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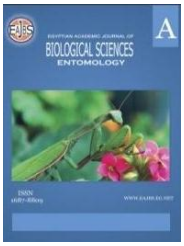

The Influence of Cultural and Socio-Economic Factors on The Acceptability of Grasshoppers, *Ruspolia differens* (Orthoptera: Tettigoniidae) by Western Ugandan Consumers

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ABSTRACT

Grasshoppers are increasingly regarded as a sustainable and healthier protein source, but their value addition and consumption for food security remain underexplored. This research examined cultural and socio-economic factors influencing grasshopper consumption in Western Uganda. A cross-sectional design sampled 384 participants, including community members, agricultural officers, and nutritionists, using closed-ended questionnaires. Data were analyzed quantitatively, employing Principal Factor Analysis and Regression.

Findings revealed that income, education, household size, and grasshopper availability significantly influence consumer acceptance. Consumers perceiving grasshoppers as disease carriers had a 4.5% probability of acceptance, while health biases led to a 59.4% likelihood of rejection. Conversely, cultural and traditional perceptions increased the probability of acceptance to 84.3%. Overall, consumer behavior emerged as the strongest determinant of grasshopper acceptance, with a perfect probability of 1. Socio-cultural perceptions ranked second at 0.843, while health-related biases negatively impacted acceptance at -0.594.

The study recommends commercializing the grasshopper value chain and educating consumers on its nutritional and environmental benefits. Further research should explore alternative methodologies to Principal Factor Analysis and Regression, as well as longitudinal correlations between study variables.

INTRODUCTION

Grasshoppers constitute 13% consumption of the total population of insects worldwide (Ekpo, 2021). Also, grasshoppers are receiving substantial attention because of their potential as a significant future food source of high nutritional value and vital environmental benefits (Ssepuuya *et al.*, 2019). However, they are unconventional resources of edible food with high cultural, economic, and social benefits. They are caught with hands, trapped in cages, or removed from the grass. They emerge in large quantities during the first rains of the rainy season and are usually dried under sunlight or fried on a hot stove (Biryomumaisho, 2022).

Grasshoppers are being promoted in Uganda as an alternative source of proteins

to meat, but research on its prospects and acceptance by households has been rare and sporadic (Kelemu *et al.*, 2017). Still, the food poverty rate stands at 42 percent in most regions of Uganda. The regional residents mainly depend on milk and eggs for animal-based protein supply (Biryomumaisho, 2022). Still, these sources are insufficient, unsustainable, and expensive for the unemployed poor locals who are the majority in western Uganda. These reasons have made access to sufficient and sustainable animal-based proteins by most households difficult leading to food shortages and malnutrition (FAO, 2020). Resorting and promoting the use of grasshoppers as an animal-based protein source is a potentially sustainable solution (Biryomumaisho, 2022).

However, scientists have now obstacles to promote the use of grasshoppers as food products. The information on the consumers' attitude/perception of it, the factors influencing its acceptance, and the quantity consumed are scanty (Ekpo, 2021). It is uncertain whether these grasshoppers are eaten because of their nutritional qualities. Some households consider the consumption of grasshoppers as a taboo. Most of the studies on insect-based foods largely focus on the nutritional aspects and the potential benefits of entomophagy (Ssepuuya *et al.*, 2019).

To address the challenges associated with grasshopper consumption, it is imperative to implement food safety measures, introducing hygiene practices and technologies during processing and vending to mitigate the risk of microbial contamination and ensure adherence to food safety standards (Sengendo *et al.*, 2021). The underlying theme of these studies is that consumers are rational and therefore, should accept grasshopper-based on the implied benefits. Despite many benefits of entomophagy, consumer acceptance remains a major barrier to the adoption of diets based on grasshoppers in Western Uganda (*Sengendo et al. 2021*). The limited information regarding consumer acceptance could pose a big challenge to such novel dietary interventions. There is no doubt that the world has to provide food for its inhabitants, but how to meet the increasing demand in the future remains an open and critical question. Therefore, this research filled the gap of knowledge on the influence of cultural and socio-economic factors on the acceptability of grasshoppers by Western Ugandan consumers.

The Problem Statement: Several communities across Uganda are among two billion people globally who consume grasshoppers as an alternative food source (*Sengendo et al. 2021*). Ideally, the consumption of grasshoppers directly contributes to food security; in that they reproduce quickly, have high feed conversion and growth rates, and are nutritious with high fat, protein, and several mineral contents (FAO, 2020). Therefore, the harvesting of grasshoppers offer significant livelihood diversification measures as far as food security and supplements are concerned. Despite the above-recognized importance of grasshoppers, the integration of them (grasshoppers) into the mainstream food system in Uganda especially Western region has continued to experience several barriers (Biryomumaisho, 2022; Sengendo *et al.*, 2021). These mainly include a lack of awareness, cultural acceptance, and lack of appropriate technology for processing and storage, as well as limited market infrastructures. Conversely, the potential of grasshoppers as an alternative and sustainable food source and economic opportunity remains largely untapped across the region (Sengendo *et al.* 2021). It is clearly recognized and reported that the majority of individuals in the Western part of Uganda either consume little or none of the grasshoppers (Biryomumaisho, 2022). While value-added grasshoppers may also command higher pay (prices), this may eventually limit their accessibility to certain cultural and socio-economic groups. In communities where there levels of income tend to be low, cases of high prices may eventually deter consumption, thus leading to a decline in consumption rates (Biryomumaisho, 2022). Consequently, empirical studies into the current study in particular remain scanty. Therefore, this approach shall not only contribute to the existing body of

knowledge but also offer actionable strategies for enhancing consumer acceptance of grasshoppers in similar regional contexts.

MATERIALS AND METHODS

The study used a cross-sectional survey design. It also employs descriptive statistics, majorly Principal Factor Analysis due to the need to make inferences about possible relationships between variables. The study used a quantitative approach.The target population included; community members, district agricultural officers, and nutritionists, all equivalent to 384 respondents. Simple random sampling was used in the selection of respondents. Questionnaires were used in gathering primary data, which was analyzed quantitatively.

RESULTS

1-The Socio-Economic Factors That Influence Consumer Acceptance of Grasshoppers:

The variables were rated with the extent of agreement or disagreements i.e. strongly agree to strongly disagree, and this was further explained with the help of Principal Factor Analysis. Findings from 384 participants are indicated in Table 1:

Table 1 represents the descriptive statistics on the socio-economic factors that influence consumer acceptance of grasshoppers in Western Uganda. The results show that 98.9% of the respondents accepted to the statements that the income of the consumers is a major technological, cultural, and market-oriented factor that influences consumer acceptance of grasshoppers (Mean=3.67 and standard deviation 1.142); followed by the availability of grasshoppers revealed by 95.8% of the respondents (Mean=4.45 and standard deviation 0.890); education of the consumers revealed by 88.5% of the respondents (Mean=4.33 and standard deviation 0.872); household size of the consumers revealed by 83.5% of the respondents (Mean=4.41 and standard deviation 0.805); and lastly, potential allergic reactions and its side effects revealed by 82.3% of the respondents (Mean=3.94 and standard deviation 1.129).

2- Descriptive Results of Principal Factor Analysis:

An exploratory factor analysis was run by the researcher to find out the factors that influence consumer acceptance of grasshoppers in Western Uganda. The principal factor analysis resulted in four-factor loadings which the researcher coded as insect disease perception, consumer health perception, socio-economic factors, and consumer behavior as shown in the table below.

Table 2, shows that consumers had insect disease attachments to their reasons for non-acceptance of consuming grasshoppers. This included customers who attached consumption of grasshoppers to experiencing anti-nutrients (74.5%), those with the perception that the grasshoppers contributed to the transmission of parasitic foodborne diseases (62.6%), the transmission of parasitoids to humans (52.7%), risk of pesticide food poisoning (48.9%) and the perception that grasshoppers were food contaminants (45.2%).

Additionally, there were customers with health perceptions such as allergic reactions arising from consuming grasshoppers (70.1%), eating heavy metals (50.3%), and the non-nutritional content of grasshoppers (49.5%).

Furthermore, the table showed that societal perception contributed to whether or not consumers would buy grasshoppers, for instance, perception, attitude of the customers and individuals' culture (88.9%), and education of the consumers about the grasshoppers (54.3%).

Finally, there were socio-economic factors which involved the cost of the

grasshoppers (69.9%), proximity of the market for grasshoppers (67.1%), taste of the grasshoppers (65.6%), income of the consumer (55.3%), size of the consumers' households (53.8%) and availability of the grasshoppers (52.5%). The availability of grasshoppers for consumption tends to change consumer behavior to buy them.

To determine the acceptance of the grasshoppers by consumers in Western Uganda, the study adopted the 4 factor loadings, that is, consumers' disease attachment to insects, consumers' health perceptions, consumers' societal perceptions, and socio-economic factors. This was incorporated in the logistic regression as presented in Table 3.

Table 1: The socio-economic factors that influence consumer acceptance of grasshopper**.**

Statement	Extent of (dis)agreement					Mean	Std. Dev
	SA	A	NS	DA	SDA		
	F (%)	*F (%)*	*F (%)*	*F (%)*	*F (%)*		
The income of the consumers	302 (78.6)	78 (20.3)	4 (1.1)	- (0)	- (0)	3.67	1.142
Availability of grasshoppers	286 (74.5)	82 (21.3)	16 (4.2)	- (0)	- (0)	4.45	.890
Education levels of the consumers	260 (67.7)	80 (20.8)	40 (10.4)	4 (1.1)	- (0)	4.33	.872
Household size of the consumers	252 (65.6)	69 (17.9)	50 (13.1)	13 (3.4)	- (0)	4.41	.805
Potential allergic reactions and its side effects	254 (66.1)	62 (16.2)	51 (13.3)	17 (4.4)	- (0)	3.94	1.129
Cost of the product (price)	242 (63.1)	56 (14.6)	54 (14)	32 (8.3)	- (0)	4.63	.615
Grasshoppers consumption contributes eating of heavy metals that cause adverse health effects	228 (59.4)	48 (12.5)	55 (14.3)	53 (13.8)	- (0)	4.42	.592
Nutritional content of grasshoppers	213 (55.5)	50 (13.1)	49 (12.7)	56 (14.6)	16 (4.1)	4.21	.576
Individuals' culture and customer attitude	204 (53.2)	55 (14.3)	51 (13.2)	50 (13)	24 (6.3)	4.25	.647
Proximity of market place for grasshoppers	189 (49.2)	47 (12.1)	54 (13.3)	60 (15.6)	34 (8.8)	4.11	.724
Taste of the grasshoppers	184 (47.9)	51 (13.3)	56 (14.6)	63 (16.4)	30 (7.8)	3.12	1.155
Risk of pesticide food poisoning	169 (44)	52 (13.6)	49 (12.7)	69 (17.9)	45 (11.8)	3.65	1.074
Grasshoppers are considered to be mycotoxins (food contaminants)	152 (39.6)	57 (14.8)	59 (15.5)	70 (18.2)	46 (11.9)	4.33	.872
Consumers of grasshoppers experience antinutrients	147 (38.3)	49 (12.7)	58 (15.2)	65 (16.9)	65 (16.9)	4.41	.805
There is cases of transmission of diseases or parasitoids to humans from the consumption of grasshoppers	138 (35.9)	48 (12.5)	60 (15.6)	70 (18.2)	68 (17.8)	3.94	1.129
Grasshoppers contribute to transmitting parasitic foodborne diseases	129 (33.6)	45 (11.7)	61 (15.8)	75 (19.5)	74 (19.3)	4.63	.615

Source: Primary Data (2024)

Where; SA: Strongly agree; A: agree ; NS: Neutral ;DA: disagree ;SDA: strongly disagree

Table 2: Factor loadings for factors influencing consumer acceptance of grasshoppers**.**

Code	Statements	Insect disease attachments	Consumer Health Perception	Consumer Societal Perception	Socio-economic factors
SE14	Consumers of grasshoppers experience anti-nutrients.	.745			
SE16	Grasshoppers contribute to transmitting parasitic foodborne diseases.	.626			
SE15	There is cases of transmission of diseases or parasitoids to humans from the consumption of grasshoppers.	.527			
SE12	Risk of pesticide food poisoning	.489			
SE13	Grasshoppers are considered to be mycotoxins (food contaminants).	.452			
SE5	Potential allergic reactions and its side effects		.701		
SE7	Grasshoppers' consumption contributes to the eating of heavy metals that cause adverse health effects		.503		
SE8	Nutritional content of grasshoppers		-.495		
SE10	Individuals' culture and customer attitude			.889	
SE3	Education of the consumers			.543	
SE9	Cost of the product				.699
SE6	Proximity of marketplace for grasshoppers				.671
SE11	Taste of the grasshoppers				.656
SE1	The income of the consumers			-.453	.553
SE4	Household size of the consumers				.538
SE2	Availability of grasshoppers				.525
	Extraction Method: Principal Component Analysis				
	a. 4 components extracted				

3. Logistic Regression:

To determine the level of prediction and significance of the socio-economic factors that influence consumer acceptance of grasshoppers; the researcher used a logistic regression model analysis to determine specific significance levels of socio-economic factors that influence consumer acceptance of grasshoppers. The researcher used winged termite collection as the predictor in the logistic regression model as presented below.

Table 3: Logistic regression analysis on factors for consumer acceptance of grasshoppers

Variables in the Equation						
Variable(s)	B	S.E.	Wald	df	Sig.	Exp(B)
Disease Perception	.045	.141	.101	1	.751	1.046
Health Perception	-.594	.152	15.291	1	.000	.552
Societal Perception	.843	.154	29.806	1	.000	2.324
Consumer Behaviour	1.336	.168	63.391	1	.000	3.805
Constant	1.066	.143	55.542	3	.000	2.903

Where; B: (Coefficient or Beta) ; S.E: (Standard Error);Wald: (wald statistics) ; df: (degrees of freedom);sig: (significance level or p-value) ; Exp(B):(Exponentiated coefficient);
a. Variable(s) entered on step 1: Disease Perception, Health Perception, Societal Perception, Consumer Behaviour.

Table 3, shows that for a one-unit increase in consumers' disease association with grasshoppers, the odds of the outcome variable increase by a factor of 0.045. This means that consumers with grasshoppers' perception of having diseases have a probability of 4.5% of accepting the consumption of grasshoppers. However, the associated p-value (Sig) of 0.751 suggests that the effect of disease perception on acceptance of consumption of grasshoppers is not statistically significant at the conventional 0.05 significance level

implying that the null hypothesis would prevail that disease perception does not have a significant effect on consumers' acceptance of grasshoppers.

Thus, for every one unit of increase in the concerns of the consumers' health perceptions, the odds of consuming grasshoppers would decrease by a factor of 0.594. This means that consumers who are biased about their health by consuming grasshoppers have a probability of 59.4% of not consuming the grasshoppers hence not accepting the consumption of grasshoppers. Furthermore, the associated *p-value* of 0.000 suggests that the effect of consumers' health perception on acceptance of the consumption of grasshoppers is statistically significant at the conventional 0.05 significance level implying that the null hypothesis shall be rejected and rather accept the alternative hypothesis that consumers' health perception has a significant effect on consumers' acceptance of grasshoppers.

On the other hand, for every one unit of consumers' societal perception about grasshoppers, the odds of consuming grasshoppers would increase by a factor of 0.843. This means that consumers with societal perceptions such as tradition and culture have a probability of 84.3% of consuming the grasshoppers hence accepting the consumption of grasshoppers. Furthermore, the associated *p-value* of 0.000 suggests that the effect of consumers' societal perception on acceptance of the consumption of grasshoppers is statistically significant at the conventional 0.05 significance level implying that the null hypothesis shall be rejected and rather accept the alternative hypothesis that consumers' societal perception has a significant effect on consumers' acceptance of grasshoppers.

Furthermore, for every one unit of increase in the consumers' behavior towards consumption of grasshoppers, the odds of consuming the grasshoppers would increase by a factor of 1.336. This means that consumer behavior is the perfect explanatory factor for acceptance of grasshoppers' consumption in western Uganda. Furthermore, the associated *p-value* of 0.000 suggests that the effect of consumers' behavior on the consumption of grasshoppers is statistically significant at the conventional 0.05 significance level implying that the null hypothesis shall be rejected and rather accept the alternative hypothesis that consumers' behavior has a significant effect on consumers' acceptance of grasshoppers.

On the whole, the logistic regression shows that consumers have accepted the consumption of grasshoppers in western Uganda reflected by a constant of 1.066. Furthermore, the most influencing factor in the acceptance of grasshoppers by consumers in western Uganda is the consumers' behavior towards the grasshoppers at a perfect probability of 1, followed by the consumers' societal/ cultural perception towards grasshoppers with a probability of 0.843. However, consumers who are biased by their health are most likely to reject consuming the grasshoppers evidenced by a probability of -0.594.

DISCUSSION

The Socio-Economic Factors That Influence Consumer Acceptance of Grasshoppers:

Income of the Consumers:

The results show that the income of the consumers as a major factor that influence consumer acceptance of grasshoppers in western Uganda. The increase in household monthly income automatically increases the expected quantity of grasshoppers consumed by a household. Thus, as higher household income increases hence purchasing power of consumers of grasshoppers also doubles. This concurs with Kewuyemi (2020) who noted that consumers who earn higher incomes would pay higher prices for fried and sundried grasshoppers than those who earn lower income. Moreover, this is expected because increase in income increases the consumers' purchasing power. Besides, Ekpo (2021), found out that, higher income earners were more willing to pay prices premiums than lower income earners. Consumers' income is important when studying food products demand it is from the income

that the consumer allocates a portion for food purchase. Kinyuru (2015) reported that increase consumer income increases the purchasing power and improve the living standards. This implies that the increase in household income, the consumers' purchasing power of consumable grasshoppers also increases. Thus, a higher monthly income shall lower the expected quantity of grasshoppers consumed by a household in household.

Education of the Consumers:

The study also noted that education of the consumers as another factor influencing consumer acceptance of grasshoppers in western Uganda. The demand and consumption for grasshoppers tend to decline when among people with higher education qualifications, and this because it increase their consciousness of nutritional aspect of health implications of food intake. Similarly, with higher education raising the consumers' living standards and income, such group of educated consumers tend to consume more grasshoppers than the less educated due to their awareness of its nutritional content importance to their bodies and health. This is in agreement with Kelemu & Adeboye (2017) who noted that more educated people could have acquired more knowledge about the nutritional, ecological and economic benefits of grasshoppers' consumption thus influencing their positive perceptions and attitudes leading to higher demand of grasshoppers. On the other hand, Kewuyemi (2020) argued that highly educated consumers understand and appreciate the health implications of their diets, thus more willing to pay higher prices for healthy products than the less educated. Most highly educated consumers find the rural areas not fit for their residence and often move to urban areas as they get higher education. This implies that education levels of consumers greatly influence their acceptability to consume grasshoppers.

Household Size of The Consumers:

The study further noted that household size of the consumers as another factor influencing consumer acceptance of grasshoppers in western Uganda. The presence of elderly members in the household tends to increase their demand for grasshoppers. On the other hand, an increase in the number of children below 5 years in the household also increases the quantity of grasshoppers' consumption. Hendriks (2015) noted that children require nutritious diets with all the necessary macro and micro elements for proper physical growth and mental development. Failure to get these elements at the required early life stage leads to deficiency physical and mental disorders that can never be corrected at later life stages. Similarly, Laureati., *et al.* (2016) noted that as the number of household members aged above 5 years increased, the quantity of grasshopper consumed increased among rural people. Rural dwellers collect and consume thus households with more members are able to collect and consume more grasshoppers. Similarly, households with more adult members consumed more cheese than those with only one adult or two adults and children. This implies that households with children consume higher quantities of grasshoppers than those without. Thus, as the number of household members aged above 5 years increased, the quantity of grasshoppers consumed increased among rural communities.

Nutritional Content of Grasshoppers:

Additionally, the study noted that nutritional content of grasshoppers as another factor influencing consumer acceptance of grasshoppers in western Uganda. This concurs with Ssepuuya *et al.* (2019) who argued that grasshoppers have been embraced as part of traditional diet among rural communities. The most seasonally collected edible insect in East Africa is the grasshoppers and like other insects, it is a good source of protein with high fat content (and thus energy) and many important minerals and vitamins. People prefer consumption of grasshoppers because they are nutritious and inexpensive food source as well as being rich source of protein that improve human diet. Grasshoppers often contain relatively more protein and minerals than meat, hence good food for nutrition among children. This implies that grasshoppers have high protein content and excellent production

efficiency compared with other conventional food groups.

Individuals' Culture and Customer Attitude:

The study noted that individuals' culture and customer attitude as factors influencing consumer acceptance of grasshoppers in western Uganda. Some cultures so not eat grasshoppers like pastoralists communities (Balaro), and they look at eating grasshoppers for those who are cursed. Such consumer attitude and the way of thinking influence consumers purchase intention as well as perceived economic situation. This concurs with Sengendo *et al.* (2021) who argued that culture had a positive significant effect on grasshoppers' acceptance among the rural people, implying that entomophagy is well rooted in their culture. Probably rural people attached greater value to their culture that increased their acceptance likelihood of grasshoppers when they viewed it as a cultural delicacy. This implies that individuals' culture and customer attitude in those areas occupied by Balaro (pastoralists) have undermined the acceptability of grasshoppers' consumption, and even those people (neighbours) who eat them, do it while hiding themselves to avoid being segregated.

Proximity of Market Place:

The study noted that proximity of market place for grasshoppers as another factor influencing consumer acceptance of grasshoppers in western Uganda. Grasshoppers tend to be most sold by vendors among the streets and hawkers within urban communities. Those consumers of grasshoppers in rural communities sometimes have less access to them for consumption. Longer distance to markets constrains access to food commodities, grasshoppers inclusive due to high transportation costs. This concurs with Ndimubandi *et al.* (2018) asserting that consumer perception underlies the success or failure of products in the market place. All stakeholders (consumers, producers, authorities) should fulfill their expected contribution in integrated manner and all efforts should be put in preventive control and consumption of safe and quality food. Besides, Kinyuru (2015) noted that there is a positive and significant variation in prices of raw, fried, sundried and blanched grasshoppers and the consumers' location of residence. Urban consumers would pay higher prices for raw, fried, sundried and blanched grasshoppers than rural consumers. This could be attributed to the transaction costs involved in moving grasshoppers from rural to urban areas as most collections are majorly in rural areas. This implies that the geographical location and accessibility of market for grasshoppers has an influence on their consumption.

Taste of the Grasshoppers:

The study noted that taste of the grasshoppers as another factor influencing consumer acceptance of grasshoppers in western Uganda. This concurs with Ekpo (2021) asserting that some consumers of grasshoppers like them because of the smell and taste, and others reject consuming them because of the sensory appeal; that is, smell, colour, texture and taste of grasshoppers. For instance, some people vomit when their sense the smell of grasshoppers. More so, Kinyuru (2015) added that consumers perceive senses such as taste and olfaction are useful in understanding food preferences, thus influencing the consumption and acceptability of grasshoppers among households. The rural and urban consumers' optimism about the consequences of consuming grasshoppers based on these attributes could have influenced acceptance. The most desirable food attributes are freshness, naturalness, and minimal processing. This implies that sensory qualities and taste in particular are critical determinants of food choice and preferences. Indeed, the consumer consciousness about what they eat, freshness, taste, safety and quality food products greatly influence consumers acceptability of consumption of grasshoppers.

Potential Allergic Reactions:

The study noted that acceptance of consumption of grasshoppers is also influenced by the potential allergic reactions and its side effects, fear of grasshoppers consumption

contributes eating of heavy metals that cause adverse health effects, risk of pesticide food poisoning, consumers of winged termites experience antinutrients, and grasshoppers being considered to be contaminated as ascertained by Castro & Chambers (2019).

Conclusions and Recommendations:

Conclusions:

The study concluded that the income of the consumers, availability of grasshoppers, education of the consumers, and household size of the consumers; are the major socio-economic factors that influence consumer acceptance of grasshoppers in western Uganda. It concluded that consumers with grasshoppers' perception of having diseases have a probability of 4.5% of accepting the consumption of grasshoppers. Consumers who are biased about their health by consuming grasshoppers have a probability of 59.4% of not consuming the grasshoppers hence not accepting the consumption of grasshoppers. Consumers with societal perceptions such as tradition and culture have a probability of 84.3% of consuming the grasshoppers hence accepting the consumption of grasshoppers. Consumer behavior is the perfect explanatory factor for acceptance of grasshoppers' consumption in western Uganda. Therefore, the most influencing factor in the acceptance of grasshoppers by consumers in western Uganda is the consumers' behavior towards the grasshoppers at a perfect probability of 1, followed by the consumers' societal/ cultural perception towards grasshoppers with a probability of 0.843. However, consumers who are biased by their health are most likely to reject consuming the grasshoppers evidenced by a probability of -0.594.

Recommendations:

The study recommended that:

1.Commercialization of edible insects' value chain can start with grasshoppers as consumers already have a positive perception of it. There is considerable need for an opportunity to improve the efficiency, productivity, and healthfulness of grasshopper husbandry and processing.

2. Formal education sector officials can take an active role in engendering grasshoppers into the food chain through school feeding programs.

3.The marketers should target consumers residing in urban areas and participating in off-farm income-generating activities for higher profits. Thus, the comprehension of driving forces behind behavioral intentions toward grasshoppers' restaurants is necessary for its greater market penetration which eventually contributes to increase the sustainable consumption behavior among restaurant consumers.

4.There is a need to educate grasshopper consumers about the environmental and nutritional benefits of grasshoppers. An individual's product knowledge level affects the process of purchase behavior since consumers with a high or low degree of product knowledge differ in their evaluation of products/services which in turn influences decision-making.

5.Finally, further research is needed on the use of choice experiments, ANOVA, and regression models in a further study. This research focused on grasshoppers whose mass production methods are unknown. Therefore, similar research can be conducted using crickets or winged termites that are easier to produce on commercial farms.

Declarations:

Ethical Approval: Not applicable.

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Competing Interests: The authors declare no conflict of interest.

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