption**

From the results in Table 6, residents’ age ( $\beta = 0.44$ ;  $p=0.00$ ) and price of soursop fruits ( $\beta = 0.26$ ;  $p=0.01$ ) were found to major determinants of the consumption of soursop fruits. This implies that

residents’ age and price of soursop fruits contributed and influenced to their consumption of soursop fruits. Age contributes 40% of the variation in the rate or likelihood of respondents’ consumption of soursop, while price of the fruits accounted for 26%

of the variation. This is against the prior expectation, as one would expect that price of soursop should be the major determinant of consuming it. As it were,

higher contribution of age percentage could be attributed to them intending to take their health seriously as they age.

**Table 6: Determinants of soursop fruits consumption**

| Variables                      | Beta value | t-value | P-value |
|--------------------------------|------------|---------|---------|
| (Constant)                     |            | 4.761   | 0.000   |
| Age                            | 0.440      | 4.452   | 0.000   |
| Monthly income                 | -0.053     | -0.547  | 0.586   |
| Price of sour-sop              | 0.255      | 2.583   | 0.012   |
| Index of constraint of soursop | -0.147     | -1.539  | 0.128   |

R= 0.569, R<sup>2</sup>= 0.324, Adjusted R<sup>2</sup>= 0.288, S.E = 10.3

### CONCLUSION AND RECOMMENDATIONS

This study concludes that despite respondents' high level of literacy coupled with several accrued benefits in consumption of soursop fruits, majority of the residents do not consume the fruits. This is probably hindered by limited promotion or marketing, seasonal variability nature of the fruit, easy accessibility issues and limited awareness about the fruit as implicated in the results of the constraints to consumption of soursop. Residents' age and price of the fruits influenced their level of consumption of soursop. Therefore, a campaign on numerous benefits accrued in soursop fruits should be embarked upon by all stakeholders. To achieve this, a collaborative effort from agriculture stakeholders, health practitioners and communication development experts is highly recommended.

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