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Customers' perception and attitude towards bio-plastic in Surat Thani Province, Thailand

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Abstract

This study aims to explore demographic factors and the relationship between environmental concern and the perception and attitude towards bioplastics among consumers in Surat Thani Province. Using a quantitative research approach, the sample consisted of 400 residents surveyed via online questionnaires. Statistical methods included frequency, percentage, mean, standard deviation, independent sample t-tests, F-tests, one-way ANOVA, and Pearson's correlation. The first hypothesis tested demographic variations in bioplastics perception. The second hypothesis examined the low correlation between environmental concern and bioplastics perception, and a moderate correlation with attitude towards bioplastics, suggesting consumers have a positive attitude towards bioplastics but limited understanding and management knowledge of bioplastics. Consumer behavior towards the environment correlates with their perception and attitude towards bioplastics.

Keywords: Awareness, Attitude, Bio-plastics, Environmental concern

1. Introduction

Environmental issues are a constant topic of discussion due to their visible impacts across all areas, particularly the problem of plastic waste. This longstanding issue continues to escalate, affecting both land and sea due to the durable nature of plastics. Effective management of plastic waste requires time, understanding, and public awareness to foster a community-wide collaborative effort. The Ellen MacArthur Foundation (2017) warns, "If we do not manage plastic waste now, by 2050, there will be more plastic than fish in the oceans."

The concept of global citizenship holds that individuals, regardless of location and environmental conditions, are part of a global community. This awareness fosters a sense of responsibility for one's actions, impacting global progress (Wongchaiyakul, P., 2021)^[13]. This mindset encourages both public and private sectors to reduce natural resource use and develop sustainable practices in energy, food, and material production to minimize environmental impact.

Thailand is consistently ranked among the top ten countries for marine debris. In 2022, Surat Thani was ranked fifth among provinces with severe waste management issues, producing 700 tons of waste per day. Despite efforts by municipal and private entities managing 40 sites over 600 acres, the Regional Environmental Office in Surat Thani reports that waste disposal methods remain largely improper.

Advocating for the switch to biodegradable plastics instead of traditional petroleum-based plastics offers a sustainable solution due to bioplastics' renewable plant-based raw materials and quicker degradation. Despite some bioplastics degrading at similar rates to conventional plastics, they can still be recycled. Overall, bioplastics are seen as a more sustainable option in the plastics industry. Despite Thailand being a major producer and the world's second-largest exporter of bioplastic pellets, domestic use remains minimal. This study aims to explore consumer perceptions and attitudes toward bioplastics in Surat Thani Province, enhancing understanding for effective environmental problem-solving and potentially benefiting stakeholders in the bioplastics business. The research objectives are 1) To study the demographic factors affecting consumer perceptions and attitudes towards

bioplastics in Surat Thani Province, Thailand and 2) To explore the relationship between environmental concern and consumer perceptions and attitudes towards bioplastics in Surat Thani Province, Thailand.

2. Literature Review

Perception is defined as one of the responses of the human body, initiated through various sensory nerves. These nerves relay sensory information to the brain, which then processes, understands, and assigns meanings to these stimuli, forming memories and behavioral responses in turn. If new, different information is introduced, the brain interprets it anew, potentially altering responses or behaviors based on this new interpretation.

Attitude refers to a person's thoughts and feelings about their surroundings, objects, or other people, which are based on underlying beliefs. These beliefs can influence future behaviors. An attitude essentially serves as a preparedness to respond to various stimuli, assessing whether one likes or dislikes a particular issue. It is a dimension of evaluation that forms a part of interpersonal communication. This communication within individuals is influenced by the reception of information, which subsequently affects behavior (Sothanasatian, 1990) [9].

Green identity refers to a group of individuals who are especially attuned and sensitive to environmental issues. These individuals adjust their lifestyle and business practices with a high regard for environmental conservation. Previous research in green marketing found that a green identity leads to green behaviors (Sparks & Shephert, 1992), such as recycling behaviors driven by a consumer's sense of being a recycler (Mannetti, Pierro, & Livi, 2004). Similarly, the intention to purchase environmentally friendly products can be influenced by individual perceptions of 'green' (Sparks & Shephert, 1992).

Self-congruity is a concept describing how a person's self-image is congruent with their behaviors and attitudes. Consumers typically gravitate towards and are more likely to purchase products that align with their personal image, suggesting that self-congruity is the behavior of aligning one's self-image with brands, products, or user imagery. This differs from theories based on rational choice, like the Theory of Reasoned Action (TRA) or the Theory of Planned Behavior (TPB), suggesting that consumers choose products that symbolize their identity and select brands or products that convey their personal image (Sirgy M. J., 2018).

Sustainable consumption refers to the use of goods and services that meet basic needs and improve quality of life while minimizing the use of natural resources and generating the least amount of toxic substances, waste, and pollutants across the lifecycle of the products or services. This approach ensures that future generations' needs are not compromised. Sustainable consumption encompasses various important aspects such as sufficiency, quality of life, efficient resource use, increasing reliance on renewable energy sources, waste reduction, lifecycle consideration, and consideration of the balance of related dimensions (Aluminiumloop, 2021). In summary, sustainable consumption is about consuming resources efficiently and beneficially with the minimal environmental impact in both the short and long term. The study framework to explore demographic factors and the relationship between environmental concern and the perception and attitude towards bioplastics among consumers in Figure 1.

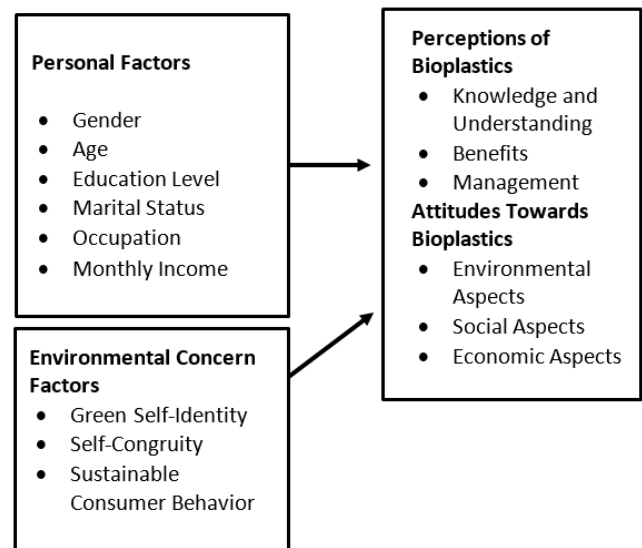


Fig 1: Research Framework

3. Research Methodology

This study on the perception and attitude towards bioplastics among consumers in Surat Thani is a survey research utilizing an online questionnaire as the data collection tool. The population consists of consumers residing in Surat Thani, with data gathered from 400 participants using convenience sampling via Google Forms.

Statistical Analysis

1. Descriptive Statistics: Frequency, percentage, mean, and standard deviation are used for initial data analysis.
2. Inferential Statistics:
 - T-tests and One-way ANOVA are used to examine differences among individual groups based on demographics like gender, age, education level, occupation, marital status, and monthly income range.
 - Hypothesis testing for relationships between environmental concern, perception, and attitudes towards bioplastics, utilizing Pearson's Correlation Coefficient to elucidate the relationship dynamics between the variables.

4. Research Results

1. General Information: The majority of respondents are female, totaling 230 individuals, accounting for 57.50%. The age group 20-29 years consists of 185 respondents, representing 46.25%. A total of 171 respondents, or 42.75%, have a bachelor's degree or equivalent, and the same number are employed by companies. Single status is reported by 207 respondents, making up 51.75% of the sample. The majority of respondents, 154 individuals, earn less than 15,000 baht, comprising 38.5% of the sample.

Table 1: Displays the mean, standard deviation (S.D.), and level of environmental concern.

Environmental Concerns	Average	S.D.	Level
Green Self-Identity	3.87	0.86	High
Self-congruity	3.77	0.90	High
Sustainable Consumer Behavior	3.92	0.83	High
Overall	3.85	0.82	High

2. Regarding Environmental Concern: As shown in Table 1, the overall level of environmental concern is high. When examining specific topics, the mean score for being a

sustainable consumer is the highest (Mean = 3.92), followed by identifying as a green individual (Mean = 3.87), and self-congruity (Mean = 3.77) respectively.

Table 2: Sample Group's Knowledge Scores

Perception of Bioplastics	Sample Size	Percentage
Low Level (0-4)	184	46.00
Moderate Level (5-8)	214	53.50
High Level (9-11)	2	0.50
Overall	400	100
Mean = 4.15 S.D. = 1.6 Max = 9 Min = 0		

3. As per Table 2, the majority of the sample group possesses a moderate level of knowledge about bioplastics, totaling 214 individuals, accounting for 53.50%. A smaller proportion,

184 people or 46.0%, have a low level of knowledge, and only 2 individuals, representing 0.5%, have a high level of knowledge.

Table 3: Displays the mean scores and standard deviations regarding attitudes towards bioplastics.

Attitudes Towards Bioplastics	Mean	S.D.	Level
1. Bioplastics help reduce global waste problems	4.10	1.11	High
2. Bioplastics reduce greenhouse gas emissions	3.92	1.19	High
3. Bioplastics reduce chemical residues in the environment, including in crops and food	4.32	1.12	Highest
4. People who choose bioplastic products care about environmental issues	4.46	0.99	Highest
5. Consumers should prioritize learning about bioplastics	4.47	1.04	Highest
6. Those contributing to pollution and environmental problems should be responsible, including financially	4.14	1.15	High
7. Bioplastic products are more expensive than conventional plastics	4.51	0.85	Highest
8. Using bioplastic products supports the cultivation of renewable plants	4.36	1.08	Highest
9. The government should promote the use of bioplastics more to consumers	4.40	1.11	Highest
10. The government should encourage manufacturers to use bioplastic materials instead of conventional plastics	4.48	0.98	Highest
Overall	4.32	0.76	Highest

4. Table 3 reveals a significantly high overall average attitude towards bioplastics among the sample group, with an average score of 4.32. The sample most strongly agreed that bioplastic products are more expensive than conventional plastics, with an average score of 4.51. This was followed by the belief that government should promote the use of bioplastic materials in production over conventional plastics, averaging 4.48, and

the importance of consumers learning about bioplastics, averaging 4.47.

Hypothesis Testing

Hypothesis 1: Different demographic characteristics influence varying perceptions and attitudes towards bioplastics.

Table 4: Tests the differences in demographic characteristics regarding the perception of bioplastics.

	N	Mean	S.D.	t/F	Sig.	Hypothesis Test Result
Gender	170	0.390	0.133	1.881	0.094	Hypothesis Rejected
Age	18	0.280	0.214	4.638	0.01	Hypothesis Accepted
Education Level	45	0.352	0.166	2.487	0.06	Hypothesis Rejected
Occupation	55	0.354	0.167	5.913	0.000	Hypothesis Accepted
Marital Status	207	0.361	0.147	2.881	0.057	Hypothesis Rejected
Income	154	0.383	0.141	0.674	0.610	Hypothesis Rejected
Total	400	0.378	0.143			

*Sig < 0.05

As shown in Table 4, the study found that age and occupation significantly influence perceptions of bioplastics, with statistical significance at the 0.05 level. However, gender,

education level, marital status, and income level did not show significant differences in the perception of bioplastics at the same statistical significance level.

Table 5: Tests demographic differences related to attitudes towards bioplastics.

	N	Mean	S.D.	t/F	Sig.	Hypothesis Test Result
Gender	170	4.342	0.803	0.573	0.935	Hypothesis Rejected
Age	18	3.328	0.939	9.949	0.000	Hypothesis Accepted
Education Level	45	4.091	0.880	7.989	0.000	Hypothesis Accepted
Occupation	55	4.156	0.903	3.418	0.009	Hypothesis Accepted
Marital Status	207	4.249	0.804	3.315	0.037	Hypothesis Accepted

Income	154	4.319	0.804	0.706	0.588	Hypothesis Rejected
Total	400	4.317	0.757			
*Sig < 0.05						

As indicated in Table 5, the research found that age, education level, occupation, and marital status significantly influence attitudes towards bioplastics, with a statistical significance of 0.05. However, gender and income did not show significant differences in attitudes.

Hypothesis 2: The level of environmental concern is correlated with perceptions and attitudes towards bioplastics.

Table 6: Tests the relationship between environmental concern and perceptions of bioplastics.

Perception of Bioplastics	Pearson's correlation coefficient (r)	Interpretation of results
Green Self-Identity	0.333**	Low level of correlation
Self-Congruity	0.404**	Low level of correlation
Sustainable Consumer Behavior	0.325**	Low level of correlation
Overall	0.375**	Low level of correlation

**Sig < 0.01

As demonstrated in Table 6, the overall correlation between environmental concern and the perception of bioplastics among consumers was found to be moderately positive with a Pearson's correlation coefficient (r) of 0.375, indicating a low-level correlation at a statistical significance of 0.01. Breaking down by categories, the correlation between having a green identity and the perception of bioplastics was also low with an r-value of 0.333 at a significance level of 0.01. Similarly, self-congruity showed a low correlation with the perception of bioplastics with an r-value of 0.404, and sustainable consumer behavior had a low correlation with an r-value of 0.325, both at a significance level of 0.01.

Table 7: Tests the relationship between environmental concern and attitudes towards bioplastics.

Perception of Bioplastics	Pearson's correlation coefficient (r)	Interpretation of results
Green Self-Identity	0.517**	Has a moderate level of correlation
Self-Congruity	0.507**	Has a moderate level of correlation
Sustainable Consumer Behavior	0.520**	Has a moderate level of correlation
Overall	0.544**	Has a moderate level of correlation

**Sig < 0.01

According to Table 7, the overall correlation between environmental concern and attitudes towards bioplastics, as measured by Pearson's correlation coefficient (r), is 0.544, indicating a moderate positive relationship at the significance level of 0.01. Specifically, the green identity's correlation with attitudes towards bioplastics shows a moderate positive relationship with an r-value of 0.517. Similarly, self-congruity correlates moderately with attitudes towards

bioplastics with an r-value of 0.507, and sustainable consumer behavior also shows a moderate correlation with an r-value of 0.520, all at a significance level of 0.01. This demonstrates a general alignment in direction across these aspects within the environmental concern framework.

5. Discussion

1. Demographic Factors and Environmental Concerns: The study examined how demographic factors such as gender, age, education, occupation, marital status, and income, in conjunction with environmental concern, awareness, and attitudes towards bioplastics, affect consumer behavior in Surat Thani.

Gender: There were no significant statistical differences in perception and attitudes towards bioplastics between genders (p-value > 0.05), indicating that both male and female consumers in Surat Thani share similar views on bioplastics, which contrasts with Tonuch, L. (2019) [11] who found gender differences in health and environmental awareness.

Age: Significant differences were found in the perception and attitudes towards bioplastics among different age groups (p-value < 0.05). Consumers aged 20-29 and 30-39 years showed higher awareness and more positive attitudes towards bioplastics than other age groups. This can be attributed to these age groups being more responsible, possibly due to their roles in their households and their familiarity with technology and online media. This finding aligns with research by CHINSATTAPONG, S. (2018) [3] and NUANGJAKCHIM, R. (2019) [8], which noted that consumers aged 21-40 are more likely to make environmentally friendly purchases, while those over 40 are less concerned with plastic categorization.

Education: The study found no differences in awareness of bioplastics across different educational levels, but there were significant differences in attitudes towards bioplastics (p-value < 0.05). It shows that while consumers in Surat Thani have similar levels of awareness regarding bioplastics regardless of their educational background, their attitudes towards bioplastics vary significantly. Those with bachelor's degrees exhibited the most positive attitudes compared to other groups, likely due to their age group and familiarity with multiple media channels which enhance their access to relevant information. These findings suggest that the level of education does not necessarily correlate with increased environmental responsibility. This contrasts with research by Klajit and Tunshevavong (2021) [6], who found that different educational levels impact the acceptance of information about reducing plastic packaging use.

Occupation: The study found that differences in occupation lead to varying levels of awareness and attitudes towards bioplastics, potentially due to different purchasing intentions and considerations of product use based on individual needs. This aligns with research by Thammachart and Boonyanam (2020) [10], who observed that different occupations make different decisions regarding the use of biodegradable plastics. For instance, individuals in trading professions prefer durable and long-lasting products. This contrasts with research by Klajit and Tunshevavong (2021) [6], which found that occupational differences do not affect the overall

openness to information about reducing plastic packaging. The presentation of environmental news is less appealing compared to other news types, affecting information receptivity. The study on marital status found no differences in awareness of bioplastics across different statuses, but attitudes towards bioplastics varied. Married consumers, likely responsible for families and cohabiting with others, despite not being highly knowledgeable about bioplastics, show a positive attitude towards environmentally friendly products due to their concern for family health and environmental impacts. This finding contradicts Arkamanonand and Srising (2020)^[2], who reported that the number of family members does not affect plastic waste management practices in Bangkok.

Income: The study on income levels found that different income levels do not impact awareness of bioplastics, which might be attributed to the specific characteristics of the area. In Surat Thani, a province primarily sustained by agriculture (e.g., palm oil, durian, and rubber), residents might not be significantly involved with bioplastics, thus sharing similar attitudes regardless of income. This contrasts with research by Tonuch, L. (2019)^[11], which found that individuals with higher monthly incomes exhibit more favorable green attitudes than those with lower incomes.

2. Environmental Concern and Bioplastic Relationships:

- **Overall Relationship:** A low correlation was found between overall environmental concern and bioplastic awareness, while attitudes toward bioplastics were moderately correlated, significant at the statistical level of 0.01.
- **Green Identity:** Exhibits a low correlation with bioplastic awareness and a moderate correlation with attitudes towards bioplastics. This parallels findings by Tonuch, L. (2019)^[11], which suggest that consumers with a strong green identity tend to agree more with the principles of bioplastics. Jaiswala & Kant (2018) also noted that environmental awareness is a critical factor influencing attitudes towards eco-friendly products.
- **Self-Congruity:** Shows a low correlation with bioplastic awareness and a moderate correlation with attitudes. Confente, I. (2020) found that consumers with a strong green self-concept recognize the value of bioplastic products and exhibit positive attitudes, which in turn can enhance their behavioral intentions to use such products.
- **Sustainable Consumer Behavior:** There is a low correlation with bioplastic awareness and a moderate correlation with attitudes, consistent with Tonuch, L. (2019)^[11], who noted that environmental awareness, health consciousness, and perceived green value significantly influence green attitudes, while social norms impact the intention to purchase sustainable products.

6. Conclusion and Suggestions

1. **Outreach to Diverse Age Groups:** Consumers aged 20-39 show a better understanding and attitude towards bioplastics. To raise awareness among other age groups, it's suggested to diversify the media formats. For older consumers unfamiliar with online media, traditional channels like TV, radio, and print media can be effective. Local organizations and community leaders can also help disseminate information. For younger

demographics, including students, engaging through educational activities and school events can instill environmental awareness from an early age.

2. **Marketing Strategy for Green Products:** Businesses or entrepreneurs focused on eco-friendly products should consider that consumers with green self-identity, self-congruity, and sustainable consumer behaviors have aligned perceptions and attitudes towards bioplastics. Marketing strategies could involve modernizing product designs to incorporate bioplastic materials and creating campaigns that highlight the long-term benefits and social contributions of these products. This can add value to the products and align with sustainable development goals.
3. **Government Support for Bioplastic Products:** Governments should aid entrepreneurs in supporting bioplastic products to encourage more businesses to cater to this market segment. This can help reduce prices through market mechanisms and contribute to solving environmental issues sustainably.
4. **Educational Policies on Bioplastics:** The government should facilitate comprehensive understanding of bioplastics covering knowledge, properties, management, and clear labeling to ensure consumers can easily handle and correctly utilize these materials.

Recommendations for Future Research

1. **Study Consumer Behaviors:** Future studies should examine other consumer behaviors like acceptance and purchasing of environmentally friendly products and awareness of microplastics.
2. **Views from Production and Distribution:** Investigate the perspectives of manufacturers or distributors involved with bioplastics to understand their views, operational constraints, or needs for assistance from various agencies.
3. **Comprehensive Plastic Management:** Explore the management of plastics from production to disposal to understand the challenges and integrate solutions effectively.

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