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Do Consumers Accept it? Wild Carob Bar as Chocolate Bar Substitute

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Abstract

Carob (*Ceratonia siliqua* L.) is a native plant of Cyprus that comes in two varieties: cultivated carob and wild carob. Because of the high sugar content of the cultivated carob fruit, it is the primary ingredient in syrup, desserts, biscuits, and other processed beverages. However, Wild carob is rarely used in Cyprus, mainly used for animal feed or discarded. As a result, rather than being discarded, the potential nutritional value inherent in wild carob is more beneficial when harnessed for food production. Therefore, the goal of this study was to assess the acceptability of wild carob bars in order to improve Cyprus's agricultural income from the waste product. In this study, an online survey was conducted among 388 customers in the 6 biggest cities of Cyprus to determine the acceptability level of purchase intention of wild carob bar. The data were analysed using SPSS Software version 26. The data, which comprises knowledge, subjective norms, sensory characteristics and purchase intention, were subjected to descriptive statistical analysis. Generally, Cypriot consumers were knowledgeable and preferred the sensory characteristics of carob over chocolate. Hence, they are willing to purchase wild carob bar rather than chocolate bar if it is available in the market. Regression analysis further revealed that all acceptability dimensions adopted for this study significantly influence the purchase intention of wild carob bars.

Keywords: Word, Wild Carob, Cocoa Powder Substitute, SPSS, Acceptability Level.

Introduction

Cyprus is an island in the Mediterranean Sea that is highly regarded for its geographical and historical profile and as one of the best tourist destinations in the world (Plecher, 2021). As a result, the country devotes most of its resources to the tourism industry, making it one of its primary income sources. However, other economic sectors, like agricultural practices, receive less attention due to the country's obsession with tourism and climate (Georgiou, 2018). As a result, Cyprus's agriculture generates about 2% of its GDP (Plecher, 2021).

Nevertheless, Cyprus is endowed with carob plants that thrive regardless of the weather. The native plant of Cyprus is called carob (*Ceratonia siliqua* L.), and it has two species: cultivated carob and wild carob. Simple sugars, proteins, fat, alkaloids, and dietary fibre are all present in varying degrees in carob fruits. Additionally, carob fruit has low levels of theobromine and caffeine, which are undesirable ingredients in some foods (Ortega et al., 2009; Salem & Fahad,

2012). Polyphenols, which are the carob fruit's active ingredients, are anticancer, anti-obesity, anti-diabetic, anti-diarrheic, and anti-hyperlipidemic medications (Christou et al., 2019; Goulas et al., 2016).

Additionally, due to its naturally low-fat composition, carob is a low energy-dense food item that is suitable for addressing the obesity problem (Caliskan et al., 2022). Cyprus is home to both the domesticated and wild varieties of carob species (Biner et al., 2007). However, the cultivated carob fruit's high sugar content is the main ingredient in syrup, desserts, biscuits, and other processed beverages. However, wild carob is rarely used in Cyprus, primarily as animal feed or throw away. Hence, heralding its minimal utilisation resulted in its low valuation (El-Shatnawi & Ereifej, 2001). However, despite its underutilisation and undervaluation, studies on wild carob conducted by Benchikh et al (2014) demonstrated the exceptional health benefits of carob, distinguished by its healthy sugar, low-fat content, dietary fibres, and bioactive molecules (polyphenols and cyclitols). As a result, the potential nutritional value inherent in wild carob is more beneficial when harnessed for food production rather than discarded. Furthermore, due to its low-fat content and high dietary fibre, wild carob may be the cheapest and most suitable alternative to cocoa in chocolate production.

Finally, most food acceptability studies are usually conducted on organic foods (Shaaban & Nguyen, 2014), chocolate (Ali et al., 2018; Prete & Samoggia, 2020), honey (Farhana, 2019), halal foods, and fresh vegetables (Sinesio et al., 2018). As a result, there is a paucity of literatures on the food acceptability of wild carob-based bars using the Theory of Planned Behaviour (TPB) to investigate the correlations between the independent and dependent variables of a given framework. As a result, this study may assist the Cyprus government in understanding the acceptance factors that affect purchase intention of wild carob bar as well as the acceptability level of wild carob bar in order to use wild carob bar to enhance Cyprus's agricultural income.

Literature Review

Theory of Planned Behavior (TPB)

TPB is one of the most used expectancy-value models for predicting and describing human food choice behaviour. It developed out of the previous Theory of Reasoned Action. This theory allows for a compelling explanation of consumer food preference behaviour (Tarkiainen & Sundqvist, 2005). Based on the TPB, three beliefs guide human behaviour: behavioural, normative, and control beliefs. The individual's attitude towards a behaviour is shaped by a behavioural belief, which is an individual's belief about the outcomes of certain behaviour. A subjective norm is created by normative belief, which refers to an individual's view of how significant others will judge their actions. Finally, control belief is linked to perceived behavioural control and refers to an individual's perceptions of control over their actions (Dean et al., 2008). This perception of control is associated with factors that may facilitate or impede the performance of the behaviour, as well as whether the individual regards the behaviour as simple or hard to carry out (Fishbein & Ajzen, 1975).

The TPB demonstrates that attitudes, the subjective norm, and perceived behavioural control can anticipate behavioural impulsion, which forecasts whether an individual will perform a behaviour. In summary, the more favourable a person's attitude and perceived behavioural control about certain behaviour, as well as the more favourable the subjective norm, the stronger the person's impulsion to conduct the behaviour; the stronger the person's intention, the more likely they will perform the behaviour (Fishbein & Ajzen, 1975). The

theory of planned behaviour has obtained significant results. It has been vastly and successfully utilised in consumer research because it is relatively flexible and forecasts the purchaser's goal and behaviour well (Dermott et al., 2015).

Purchase Intention

The probability that customers in certain purchasing scenarios would identify and choose a certain brand among a particular product is identified as purchase intention (Haro, 2016). Marketing experts have gained interest in the relationship between purchase intentions and purchase behaviour. According to Fishbein & Ajzen (1975), "the best single predictor of an individual's behaviour will be a measure of that individual's intention to perform that behaviour". Furthermore, Rezvani et al (2013) noted that interest in the purchase is seen as the forecast of future purchase decisions. An individual showing tendency to take action upon his attitude toward the purchase of a product is an indication of interest in the purchase (Kim & Chung, 2011). Companies can identify their sales by conducting a market survey on consumers' purchase intentions. Omar et al (2012) suggested that the intention of purchasing goods or services desired is a psychic action brought about by feelings (affective) and the mind (cognitive). More precisely, purchase intention can be interpreted as a happy attitude that a customer expresses to obtain an item by paying with cash or with sacrifice.

Since marketing executives are interested in customer purchase intentions to predict sales of existing and/or future products and services, information on purchase intentions can aid administrators in taking action on product demand, market segmentation, and advertising schemes (Ghalandari & Norouzi, 2012).

Relationship between Knowledge and Purchase Intention

According to Chrysochoidis (2000); Gracia & De Magistris (2007), a higher degree of knowledge influences the intention to purchase. Gracia & De Magistris (2007) concluded that this is due to the idea that intelligence is the sole tool that buyers have and use to distinguish between the characteristics of raw and traditional goods and to shape positive attitudes towards these goods. Chrysochoidis (2000) also noted that customers with low recognised self-competence have a lower chance of buying organic food because they believe they cannot make a good decision. Furthermore, Thøgersen (2009) discussed that ambiguity has a strong negative effect on the intention to purchase healthy food and the actual purchase of healthy produce. What's more, knowledge about a certain food product helps to improve benefit perception, reduces the perceived risk, and directly impacts the decision to purchase (Yeung & Morris, 2006). This fact illustrates that knowledge has a decisive capacity in the intention to purchase, which was also concurred by (Mceachern & Warnaby, 2008).

H1: There is a significant relationship between knowledge and purchase intention.

Relationship between Subjective Norms and Purchase Intention

The needs theory suggested by McClelland (1987) noted that people are prone to display a behaviour appreciated by reference groups when looking for relationships and group relationships. In the food literature, it has been shown that the subjective norm is an important determinant of consumption. For instance, a vital relationship was found between the subjective norm and the intention to purchase food (Ali et al., 2018). According to studies done by Chen (2007); Dean et al (2008); Nursalwani et al (2017), on organic food and a halal

labelled chocolate bar conducted on Taiwanese, British, and Malaysian consumers, there is a significant positive relationship between subjective norms and purchase intention.

H2: There is a significant relationship between subjective norms and purchase intention.

Relationship between Sensory Characteristics and Purchase Intention

Sensory characteristics of food attributes contribute a substantial part to food preferences. Individual food choices are influenced by sensory reactions to flavour (taste and aroma), colour, and texture (Bhuiyan, 2015). Maina (2018) noted that food sensory characteristics such as taste, texture, aroma, and appearance have distinct and significant effects on food acceptability. As a result, a sensory attribute of food is considered the most important field where food producers can effectively differentiate their products. This fact is supported by a study on plant-based yoghurt alternatives done by Gakobo & Jere (2016), who found that the sensory characteristics of the products have a significantly high effect on purchase intention. H3: There is a significant relationship between sensory Characteristics and purchase intention.

Material & Methods

This study utilised a quantitative study conducted with 388 respondents. The sampling size was calculated using Krejcie and Morgan sampling method. The survey was conducted online using Google Forms. Seeing that the study needs to collect data in 6 different cities of Cyprus exclusively, a city-filter question is included on the first page of the online survey. Therefore, only individuals from the 6 respective cities would be allowed to proceed with the questionnaire survey. The questions were distributed to respective cities via WhatsApp, E-mail, Instagram, or Facebook with the assistance of respondents' local friends who lived in respective cities. This data collection process spanned three months. A total of 399 respondents answered the questionnaire, including 146 respondents from Nicosia, 115 from Limasol, 54 from Larnaca, 35 from Famagusta, 28 from Pophos, and 21 from Kyrenia. Even though there were no missing data, 11 responses were deleted due to false and redundant information. The data collected were analysed using SPSS Software version 26. for descriptive, correlational and regression analyses.

Results & Discussion

Respondents' Demographic Profile

A response rate of 100% was gathered for this study. This study was conducted with people living in 6 respective cities and above 18 years old. Table 1 shows the respondent's demographic profile of the study.

Table 1

Demographic profile of the respondents

| Demographic Profiles | Frequency (n) | Percentage (%) |
|------------------------------------|----------------------|-----------------------|
| City | | |
| Nicosia | 142 | 36.6 |
| Limasol | 112 | 28.9 |
| Larnaca | 50 | 12.9 |
| Famagusta | 35 | 9 |
| Pophos | 28 | 7.2 |
| Kyrenia | 21 | 5.4 |
| Race | | |
| Turkish Cypriot | 173 | 44.6 |
| Greek Cypriot | 215 | 55.4 |
| Gender | | |
| Male | 202 | 52.1 |
| Female | 186 | 47.9 |
| Age | | |
| 18-25 years old | 135 | 34.8 |
| 26-35 years old | 151 | 38.9 |
| 36-49 years old | 62 | 16 |
| ≥ 50 | 40 | 10.3 |
| Education Attainment | | |
| Higher Degree – Master/PhD | 97 | 25 |
| Tertiary Education- Diploma/Degree | 198 | 51 |
| Secondary/High School Education | 63 | 16.2 |
| Primary/Elementary Education | 26 | 6.7 |
| No Formal Education | 4 | 1 |

Descriptive Analysis**Knowledge**

Information deposited in an individual's long-term memory is known as knowledge (Ibrahim et al., 2017). Thus, consumer knowledge is described as the quantity and essence of the knowledge deposited in the long-term memory and the consumer's perceptions of what they know or how much they know (Ateke & James, 2018). Based on the descriptive analysis of the knowledge, the mean scores and standard deviation scale were in the range of 4.23 to 4.38 and .870 to 1.010, respectively. This shows that, in general, Cypriot respondents were familiar with the carob.

According to Table 2, Cypriot respondents were knowledgeable about carob and knew that carob is high in minerals and vitamins (K1, M= 4.39). Furthermore, carob is not harmful to their health (K2, M= 4.33), carob is good for their immune system (K3, M= 4.35), carob has more healthy properties than cocoa beans (K4, M= 4.32), and carob is better for their health than cocoa beans (K5, M= 4.31). Furthermore, respondents agreed that their knowledge of carob is based on prior experience, such as purchasing/consuming/hearing about it from others/reading about it (K7, M= 4.23) and that they are sufficiently knowledgeable about carob (K6, M= 4.10). This finding demonstrates that Cypriot respondents are well-versed in carob and its health benefits. This can be attributed to the fact that carob is a traditional product of Cyprus, and everyone in Cyprus has consumed carob at some point in their lives.

Table 2

Result of the Mean Score and Standard Deviation for Knowledge

| Code | Items | Mean Value | S.D |
|------|--|------------|-------|
| K1 | I believe carob is not harmful to my health. | 4.38 | .894 |
| K2 | I am aware that carob is good for my immune system. | 4.35 | .851 |
| K3 | I convinced that carob is rich in minerals and vitamins | 4.39 | .870 |
| K4 | I believe that carob has more healthy properties than cocoa beans. | 4.32 | .889 |
| K5 | I believe carob is good for my health compared to cocoa beans. | 4.31 | .930 |
| K6 | I am sufficiently Knowledgeable about Carob. | 4.10 | 1.010 |
| K7 | My knowledge on carob is based on previous experience such as purchasing/consuming/hearing from others/reading about it. | 4.23 | .973 |

Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree (n=388)

Subjective Norms

As Fishbein & Ajzen (1975) mentioned, subjective norms mirror the "influence of the social environment on behaviour" and can be explained as "the individual's perception that the majority of referent individuals or groups would expect him or her to perform a certain behaviour". According to Table 3, the mean value and standard deviation of the subjective norm's items were in the range of 3.57 to 4.09 and 1.066 to 1.390, respectively.

In a deeper look, Cypriot respondents were neutral to 5 on the subjective norm's items, but they agreed that their close friends and family would support their consumption of healthy chocolate (SN7, M=4.09). However, respondents were neutral about the influence of the family and important ones when it comes to choosing healthy chocolate (SN6, M=3.98), their friends will go for a healthy bar rather than the conventional chocolate bar (SN3, M= 3.87), believe they should buy a healthy chocolate bar (SN5, M= 3.85), their friends encourage them as well as desire that I choose healthy chocolate products (SN4, M= 3.75), influencing from their friends believes that they should buy carob-based healthy bar rather than a conventional chocolate bar (SN2, M= 3.70). This research reveals that Cypriot respondents are not really influenced by their relatives or friends when choosing food products.

Table 3

Result of the Mean Score and Standard Deviation for Subjective Norms

| Code | Items | Mean Value | S.D |
|------|--|------------|-------|
| SN2 | My family believes I should buy carob-based healthy bar rather than a conventional chocolate bar. | 3.70 | 1.093 |
| SN3 | My friends and loved ones will go for a healthy bar rather than the conventional chocolate bar. | 3.87 | 1.147 |
| SN4 | My friends and loved ones encourage me as well as desire that I choose healthy chocolate products. | 3.75 | 1.202 |
| SN5 | Persons within my sphere of influence who are accurately opinionated about chocolate, believe I should buy a healthy chocolate bar | 3.85 | 1.146 |
| SN6 | I am influenced by my friends, society, environment, social network when it comes to choosing healthy chocolate for myself. | 3.98 | 1.066 |
| SN7 | People around me support my decision to consume healthy chocolate. | 4.09 | 1.053 |

*Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree (n=388)***Sensory Characteristics**

Food acceptability depends largely on the sensory characteristics of food, such as its appearance, aroma, taste, and texture (Fizman & Spence, 2015). According to Table 4, Cypriot respondents ranked the influence of the sensory characteristics in the range of 3.76-4.09. In deep looking, respondents were neutral on three sensory characteristics items: SC3 M=3.90, SC7 M=3.77 and SC5 M=3.76. Respondents, on the other hand, agreed on four sensory characteristics: SC1 M=4.09, SC8 M=4.06, SC6 M=4.02, and SC4 M=4.01. This illustrates that Cypriot respondents were neutral to the chocolate's smooth and velvety texture, flavour, and colour, while they agreed with the chocolate's hardness, sweet and bitter taste, and appearance. This could imply that when producing cocoa-based products or any alternative products that can be substituted for cocoa (i.e., carob) in Cyprus, the focus should be on the parameters that respondents agreed on rather than other neutral parameters.

Table 4

Result of the Mean Score and Standard Deviation for Sensory Characteristics

| Code | Items | Mean Value | S.D |
|------|---|------------|-------|
| SC1 | The hardness of chocolate alleviates my stress level. | 4.09 | 1.100 |
| SC3 | The smooth and velvety nature of chocolate gives me a superb mouthfeel. | 3.90 | 1.099 |
| SC4 | The sweet taste of chocolate makes me ecstatic. | 4.01 | 1.102 |
| SC5 | The flavour of chocolate enhances my appetite. | 3.76 | 1.034 |
| SC6 | The bitter taste of chocolate makes me feel it is healthy. | 4.02 | 1.177 |
| SC7 | The colour of chocolate increases my affinity. | 3.77 | 1.042 |
| SC8 | The appearance of chocolate radiates a cordial invitation. | 4.06 | 1.128 |

Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree (n=388)

Purchase Intention

In this study, purchase intention was the dependent variable of the model. Table 9 shows the mean scores and standard deviation of the 4 purchase intention items. The mean value of the purchase intention was in the range of 4.13 to 4.36, while the standard deviation was from .824 to .920. Looking in-depth, it can be observed from Table 5 that the first 3 items, PI1 (willing to purchase), PI2 (intend to purchase), and PI3 (plan to purchase) had mean values of corresponding to M=4.36, M=4.32, M=4.32, respectively, which were higher than PI4; try to consume (M=4.13). It can be seen that the phrase 'will try to consume' in PI4 translates the idea of the partial tendency to purchase, resulting in a mean value relatively lower than PI1 (willing to purchase), PI2 (intend to purchase), and PI3 (plan to purchase). Hence, this resultant outcome implies that the Cypriot respondents are more attracted to purchasing than just trying.

Table 5

Result of the Mean Score and Standard Deviation for Purchase Intention

| Code | Items | Mean Value | S.D |
|------|---|------------|------|
| PI1 | I am willing to consume chocolate made from carob if they are available for purchase. | 4.36 | .920 |
| PI2 | I intend to consume chocolate made from carob if they are available for purchase. | 4.32 | .879 |
| PI3 | I plan to consume chocolate made from carob if they are available for purchase. | 4.34 | .865 |
| PI4 | I will try to consume chocolate made from carob if they are available for purchase. | 4.13 | .824 |

Scale: 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree (n=388)

The relationship between independent variables and dependent variable

A Pearson correlation coefficient was computed to assess the relationship between independent variables (K, SN, SC) and dependent variable (PI). The degree of correlation is defined as a strong correlation if the value is between ± 0.50 and ± 1 ; a medium correlation if the value is between ± 0.30 and ± 0.49 ; and a small correlation if the value is below ± 0.29 . The correlational results obtained are shown in Table 6.

Table 6

Result of Pearson Correlation

| No. | Variables | | Purchase Intention |
|-----|-----------|---------------------|--------------------|
| 2. | knowledge | Pearson Correlation | .515** |
| | | Sig. (2-tailed) | .000 |
| 4. | Price | Pearson Correlation | .470** |
| | | Sig. (2-tailed) | .000 |
| 5. | Promotion | Pearson Correlation | .486** |
| | | Sig. (2-tailed) | .000 |

Regarding knowledge, there was a strong correlation between K and PI ($r = 0.515$, $n = 388$, $p = 0.00$). This shows that knowledge contributes 51.5% to the purchase intention. Furthermore, regarding subjective norms, a moderate correlation was observed between SN and PI ($r = 0.470$, $n = 388$, $p = 0.00$). Hence, subjective norms contribute 47.0% to the purchase intention. Finally, regarding sensory characteristics, a moderate correlation was recorded between SC and PI ($r = 0.485$, $n = 388$, $p = 0.00$). Therefore, sensory characteristics contribute 48.6% to the purchase intention.

Regression Analysis

The relationship between a set of independent factors and a dependent variable is described by regression analysis. Table 7 shows the regression results indicating that knowledge, subjective norms, and sensory characteristics positively affect purchase intention. The coefficient of determination (R^2) value is the amount of variance in a dependent variable explained by the independent factors. This value should be significant to adequately explain the variance of the endogenous latent variable (Hair et al., 2019). As a result, a higher R^2 value improves the structural model's predictive ability. According to (Chin, 1998), R^2 values of 0.19 to 0.33 are weak, 0.33 to 0.67 are moderate, and 0.67 and above are significant. Since the R^2 values for purchase intention were 0.390, it can be stated that the independent variables moderately explained purchase intention.

Table 7

The result of Multiple Regression between constructs of Customer Satisfaction and Repurchase Intention

| Model | Beta | t value | Sig. | Result |
|----------|--------|---------|------|-----------|
| K => PI | .342 | 7.717 | .000 | Supported |
| SN => PI | .200 | 4.075 | .000 | Supported |
| SC => PI | .246 | 5.043 | .000 | Supported |
| R^2 | .390 | | | |
| F value | 81.850 | | | |
| P value | .000 | | | |

Note: K= Knowledge; SN= Subjective Norms; SC= Sensory Characteristics; PI= Purchase Intention.

Since the sample size for this study has been met, the beta value of standardised coefficients from the table above is used. Knowledge, subjective norms, and sensory characteristics were reported as having coefficient values of $\beta = 0.342$, $\beta = 0.200$, and $\beta = 0.246$, respectively. Thus, independent variables positively influence the purchase intention of wild carob bar. Furthermore, the "t value" for knowledge, subjective norms, and sensory characteristics was $t = 7.717$, $t = 4.075$, and $t = 5.043$, respectively. The fact that the t values of the independent variables (K, SN, and SC) are greater than 2 indicates that K, SN, and SC are significant predictors of purchase intention. Finally, since the p values for the K ($p = .000$), SN ($p = .000$), and SC ($p = .000$) are less than 0.05, all proposed hypotheses are supported.

Conclusion

This study proved that Cypriot consumers are willing to substitute chocolate bars with wild carob bars. This was generally due to the high awareness of carob in Cyprus. However, according to the data from previous studies, only cultivated carob is harvested in Cyprus for production or use in food products. In contrast, only a small amount of wild carob is harvested for animal feeding, and the rest remains on the tree. As a result, this study may contribute to the Ministry of Economy encouraging food sectors to adopt wild carob as an alternative to cocoa in the food industry. As a result, this can create an opportunity to boost the economy of agriculture in Cyprus from the agricultural waste product (wild carob).

Furthermore, the descriptive analysis revealed that Cypriot respondents were neutral regarding the chocolate's smooth and velvety texture, flavour, and colour. At the same time, they agreed regarding its hardness, sweet and bitter flavour, and appearance. Therefore, when the food industry produces a product from wild carob powder, it should focus on enhancing its hardness, sweetness and bitterness, and appearance.

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