ISSN: P-2455-0515
E- 2394-8450

Educreator Research Journal

OPEN ACCESS

Volume–XIII, Special Issues–I(a) Jan – Feb 2026

Original Research Article

FROM IDEA TO INCOME: A FINANCIAL STUDY OF OWN HERBAL MOSQUITO REPELLENT STARTUP

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Abstract:

This study examines the financial feasibility of establishing a small-scale herbal mosquito repellent startup using natural ingredients such as neem, nirgundi, camphor, and cow dung powder. A descriptive research design was adopted, and primary data were collected from 248 respondents through structured questionnaires.

Statistical analysis, including chi-square testing using Jamovi (Version 2.3), was conducted to examine the relationship between awareness and purchase intention. The results indicate significant association between awareness of herbal repellents and future purchase intention ($\chi^2(4, N = 248) = 74.3, p < .001$). Financial analysis shows an initial investment of ₹3,47,000, an estimated annual profit of ₹2,28,384, a break-even point of 8,908 boxes annually, a payback period of approximately 1.52 years, and a return on investment of 65.8%. The findings suggest that the proposed herbal mosquito repellent startup is financially viable and has strong market potential, supported by increasing consumer preference for safe and natural products.

Keywords: *Herbal Mosquito Repellent, Startup, Financial study, Eco-friendly Product, Profitability, Consumer Behavior.*

Introduction:

In today's time, mosquito-borne diseases like dengue and malaria are increasing rapidly. Many people are looking for safe and natural alternatives instead of chemical-based mosquito repellents. Herbal mosquito repellents are becoming popular because they are eco-friendly, safe for children and elderly people, and have fewer side effects. This research focuses on converting a business idea into income by starting an herbal mosquito repellent startup. The study mainly examines the financial aspects such as cost of production, pricing, demand, revenue, and profitability. The main purpose of this research is to analyze whether starting an herbal mosquito repellent business is financially profitable and can generate sustainable income.

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Statement of Problem:

Many studies focus on the effectiveness, ingredients, and health benefits of herbal mosquito repellents, as well as consumer preference for natural products. However, very limited research examines the financial aspects of starting a small-scale herbal mosquito repellent business. Therefore, this study aims to fill this gap by providing a financial analysis of converting a herbal mosquito repellent idea into a sustainable income-generating startup

Significance of the Study:

This study is significant as it promotes an eco-friendly herbal mosquito repellent business that can create multiple economic and social benefits. The use of natural ingredients such as neem, tulsi, and other herbal materials can increase farmers' revenue by generating additional demand for medicinal and aromatic crops. It encourages sustainable agricultural practices and strengthens the rural supply chain. The product provides an eco-friendly alternative to chemical-based mosquito repellents, thereby reducing environmental pollution and chemical exposure. It also has a positive impact on health, as herbal products are generally safer for children, elderly people, and regular household use. Moreover, the startup model can create employment opportunities for rural youth, women, and self-help groups through small-scale production and distribution activities. It supports self-employment and promotes entrepreneurship at the grassroots level. By encouraging local production and consumption, the business contributes to economic circulation within the community. In the long run, the growth of such small-scale industries can contribute to the country's GDP and overall economic development.

Thus, the study highlights both financial viability and broader socio-economic benefits.

Limitations of the Study:

- Financial analysis is based on estimated costs and projected sales, which may differ from real market conditions.
- Seasonal changes in mosquito population may affect demand and profitability.

Research Objectives:

- To analyze the market demand for herbal mosquito repellent products.
- To examine consumer awareness and preference towards herbal mosquito repellents.
- To study the pricing acceptability of the product among consumer.
- To estimate the initial investment required to start the herbal mosquito repellent startup.
- To evaluate the estimated profit of the herbal mosquito repellent business.

Research Hypothesis:

Hypothesis 1:

1. H_0**:** There is no significant relationship between awareness of herbal repellents and purchase intention.
2. H_1: There is a significant relationship between awareness of herbal repellents and purchase intention.

Hypothesis 2:

1. H_0: Starting an herbal mosquito repellent business is not profitable.
2. H_1: Starting an herbal mosquito repellent business is profitable

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Literature Review:

1. ***Chadha, A., & Vohra, S. Step Towards SOCIAL ENTREPRENEURSHIP:***
   The chapter by A. Chadha and S. Vohra in CSR and Sustainable Development: A Multinational Perspecti ve explores the idea of social entrepreneurship and how waste materials and inexpensive resources might be used to create mosquito repellant goods.According to the study, mosquito repellents that are both econ omical and environmentally benign can benefit low-income communities by generating employment and small business chances. It links waste management, inclusive growth, and sustainable development to the manufacturing of mosquito repellent. The chapter is pertinent for a herbal mosquito repellent startup study since it demonstrates that producing inexpensive re pellents can be both commercially and socially advantageous.
2. ***Hazarika, H., & Krishnatreyya, H. (2025).***
   The creation of herbal dhoopbatti utilising natural substances such as cow dung, cow ghee, tulsi, campho r, jasmine, and guggul is explained in the research study titled "Preparation and Evaluation of Herbal Dh oopbatti for Cleansing the Air" published in the World Journal of Pharmaceutical Research (2025).Accor ding to the study, dhoopbatti made from herbs has antibacterial qualities and lowers airborne microbes. Because of the cow dung and medicinal plants, it also acts as a natural mosquito repellant. Because it is profitable and made from inexpensive, readily available raw ingredients, it may be produced commercial ly. The article concludes that herbal dhoopbatti has good market potential and can be a safe, natural subs titute for chemical-based air fresheners and insect repellents.
3. ***Ainane, A., Abdoul-Latif, F. M., Abdoul-Latif, T. M., & Ainane, T. (2021).***
   The viability of using the essential oil from Rosmarinus officinalis (rosemary) to produce an insecticide is investigated in the study by Ainane et al. (2021). It examines earlier studies demonstrating the efficacy of rosemary oil and discusses its chemical makeup and insecticidal qualities. Additionally covered in the study are formulation strategies, extraction procedures, and variables influencing product stability. It also examines economic viability, taking into account market demand, production costs, raw material availability, and environmental advantages. The study supports the possibility of plant-based mosquito repellent solutions by concluding that pesticides based on rosemary are both technically and financially feasible.
4. ***Tyagi, B. K. (2016).***
   With a particular emphasis on herbal products, B. K. Tyagi's chapter in the book Herbal Insecticides, Re pellents and Biomedicines: Effectiveness and Commercialization describes various mosquito control stra tegies.The increasing prevalence of diseases spread by mosquitoes and the drawbacks of chemical pestic ides, including resistance, expense, and environmental risks, are covered. Herbal insecticides and plant- based repellents are seen as safer and more environmentally friendly substitutes due to these problems. T he chapter also emphasizes the value of ethnobotanical research and traditional knowledge in determinin g which plants are best for controlling mosquitoes.All things considered, the study backs the creation, tes ting, and marketing of herbal insect repellents as an effective and long-term vector control measure.

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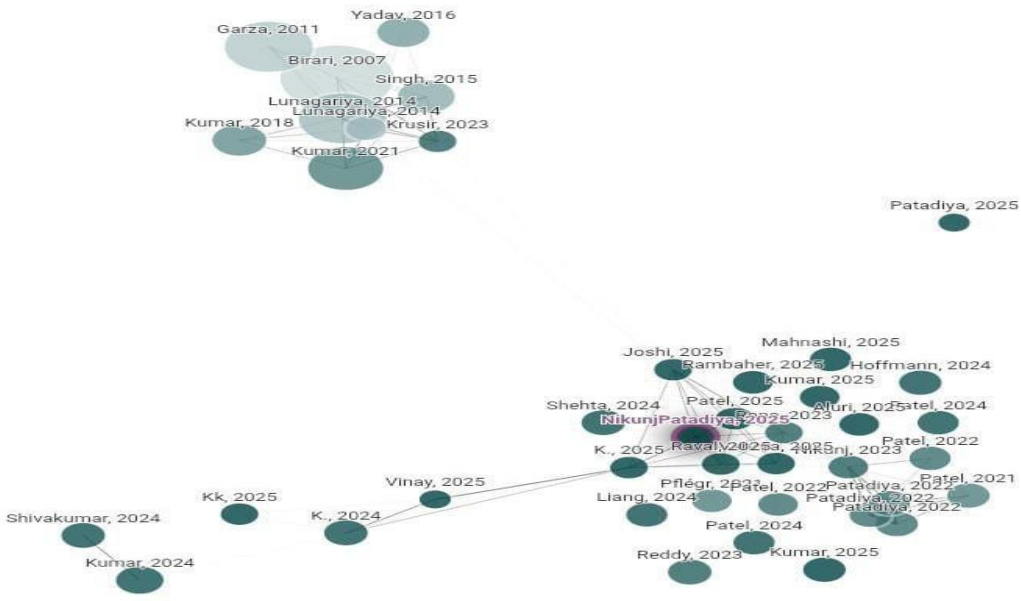
5. ***Shriram, B. K., Devhare, L. D., Mehrotra, A., Deokar, S. S., & Singh, S. P. (2023).***
   A study on the creation and assessment of a mosquito repellent stick with natural and plant-based chemicals was carried out by Shriram et al. (2023). The goal of the study was to create a mosquito repellent that was safe, efficient, and easy to use instead of chemical ones. Burning time, stability, aroma , and repellant effectiveness were among the criteria that were assessed in the study. The results showed that the herbal stick was safe for everyday usage in the home and effective in keeping mosquitoes away. This study reinforces the current research's practical basis and demonstrates that creating herbal insect re pellent products is feasible.
6. ***Diiro, G. M., Kassie, M., Muriithi, B. W., Gathogo, N. G., Kidoido, M., Marubu, R., ... & Mutero, C. M. (2020).***
   In a study published in Sustainability, Gracious M. Diiro et al. (2020) investigated the willingness of families in malaria-prone Kenyan communities to pay (WTP) for a plant-based mosquito larvicide. The product used a biopesticide that is safe for the environment to control mosquitoes when they are still larvae. Household surveys and experimental auctions were used to get information about the amount that people were willing to donate. According to the findings, most participants were prepared to pay, particularly for reasonably priced goods. WTP was considerably raised by higher income, better education, and enhanced knowledge about malaria. The study found that if eco-friendly mosquito control methods are backed by appropriate pricing and awareness campaigns, they have a high market potential and community acceptance



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Research Methodology:

SR.NO	METHODS	PARAMETERS
1	Research type	Research report (descriptive)
2	Source of data collection	Primary and secondary data collection
3	Data collection tool	Survey based structured (questionnaires)
4	Data analysis tool	Jamovi (Version 2.3)
5	Sampling size	248
6	Sampling method	Convenience Sampling

Product and Operational Framework:

Product Description:

The herbal mosquito repellent product is prepared using natural and plant-based ingredients. Unlike chemical mosquito repellents that contain synthetic substances, herbal alternatives are environmentally friendly, biodegradable, and comparatively safer for regular household use.

The product is intended for residential households, rural communities, and consumers who prefer natural mosquito control solutions. Due to increasing awareness about the harmful effects of chemical repellents, demand for herbal products is gradually increasing.

The proposed product is a herbal mosquito repellent incense prepared using natural ingredients such as neem leaves, nirgundi leaves, cow dung powder, and natural binding agents. These materials are locally available and economical, making production suitable for small-scale operations.

Raw Materials:

The herbal mosquito repellent product is manufactured using easily available and cost-effective natural ingredients. The key raw materials include:

- Neem leaves
- Nirgundi leaves
- Camphor
- Cow dung powder (base material)
- Water (for mixing and binding)

These materials are locally available and economical, making the product suitable for small-scale and home-based production. The use of herbal ingredients also enhances environmental sustainability.

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Production Process:

1. Collection of raw materials from local suppliers.
2. Drying of plant materials to remove moisture.
3. Grinding into fine powder.
4. Mixing ingredients with binding material.
5. Shaping into incense form using molds.
6. Natural drying for 24–48 hours.
7. Packaging using eco-friendly materials.

The process requires minimal machinery, allowing home-based or micro-enterprise production

Initial Investment:

Sr. No.	Particulars	Annual Cost	Calculation
1	Mixing Equipment	₹. 10,000	-
2	Drying Trays	₹. 5,000	-
3	Initial Raw Material Stock from Farmers	₹. 1,20,000	10,000*12(months)
4	Rent	₹. 96,000	8000*12(months)
5	Labour	₹. 96,000	8000*12(months)
5	Miscellaneous Expenses	₹. 20,000	-
	Total	**₹. 3,47,000**	

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Source of Investment – Own Investment (Own Capital) – Equal Contribution

Costing of herbal mosquito repellent dhoop per unit

Material Cost:

Ingredients	**Quantity per dhoop**	**Market Price per unit of dhoop**	**Basis/Calculation**	**Cost per dhoop**
Neem Leaves	3 gram	₹. 50 / 100 g	3/100*50	₹. 1.5
Nirgundi Leaves	1.5 gram	₹. 40 / 100 g	1.5/100*40	₹. 0.6
Camphor	0.5 gram	₹. 100 / 100 g	0.5/100*100	₹. 0.5
Cow Dung	15 gram	₹. 10 / 100 g	15/100*10	₹. 1.5
Total				**₹. 4.1**

Labor Cost (Production capacity per month – 9100 Dhoops i.e. 1300 Boxes containing 7 dhoops)

Monthly Wages	**Production Capacity per month**	**Basis/Calculation**	**Labor cost per dhoop**
₹. 8,000	9100 Dhoops i.e.1300 Boxes containing 7 dhoops	8000 / 9100	₹. 0.879

Other Expenses Per Unit of Dhoop Packaging cost per Unit of Dhoop - ₹. 0.7 Electricity per Unit of Dhoop - ₹. 0.5 Contingencies per Unit of Dhoop - ₹. 0.3

Total Cost Per Unit of Dhoop

(Material Cost = 4.10 Labour Cost = 0.88

Other Expenses = 1.50) = ₹. 6.479

Total Cost Per Box of Dhoop (containing 7 dhoops) - ₹. 45.35 Selling Price Per Unit of Dhoop - ₹. 9

Selling Price Per Box of Dhoop (containing 7 dhoops) - ₹. 63 but will sold in ₹. 60 Profit Per Box of Dhoop (containing 7 dhoops) - ₹. 14.65

Monthly Production = 1,300 boxes

Monthly Profit = 1,300 × 14.64

= **₹19,032**

Annual Profit = 19,032 × 12

= ***₹2,28,384***

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Break-Even Analysis

Classification of Costs Fixed Costs (Annual)

Particular	**Amount (₹)**
Rent	96,000
Labour	96,000
Miscellaneous	20,000
Total Fixed Cost	**₹ 2,12,000**

Monthly Fixed Cost = 17,667

Variable Cost per Dhoop (excluding fixed labour)

Material + Packaging + Electricity + Contingencies

= 4.10 + 1.50

= **₹5.60**

Contribution Analysis:

Selling Price per Dhoop = ₹9 Variable Cost per Dhoop = ₹5.60

Contribution per Dhoop = 9 – 5.60

= **₹3.40**

Contribution per Box = 3.40 × 7

= **₹23.80**

Break-Even Point (BEP)

BEP (Units) = Fixed Cost / Contribution per Unit

Annual BEP (Dhoops) = 2,12,000 / 3.40

= ***62,353 dhoops***

Annual BEP (Boxes) = 62,353 / 7

= ***8,908 boxes***

Monthly BEP (Boxes) = 742 boxes

Margin of Safety:

Monthly Production = 1,300 boxes Monthly BEP = 742 boxes

Margin of Safety = 1,300 – 742

= 558 boxes

Margin of Safety (%) = (558 / 1,300) × 100

= **42.9%**

This indicates a strong operational safety margin.

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Payback Period:

Initial Investment = ₹3,47,000 Annual Profit = ₹2,28,384

Payback Period = 3,47,000 / 2,28,384

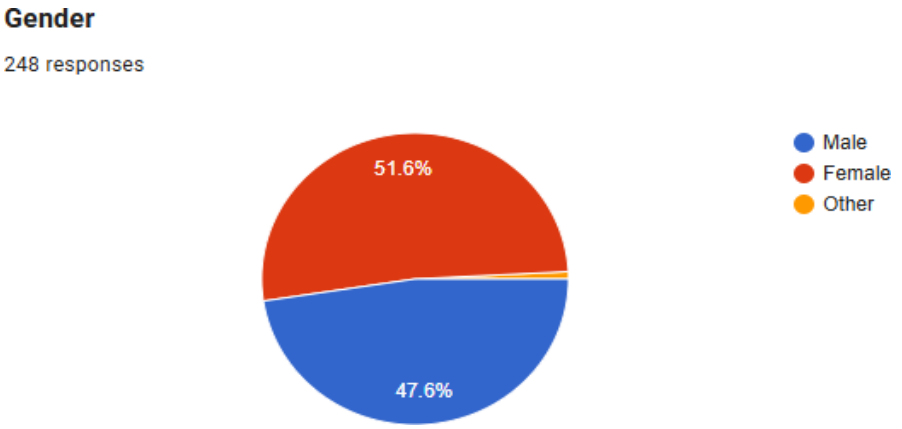
= ***1.52 years (approximately 18 months) Return on Investment (ROI)***

ROI = (Annual Profit / Initial Investment) × 100

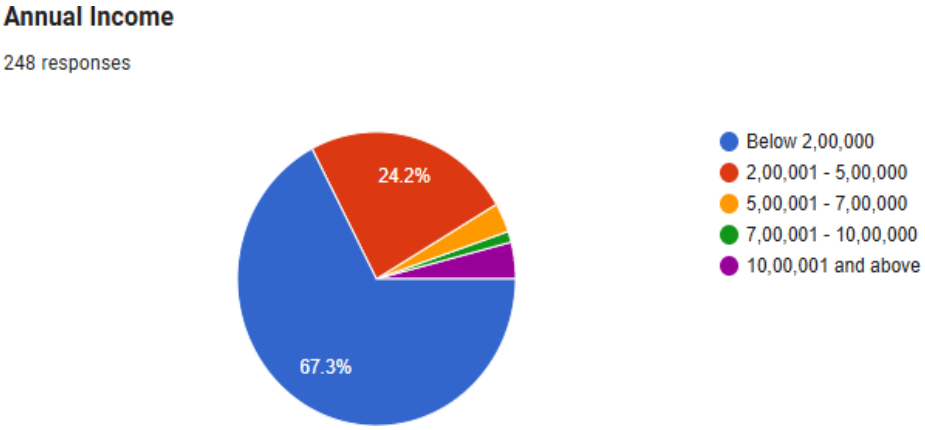
= (2,28,384 / 3,47,000) × 100

= **65.8%**

Data Analysis and Interpretation:



Nearly equal gender involvement in the survey is indicated by the following chart, which shows that 51.6% of respondents are female, 47.6% are male, and 0.8% fall into other categories



The data shows that the majority of respondents are in lower income levels, with 67.3% earning less than ₹2,00,000 yearly, 24.2% earning between ₹2,00,001 and ₹5,00,000, and only a small minority earning more than ₹5,00,000.

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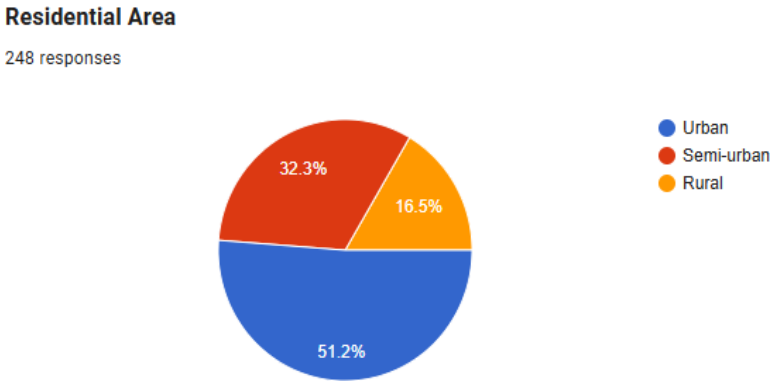
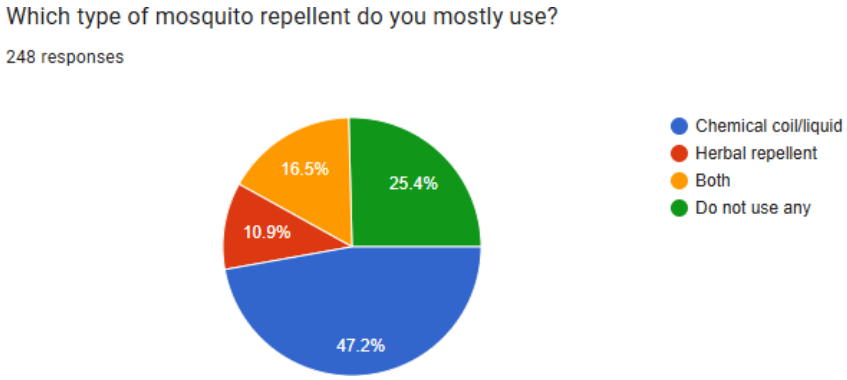
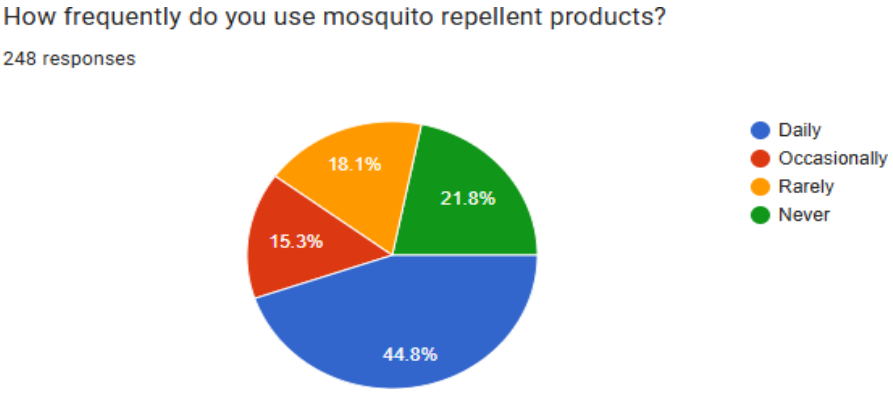


According to the above chart, 51.2% of respondents reside in urban areas, 32.3% in semi-urban areas, and 16.5% in rural areas, reflecting greater representation from urban regions.



Among the 248 respondents, 47.2% of them used the chemical coil/liquid option, according to the statistics. A total of 27.4% of people choose either herbal repellents (10.9%) or a mix of both (16.5%), while 25.4% of people do not use any repellent at all.



According to the following graph, 21.8% of respondents never use mosquito repellents, 15.3% do so occasionally, 18.1% infrequently, and 44.8% do so every day. This suggests a consistent market for items that repel mosquitoes.

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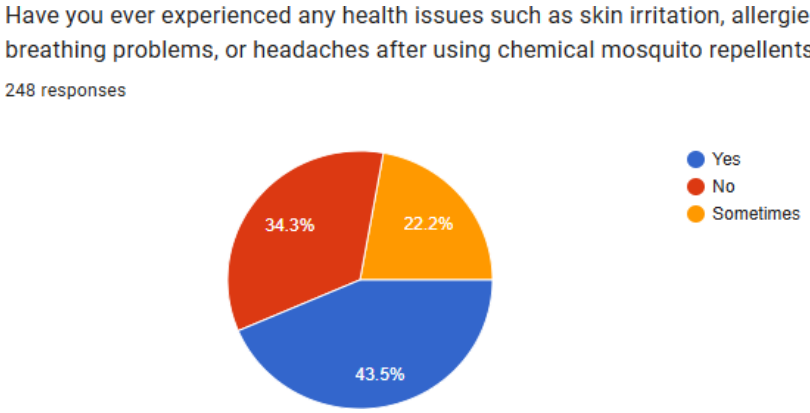
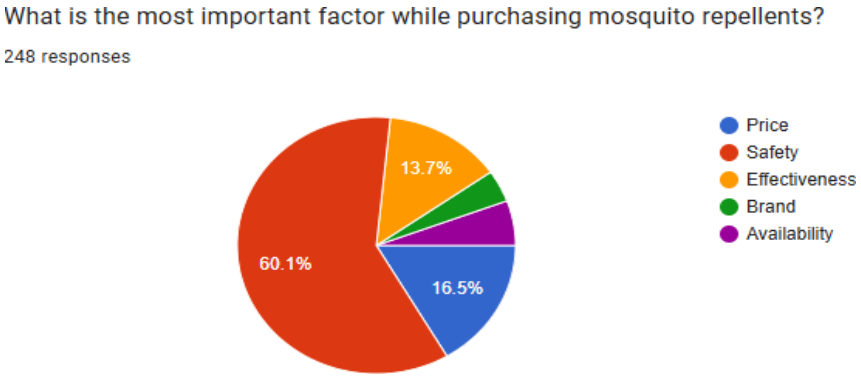
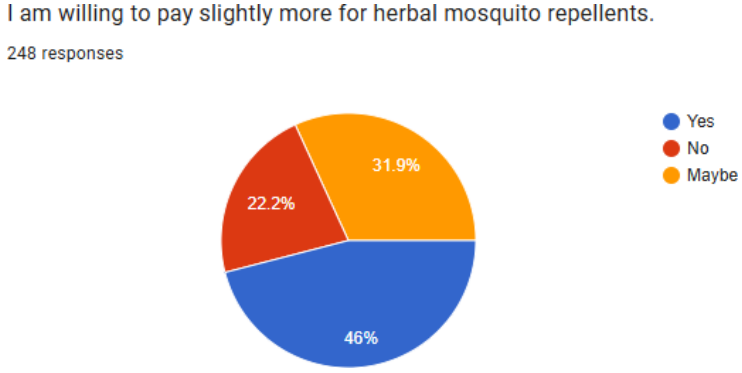


According to the graph, 22.2% of respondents occasionally have problems because of chemical repellents, and 43.5% of respondents have had health problems. Nearly two-thirds of responders are impacted, which emphasizes the need for safer substitutes.



According to the report, consumers' top concern is safety, as 60.1% of respondents say that is the most crucial consideration when buying mosquito repellents. Brand and availability are far less important factors in the decision-making process, with price and effectiveness coming in second at 16.5% and 13.7%, respectively.



Given that 46% of the 248 respondents are expressly willing to pay more for herbal insect repellents, the survey shows a significant market potential for natural alternatives. Even after accounting for the 31.9% who selected "Maybe," almost 78% of people are prepared to pay more for herbal items, compared to just 22.2% who are not

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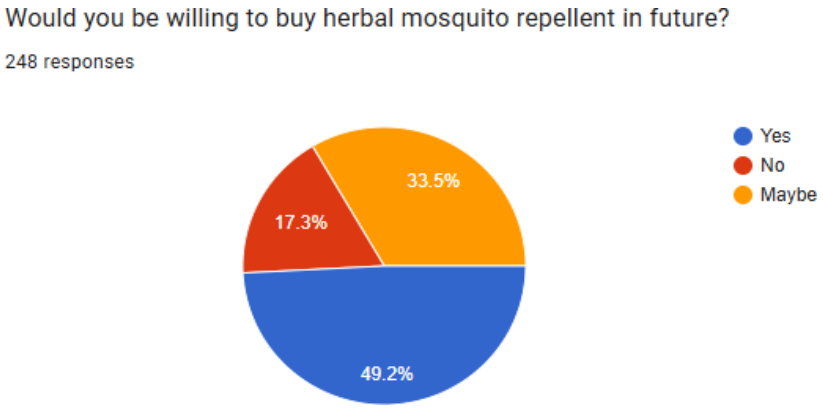
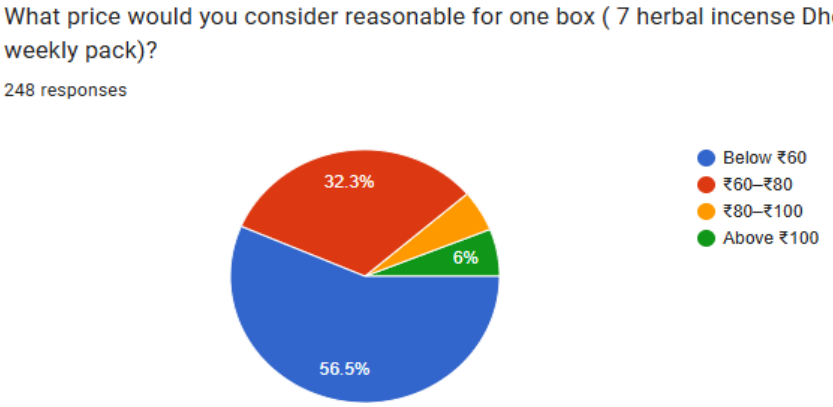
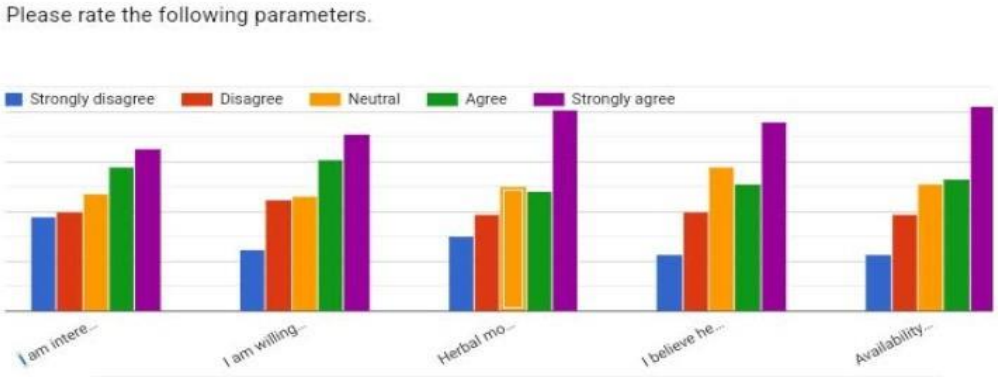


Out of the 248 respondents, 49.2% said they would definitely use herbal mosquito repellents in the future, indic ating a robust market for herbal alternatives. Together with the 33.5% who selected "Maybe," almost 83% of par ticipants indicated that they would be open to using these items, whereas just 17.3% showed no interest at all.



According to the study, most of the 248 respondents are price conscious, with 56.5% thinking that a weekly pack of herbal incense Dhoop should cost less than ₹60. Only 11% of respondents would contemplate prices beyond ₹80, despite 32.3% being prepared to pay between ₹60 and ₹80. This indicates that setting the product's price at ₹60 would be appropriate for greatest acceptance.



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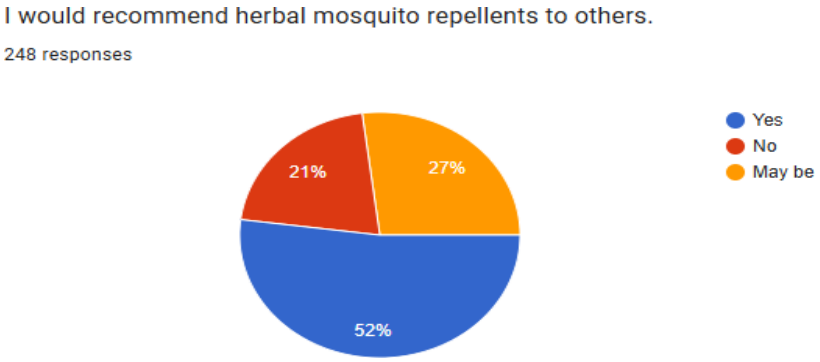
The bar chart indicates a strong positive sentiment toward herbal mosquito repellents, with the highest frequency of respondents choosing "Strongly agree" across all five parameters. This suggests that consumers are not only highly interested and willing to try these products but also hold a firm belief in their benefits and the importance of their availability.



According to the following chart, 27% of respondents might suggest herbal insect repellents, and 52% of respondents would. This suggests strong word-of-mouth potential and favorable customer impression.

Contingency Tables

Contingency Tables

Are you aware of the herbal mosquito repellent?	Would you be willing to buy herbal mosquito repellent in future? Maybe	No	Yes	Total
Maybe	46	6	7	59
No	22	29	71	122
Yes	15	8	44	67
Total	83	43	122	248

χ^2 Tests

	Value	df	p
χ^2	74.3	4	< .001
N	248		

A Chi-square test of association was conducted to examine the relationship between awareness of herbal mosquito repellents and willingness to purchase in the future. The results showed a statistically significant association, $\chi^2(4, N = 248) = 74.3$, $p < .001$. Therefore, the null hypothesis was rejected, indicaties that awareness significantly influences purchase intention.

Conclusion:

This study evaluated the financial feasibility and market potential of establishing a herbal mosquito repellent start up. The findings reveal a strong consumer inclination toward herbal alternatives. Statistical analysis confirmed a significant relationship between awareness and purchase intention, highlighting the importance of consumer education and marketing strategies. From a financial perspective, the project demonstrates strong

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viability. The calculated break-even point of 8,908 boxes annually is significantly lower than the projected annual production capacity of 15,600 boxes, resulting in a margin of safety of 42.9%. The estimated annual profit of ₹2,28,384, payback period of approximately 18 months, and ROI of 65.8% indicate that the start up has the potential to generate sustainable income within a relatively short time frame. Moreover, beyond financial profitability, the venture contributes to environmental sustainability, rural employment generation, and support for local agricultural supply chains. However, profitability projections are based on estimated costs and demand assumptions, and actual performance may vary due to seasonal fluctuations and competitive market conditions. Overall, the study concludes that establishing a small-scale herbal mosquito repellent start up is both financially feasible and socially beneficial, provided that effective pricing, awareness campaigns, and quality control measures are implemented.

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Cite This Article:

Pohare G. M., Dubey P. K., Phadtare J.S., Prof. Dr.Yadav S. B., Kumawat O. I., Moule P. N. & Khutikar V. B. (2026). *From Idea to Income: A Financial Study of Own Herbal Mosquito Repellent Startup* **In Educreator Research Journal: Vol. XIII (Issue I),** pp. 94–102. **Doi:** https://doi.org/10.5281/zenodo.19881886