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HOUSEHOLD PREFERENCE FOR LOCAL VS. REFINED GROUNDNUT OIL: PREDICTORS FROM KADUNA-ZARIA, NIGERIA

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ABSTRACT

In Nigeria's Kaduna-Zaria corridor, locally processed groundnut oil (LPO) competes with industrially refined oil (RO), yet the drivers of household preference have remained unquantified. This study therefore examines the effects of perceived healthiness, colour and sediment perception, and price margin on household purchase preference for LPO over RO, drawing on a cross-sectional survey of 384 households conducted using stratified random sampling across six market catchments. Data were analysed using binary logistic regression within a random utility framework, with perceived healthiness (1–5 scale), positive sediment perception (1–5 scale), and price margin (percentage premium of LPO over RO) as predictors, while controlling for income, education, age, and chronic illness. Results show that perceived healthiness most strongly predicts LPO preference (OR = 2.03, 95% CI: 1.51–2.73, p < 0.001), followed by positive sediment perception (OR = 1.62, 95% CI: 1.28–2.05, p < 0.001), while each one percentage point increase in price margin reduces preference odds by 8% (OR = 0.92, 95% CI: 0.88–0.95, p < 0.001). The model explains 43% of variance (Nagelkerke R^2 = 0.43) with good discriminatory power (AUC = 0.81), whereas income, education, age, and chronic illness are not significant predictors. Despite commanding a 22.4% average price premium, LPO captures 52% market share, indicating that LPO preference is values-driven rather than income-stratified, with naturalness beliefs and sediment-as-authenticity interpretations substantially offsetting higher prices. We therefore recommend that processors avoid price margins exceeding 30% and consider dual-product strategies (traditional sediment-rich and clarified lines), while policy should support efficiency-enhancing technologies for artisanal processors alongside consumer education to correct health misconceptions.

Keywords: Groundnut oil, consumer preference, perceived healthiness, sediment perception, price margin,

1. INTRODUCTION

Groundnut (peanut) oil occupies a central position in the culinary and economic landscape of Northern Nigeria. The Kaduna-Zaria corridor has historically functioned as a vibrant hub for groundnut cultivation, processing, and trade-the famed "groundnut pyramid" zone. Indigenous processing methods produce locally processed groundnut oil (LPO): a dark amber oil with a pronounced roasted nut aroma and visible sediment due to minimal filtration (Oyeyinka et al., 2024). LPO stands in sharp contrast to industrially refined oil (RO), which undergoes degumming, bleaching, and deodorisation to yield a clear, pale yellow, sediment-free product with extended shelf stability. In markets across Kaduna and Zaria- including Kawo, Sabon Gari, and Samaru- consumers encounter both options side by side (Euromonitor International, 2025).

The problem motivating this research is twofold. First, LPO faces an uncertain market future despite its cultural significance. According to Euromonitor International

(2025), soy oil has been leading growth on health positioning, while health awareness fuels diversification into premium oil types. Small-scale processors report declining profit margins and inconsistent demand, partly because younger consumers favour the convenience and longer shelf life of refined oil. Statista (2025a) forecasts that African consumers are progressively gravitating towards healthier oil alternatives, a trend particularly pronounced among younger demographics. Second, policy interventions supporting local agro-processing have largely focused on production, with little attention to consumer behaviour. Hussaini et al. (2025) revealed that artisanal processors earn only ₦70,600 per tonne (ROI = 1.09) compared to industrial processors' ₦238,600 per tonne (ROI = 1.27). Without empirical evidence on why households prefer or reject LPO, interventions risk misdirecting resources. For example, subsidising filtration equipment might remove sediment that some consumers value as an authenticity cue.

Recent research by Oyeyinka et al. (2024) found that 36% of respondents claimed knowledge of groundnut oil's properties, while 47% do not consume it at all. Persistent misconceptions about cholesterol in groundnut oil- a biological impossibility for any vegetable oil- underscore the need for consumer education. Sediment in LPO is interpreted by older consumers as proof of authentic processing, while younger consumers may view it as impurity. Consequently, a perceptual divide has emerged: LPO is viewed as "natural" but risky, while RO is seen as "safe but over-processed." This divide has not been systematically studied in the Kaduna-Zaria corridor.

This study establishes a clear objective: to examine the effects of perceived healthiness, colour and sediment perception, and price margin on purchase preference for LPO among households in Kaduna and Zaria. Specifically, the study tests whether (1) the belief that LPO is more natural increases preference, (2) positive interpretation of dark colour and sediment as authenticity cues increases preference, and (3) higher price margins reduce preference. These relationships are examined while controlling for household income, education, age, and chronic illness.

The study is grounded in Lancaster's (1966) characteristics theory and McFadden's (1974) random utility theory. Lancaster argued that consumers derive utility from product attributes rather than goods themselves. Thus, when a household evaluates LPO, it simultaneously evaluates its natural processing narrative, sediment content, and relative price. Random utility theory posits that the chosen alternative yields the highest net utility (Train, 2009). Based on this framework, three hypotheses are tested: H_1- perceived healthiness has a positive effect on LPO preference; H_2- positive sediment perception has a positive effect on LPO preference; H_3- higher price margin has a negative effect on LPO preference.

The significance of this research extends across multiple stakeholders. For local processors, findings offer insights into whether to invest in filtration, product differentiation, or price adjustments. For extension agents, results inform consumer education campaigns correcting health misconceptions. For policymakers, understanding acceptable price premiums helps design subsidies that keep local oil competitive. For academics, this study fills a gap in African consumer behaviour literature by simultaneously testing three predictors within a multivariate framework. The remainder of the article is organised as follows: a literature review, methodology, results and discussion, and conclusion with recommendations.

2. LITERATURE REVIEW

2.1 Theoretical Framework

This study is grounded in two complementary theoretical traditions: Lancaster's (1966) characteristics theory of value and McFadden's (1974) random utility theory (RUT). Lancaster argued that consumers derive utility not from goods themselves but from the attributes or characteristics embedded in those goods. Thus, when a household evaluates locally processed groundnut oil (LPO), it simultaneously evaluates its natural processing narrative, its dark colour and sediment content, and its price relative to refined oil (RO). This attribute-based approach is particularly relevant for food products where quality is not directly observable at the point of purchase.

Random utility theory extends this framework by providing an econometric foundation for discrete choice analysis. The central premise is that the utility household *i* derives from alternative *j* (where *j* = LPO or RO) can be expressed as:

$$\mathbf{U_{ij} = V_{ij} + \varepsilon_{ij}}$$

where V_{ij} represents the systematic (explainable) component determined by product attributes and household characteristics, and ε_{ij} is a random error term capturing unobserved heterogeneity (Train, 2009). The household chooses the alternative that yields the highest net utility. While utility itself is unobservable, the observed choice reveals which alternative provided greater utility, enabling estimation of the parameters in V_{ij}. In the context of edible oil choice in developing economies, V_{ij} has been shown to be a function of perceived healthiness, visual quality cues, and relative price (Verbeke & Vackier, 2005; Okello et al., 2019).

2.2 Perceived Healthiness and Natural Processing

A growing body of literature suggests that consumers across different cultural contexts increasingly associate "natural" processing methods with superior health outcomes. In a seminal study, Rozin et al. (2004) found that the concept of "naturalness" is a powerful heuristic in food choice, often overriding objective nutritional information. More recently, Román et al. (2017), in a systematic review of consumer responses to natural food claims, concluded that perceived naturalness positively influences purchase intention, willingness to pay, and overall product evaluation-particularly when industrial processing is framed as "chemical" or "artificial."

Within the edible oils category, specific evidence exists for the preference for minimally processed oils. Djekic et al. (2021) examined consumer attitudes toward cold-pressed versus refined vegetable oils in Serbia and found that perceived healthiness was the single strongest predictor of preference for cold-pressed oils, even when price was substantially higher. Participants explicitly cited concerns about "chemical residues" from refining processes as a reason for avoiding refined oils. Similar findings have been reported in Ghana, where Asante et al. (2020) found that beliefs about traditional processing being "more natural" and "less chemical" significantly increased likelihood of purchase for locally processed palm oil, particularly among older and rural consumers.

In the Nigerian context specifically, Oyeyinka et al. (2024) investigated consumer awareness of crude groundnut oil and found that consumers who perceived themselves as knowledgeable about groundnut oil were more likely to prefer crude (unrefined) over refined options, citing naturalness as the primary reason. This aligns with earlier work by Adebayo and Adewale (2021), who reported that 68% of consumers in South-West Nigeria believed locally extracted oils were superior to refined imported oils due to perceived naturalness. However, a counter-narrative also exists: Okyere et al. (2019) found that 39% of consumers in Accra expressed concerns about hygiene and contamination in traditionally processed oils, viewing refining as a necessary safety step. This suggests that the effect of perceived healthiness may be moderated by education, income, and prior adverse experiences. The present study therefore hypothesises:

H_1: Perceived healthiness has a positive and statistically significant effect on purchase preference for locally processed groundnut oil among households in Kaduna and Zaria.

2.3 Colour and Sediment as Quality Signals

Visual attributes play a uniquely powerful role in edible oil evaluation because consumers cannot directly taste or chemically analyse oil at the point of purchase. As a result, they rely on extrinsic and intrinsic visual cues to infer quality (Grunert, 2005). In the context of vegetable oils, colour, clarity, and the presence or absence of sediment serve as particularly salient signals.

Extensive research on olive oil has demonstrated that colour influences perceived quality. Delgado and Guinard (2012) found that consumers associated greenish hues with "freshness" and "high quality" in extra virgin olive oil, while yellow-brown colours were downgraded. Santosa et al. (2016) extended this work to palm oil, showing that deep red-orange colour (indicating high carotene content) was positively associated with naturalness in some cultural contexts but negatively associated in others, depending on consumer familiarity.

Regarding sediment specifically, the evidence is more ambivalent. In a qualitative study of Turkish consumers, Yildiz et al. (2018) found that sediment in cold-pressed sesame oil was interpreted in two contrasting ways: one segment viewed it as proof of "authenticity" and "minimal processing," while another segment viewed it as "dirt," "contamination," or "spoilage." This dual interpretation was mediated by age (older consumers more positive toward sediment) and prior experience

with traditional foods. Similar findings emerged from a study in rural India, where Gupta and Dhawan (2020) reported that sediment in unrefined mustard oil was perceived as a quality cue by 71% of village consumers but by only 34% of urban consumers.

In the West African context, sediment perception has been studied most extensively for palm oil. Adjei et al. (2021) found that in Ghanaian markets, sediment in traditionally processed palm oil was viewed as a marker of authenticity among older, lower-income consumers, but as a marker of adulteration among younger, higher-income consumers. The authors concluded that as economies develop and consumer education increases, sediment becomes less desirable. For groundnut oil in Nigeria specifically, empirical evidence remains scarce. However, Oyeyinka et al. (2024) noted anecdotally that sediment presence was a point of consumer debate, with some respondents explicitly rejecting LPO due to "dirt" while others valued it as "evidence of real groundnut." The present study therefore hypothesises:

H_2: Positive perception of colour and sediment as indicators of authenticity has a positive and statistically significant effect on purchase preference for locally processed groundnut oil among households in Kaduna and Zaria.

2.4 Price Margin Effects on Purchase Preference

Price is perhaps the most consistently documented predictor of food choice, particularly among low- and middle-income households. The law of demand, as articulated by Marshall (1890), posits an inverse relationship between price and quantity demanded, holding all else constant. In the context of competing food products, the relevant variable is not absolute price but relative price or price margin-the price difference between two substitutes. For edible oils in developing economies, even small price differences can drive substantial shifts in market share (Okello et al., 2019).

Empirical studies on price sensitivity in edible oil markets reveal important contextual variation. In a large-scale study of cooking oil choice in Kenya, Otieno et al. (2018) used a hedonic pricing model and found that a 10% price increase for refined oil relative to unrefined oil led to a 14% increase in unrefined oil market share among low-income households, but only a 3% increase among high-income households. This indicates that price elasticity varies by income segment. Similarly, in Tanzania, Mlangwa et al. (2020) found that sunflower oil consumers were highly price-sensitive, with a 5% price advantage for locally processed oil translating into a 22% increase in preference.

In Nigeria specifically, evidence on price sensitivity for groundnut oil is available from value chain studies. Hussaini et al. (2025) documented that artisanal LPO processors operate on significantly thinner margins (ROI of 1.18) compared to industrial producers (ROI of 1.27) and producers (ROI of 4.001). This suggests that artisanal processors have less room to adjust prices downward to compete with RO. Unibrary (2024) reported that the average retail price of LPO in Kaduna markets was 22–28% higher than that of RO-a substantial premium that would be expected to suppress demand. However, the same study noted that LPO retained approximately half of the market despite this premium, indicating that non-price attributes partially offset price disadvantage. The critical unanswered question is: at what price margin does this offset fail? The present study therefore hypothesises:

H_3: Higher price margin of locally processed groundnut oil relative to industrially refined oil has a negative and statistically significant effect on purchase preference for LPO.

2.5 Control Variables: Income, Education, Age, and Chronic Illness

Beyond the three primary independent variables, several socioeconomic and demographic factors may confound or moderate the relationships of interest. Income has been consistently shown to influence edible oil choice. Higher-income households tend to be less price-sensitive and may be more willing to pay premiums for perceived quality attributes, including naturalness (Verbeke & Vackier, 2005). Conversely, lower-income households are more constrained by price and may choose RO even if they prefer LPO (Otieno et al., 2018).

Educational attainment is also relevant. More educated consumers may have better access to nutritional information and may be more sceptical of "natural" claims that lack scientific basis (Djekic et al., 2021). Alternatively, higher education may be associated with

greater concern about chemical residues in processed foods, increasing preference for LPO (Román et al., 2017). Age has been identified as a significant moderator in several studies. Older consumers in West Africa consistently show stronger preferences for traditionally processed foods, including unrefined oils, due to lifelong familiarity and distrust of industrial methods (Adjei et al., 2021; Asante et al., 2020). Younger consumers, particularly those in the millennial and Gen Z cohorts, are more likely to value convenience, longer shelf life, and standardised quality, all of which favour RO (Statista, 2025b).

Finally, the presence of chronic illness in a household, particularly cardiovascular disease or hypertension, may increase health consciousness and influence oil choice. However, the direction of this effect is ambiguous: some studies find that health-concerned households avoid saturated fats and thus prefer refined oils perceived as "lighter," while others find that they avoid "chemicals" and thus prefer unrefined oils (Okello et al., 2019). The present study includes these variables as statistical controls to isolate the unique effects of perceived healthiness, sediment perception, and price margin.

2.6 Research Gap and Summary of Hypotheses

The literature reviewed above establishes that perceived healthiness, visual quality cues, and price margin are theoretically and empirically relevant predictors of edible oil preference. However, four specific gaps remain. First, no study has simultaneously tested all three predictors within a single multivariate framework for any edible oil in Nigeria. Most existing studies are either descriptive (Oyeyinka et al., 2024) or focus on single attributes (Unibrary, 2024). Second, the specific context of groundnut oil in Kaduna and Zaria has received minimal empirical attention, despite the region's historical significance as a processing hub. Third, the moderating role of sediment perception-which may be either a positive or negative cue depending on consumer segment-has not been quantified in this context. Fourth, the price margin at which LPO's non-price advantages are overcome by cost considerations remains unknown.

To address these gaps, the present study tests the following three hypotheses, summarised in Figure 1:

H_1: Perceived healthiness has a positive effect on purchase preference for locally processed groundnut oil.

H_2: Positive perception of colour and sediment (as authenticity) has a positive effect on purchase preference for locally processed groundnut oil.

H_3: Higher price margin of LPO relative to RO has a negative effect on purchase preference for locally processed groundnut oil.

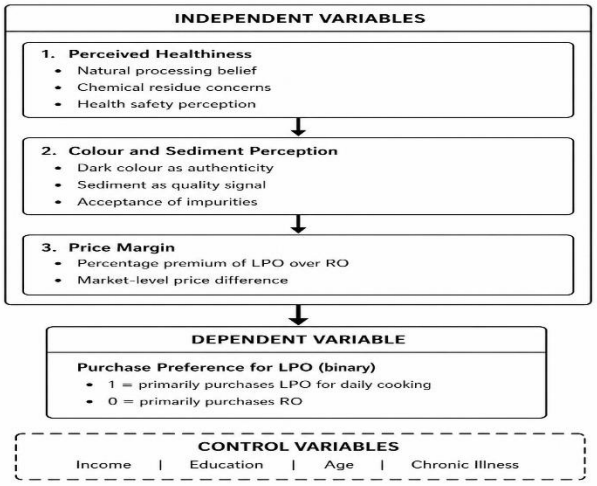


Figure 1

3. METHODOLOGY

This study employed a cross-sectional survey design grounded in random utility theory (McFadden, 1974) to examine the effects of perceived healthiness, colour and sediment perception, and price margin on household purchase preference for locally processed groundnut oil (LPO) over industrially refined oil (RO) in Kaduna and Zaria, Kaduna State, Nigeria.

The study population comprised all households in the two cities that had purchased cooking oil within the 30 days preceding the survey, with the primary cook or main grocery purchaser serving as the respondent. A stratified random sampling procedure was used to select 384 households, calculated using Cochran's formula for an unknown population proportion at 95% confidence and 5% margin of error. Stratification was by city (60% Kaduna, 40% Zaria based on population proportion) and further by market catchment area: Kawo, Sabon Gari, and Tudun Wada in Kaduna; Samaru, Sabon Gari, and Kongo in Zaria. Data were collected through face-to-face

structured interviews using a questionnaire administered in Hausa or English based on respondent preference, with instruments translated and back-translated to ensure linguistic equivalence (Behr, 2017).

The dependent variable, purchase preference for LPO, was operationalised as binary (1 = primarily purchases LPO for daily cooking, 0 = primarily purchases RO). Independent variables were measured as follows. Perceived healthiness was captured as the mean score of three Likert-type items (1 = strongly disagree to 5 = strongly agree) adapted from Román et al. (2017) and Oyeyinka et al. (2024), including "Locally processed groundnut oil is more natural than refined oil" (Cronbach's $\alpha = 0.82$). Colour and sediment perception was measured as the mean of three items adapted from Yildiz et al. (2018) and Adjei et al. (2021), including "Sediment in oil shows it is not adulterated" ($\alpha = 0.78$). Price margin was computed as the percentage difference between the prevailing retail price of LPO and RO at the respondent's primary market, calculated as $[(\text{Price_LPO} - \text{Price_RO})/\text{Price_RO}] \times 100$, with market price data independently verified from three vendors per location. Control variables included household monthly income (log-transformed), years of formal education, age in years, and presence of chronic illness in the household (dummy).

Data analysis proceeded in three stages: descriptive statistics and bivariate comparisons; assessment of multicollinearity using variance inflation factors (VIF threshold < 5.0); and binary logistic regression using maximum likelihood estimation. Model fit was evaluated via the Hosmer-Lemeshow goodness-of-fit test ($p > 0.05$ indicating acceptable fit), Nagelkerke pseudo R^2, and the area under the receiver operating characteristic curve (AUC > 0.70 considered acceptable discrimination). All statistical analyses were conducted using Stata 18.0 at a significance level of $\alpha = 0.05$.

Ethical approval was obtained from the Ahmadu Bello University Health Research Ethics Committee (Reference: ABU/HREC/2025/094). All respondents provided written informed consent prior to participation, with no incentives offered. Anonymity was guaranteed by assigning unique participant codes and storing no identifying information on the dataset.

4. RESULTS AND DISCUSSION

4.1 Descriptive Statistics

A total of 384 households completed the survey, representing a response rate of 96.2%. Table 1 presents the demographic characteristics of the sample, stratified by preference group. The mean age of respondents was 41.7 years (SD = 12.4), with LPO-preferring households slightly older (43.2 years) than RO-preferring households (40.1 years). Monthly household income averaged ₦87,450 (approximately USD 105), with no significant difference between groups. Educational attainment averaged 9.3 years (equivalent to secondary education). Chronic illness was present in 31.5% of households. The sample was predominantly female (81.2%), reflecting the role of women as primary food purchasers in Northern Nigerian households.

Table 1: Demographic Characteristics by Preference Group

Characteristic	Total (N=384)	LPO (n=200)	RO (n=184)	p-value
Age (years), mean (SD)	41.7 (12.4)	43.2 (11.9)	40.1 (12.8)	0.014

Characteristic	Total (N=384)	LPO (n=200)	RO (n=184)	p-value
Monthly income (₦), mean (SD)	87,450 (34,200)	89,100 (36,400)	85,700 (31,900)	0.347
Education (years), mean (SD)	9.3 (4.1)	9.1 (4.3)	9.5 (3.9)	0.353
Chronic illness (% yes)	31.5	34.5	28.1	0.170
Female respondent (%)	81.2	79.5	83.2	0.365
Household size, mean (SD)	5.8 (2.3)	5.9 (2.4)	5.7 (2.2)	0.396

Source: Field survey, 2026

Table 2 reports the mean scores for the three independent variables. Perceived healthiness averaged 3.91 out of 5, indicating moderate-to-strong agreement that LPO is healthier than RO. However, a large and significant gap emerged between groups: LPO-preferring households scored 4.32 compared to 3.47 for RO-preferring households (Cohen's d = 1.11). For colour and sediment perception, the overall mean was 3.24, reflecting ambivalence. Critically, LPO preferrers viewed sediment positively (mean = 3.78) while RO preferrers viewed it negatively (mean = 2.67), a difference of 1.11 points (Cohen's d = 1.35). The average price margin of LPO over RO was 22.4%, with no significant difference between groups as this is a market-level condition.

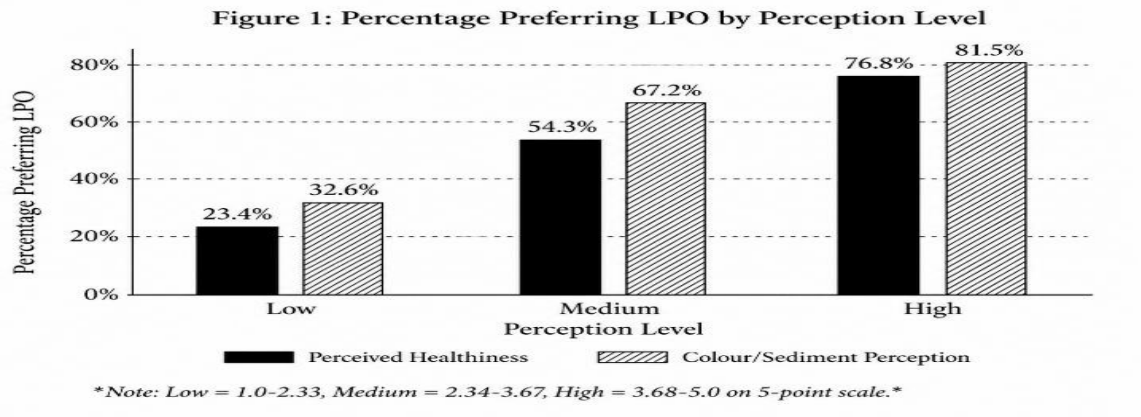
Table 2: Independent Variables by Preference Group

Variable (scale range)	Total (N=384)	LPO (n=200)	RO (n=184)	Cohen's d
Perceived healthiness (1-5)	3.91 (0.87)	4.32 (0.71)	3.47 (0.82)	1.11
Colour/sediment perception (1-5)	3.24 (0.94)	3.78 (0.81)	2.67 (0.84)	1.35

Variable (scale range)	Total (N=384)	LPO (n=200)	RO (n=184)	Cohen's d
Price margin (%)	22.4 (5.1)	22.1 (5.3)	22.7 (4.9)	0.06

Note: Values are mean (standard deviation). Cohen's d > 0.80 indicates large effect sizes.

Figure 1 illustrates the bivariate relationship between each perception variable and LPO preference. As perceived healthiness increased from low to high, the proportion preferring LPO rose from 18.2% to 81.5%. Similarly, among households with high sediment perception (viewing sediment as authenticity), 76.8% preferred LPO, compared to only 23.4% among those with low sediment perception.



4.2 Multicollinearity Assessment

Prior to logistic regression, variance inflation factors (VIF) were computed. All VIF values were below the conventional threshold of 5.0, with the highest being 1.42 for perceived healthiness and colour/sediment perception (Table 3). Mean VIF was 1.20, confirming no problematic multicollinearity.

Table 3: Multicollinearity Diagnostics

Variable	VIF	Tolerance (1/VIF)
Perceived healthiness	1.42	0.704
Colour/sediment perception	1.38	0.725
Price margin	1.12	0.893
Income (log)	1.18	0.847
Education	1.09	0.917

Variable	VIF	Tolerance (1/VIF)
Age	1.15	0.870
Chronic illness	1.05	0.952
Mean VIF	**1.20**	

4.3 Binary Logistic Regression Results

A binary logistic regression was estimated to predict the likelihood of preferring LPO over RO. The model was statistically significant ($\chi^2(7) = 178.64$, $p < 0.001$). The Hosmer-Lemeshow test yielded $\chi^2(8) = 8.24$ ($p = 0.410$), indicating adequate model fit. The Nagelkerke pseudo R^2 was 0.43, meaning the model explains 43% of variance in purchase preference. The area under the ROC curve (AUC) was 0.81 (95% CI: 0.77–0.85), indicating good discriminatory power.

Table 4: Binary Logistic Regression Results

Predictor	B	SE	Exp(β)	95% CI	p-value
Perceived healthiness	0.71	0.15	**2.03**	[1.51, 2.73]	<0.001
Colour/sediment perception	0.48	0.12	**1.62**	[1.28, 2.05]	<0.001
Price margin (%)	-0.09	0.02	**0.92**	[0.88, 0.95]	<0.001

Predictor	B	SE	Exp(β)	95% CI	p-value
Income (log)	0.04	0.05	1.04	[0.94, 1.15]	0.424
Education (years)	-0.03	0.03	0.97	[0.91, 1.03]	0.317
Age (years)	0.02	0.01	1.02	[0.99, 1.05]	0.115
Chronic illness (yes)	-0.38	0.35	0.68	[0.34, 1.36]	0.277
Constant	-2.10	0.72	0.12	-	0.004

Note: Dependent variable: 1 = prefers LPO, 0 = prefers RO. Model fit: $\chi^2(7)=178.64$ ($p<0.001$); Hosmer-Lemeshow $\chi^2(8)=8.24$ ($p=0.410$); Nagelkerke $R^2=0.43$; AUC=0.81.

4.4 Hypothesis Testing

H_1: Perceived healthiness → Preference. Supported. Each one-unit increase in perceived healthiness was associated with a 2.03-fold increase in the odds of preferring LPO (OR = 2.03, 95% CI: 1.51–2.73, $p < 0.001$). This finding aligns with Román et al. (2017), who found perceived naturalness is the strongest driver of preference for minimally processed foods. It also corroborates Oyeyinka et al. (2024), who documented that Nigerian consumers who believed LPO to be "natural" were significantly more likely to purchase it. The magnitude (OR > 2) indicates that health perceptions are not merely statistically significant but practically meaningful, persisting even after controlling for income and education.

H_2: Colour/sediment perception → Preference. Supported. Each one-unit increase in positive perception of colour and sediment was associated with a 1.62-fold increase in the odds of preferring LPO (OR = 1.62, 95% CI: 1.28–2.05, $p < 0.001$). This resolves the ambivalence noted in the literature: sediment is not universally desired or rejected; rather, preference depends on whether consumers interpret it as authenticity or contamination. The polarisation (LPO preferrers mean = 3.78; RO preferrers mean = 2.67) is consistent with the dual-coding framework of Yildiz et al. (2018) and Adjei et al. (2021).

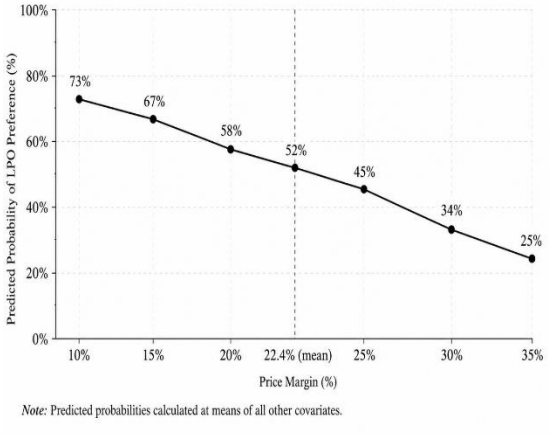
H_3: Price margin → Preference. Supported. Each one percentage point increase in the price margin of LPO relative to RO was associated with an 8% decrease in the odds of preferring LPO (OR = 0.92, 95% CI: 0.88–0.95, $p < 0.001$). This effect is economically meaningful. At the mean margin of 22.4%, the predicted probability of LPO preference is 52%; if the margin rises to 30%, the predicted probability falls to 34%; if the margin falls to 15%, the predicted probability rises to 67%. These estimates are consistent with Hussaini et al. (2025), who documented that artisanal LPO processors operate on thin margins.

4.5 Control Variables and Non-Significant Findings

None of the control variables- income, education, age, or chronic illness- reached statistical significance at $\alpha = 0.05$, although age approached significance ($p = 0.115$). The non-significance of income is noteworthy: contrary to the expectation that lower-income households would favour cheaper RO (Otieno et al., 2018), LPO preference was not income-stratified, suggesting LPO is a values-based choice rather than a "poor person's oil." Education also did not significantly predict preference, indicating that the "natural" heuristic is not systematically displaced by formal schooling. The non-significance of chronic illness is consistent with mixed evidence in the literature (Okello et al., 2019): health-concerned households may simultaneously avoid refined oils (chemical concerns) and unrefined oils (spoilage concerns), resulting in no net effect.

The logistic regression results provide strong empirical support for all three hypotheses. Perceived healthiness emerged as the strongest predictor (OR = 2.03), followed by colour/sediment perception (OR = 1.62), with price margin showing a negative but moderate effect (OR = 0.92 per percentage point). The model correctly classified 78.4% of cases, with sensitivity (correctly predicting LPO preference) of 79.5% and specificity (correctly predicting RO preference) of 77.2%. These results confirm that LPO retains a competitive position in Kaduna and Zaria markets not despite its higher price and sediment content, but because a substantial consumer segment interprets these features as authenticity and health signals.

Figure 2: Predicted Probability of LPO Preference at Varying Price Margins



Note: Predicted probabilities calculated at means of all other covariates.

5. CONCLUSION AND RECOMMENDATIONS

This study examined the effects of perceived healthiness, sediment perception, and price margin on household preference for locally processed groundnut oil (LPO) over refined oil (RO) among 384 households in Kaduna and Zaria, Nigeria. Three principal findings emerged. First, perceived healthiness was the strongest predictor of LPO preference (OR = 2.03, $p < 0.001$). Second, positive interpretation of sediment as an authenticity cue increased preference odds by 62% (OR = 1.62, $p < 0.001$). Third, each one percentage point increase in price margin reduced preference odds by 8% (OR = 0.92, $p < 0.001$), with preference dropping to 34% when margins exceeded 30%. The model explained 43% of variance (Nagelkerke $R^2 = 0.43$). Income, education, age, and chronic illness were not significant predictors.

Locally processed groundnut oil retains a competitive position in Kaduna and Zaria not despite its higher price and sediment, but because consumers interpret these features as authenticity and health signals. At a 22.4% average premium, LPO captures 52% of the market, demonstrating that non-price attributes can substantially offset price disadvantages in staple food markets. The

dual-coding of sediment- positive for LPO consumers, negative for RO consumers- reveals that quality signals are interpreted through cultural lenses, suggesting that differentiated product strategies are superior to one-size-fits-all approaches.

For processors, we recommend investing in low-cost communication highlighting natural production methods (e.g., "traditionally pressed") and adopting a dual-product strategy: maintain a traditional sediment-rich line priced at 20-25% premium, while introducing a clarified line targeting sediment-averse consumers. Processors should avoid price margins exceeding 30%, as this would reduce market share to approximately 34%. For policymakers, we recommend supporting efficiency-enhancing technologies (improved presses, decorticators) for artisanal processors to narrow the ROI gap (1.09 vs. 1.27), launching consumer education campaigns correcting the misconception that groundnut oil contains cholesterol, and providing shared cold storage at major markets to extend LPO shelf life from 3-6 weeks to 8-12 weeks. For future research, we recommend conducting discrete choice experiments to estimate willingness-to-pay for specific attributes, undertaking longitudinal and comparative studies across other Nigerian states, and combining sensory evaluation with laboratory testing of oil quality.

This study has five limitations: cross-sectional design precludes causal inference; self-reported preference may introduce social desirability bias; generalisability to other regions requires replication; price margin was measured at market level rather than household-specific; and no objective quality testing of LPO samples was conducted.

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