

FOOD SAFETY DEVICE

घुलता जहर: फलों, सब्जियों और खाद्य पदार्थों के जरिये शरीर में पहुंच रहे कीटनाशक

मनीष मिश्र, अमर उजाला, नई दिल्ली। Published by: योगेश साहू Updated Fri, 14 Aug 2020 04:18 AM IST



Revealed: the child victims of pesticide poisoning in India

Peter Caton and Beatriz Lopez | 4th January 2012

1. Team



Harsh Kumar

**Undergraduate Student,
IIT Patna**

- Research and Development
- Data Analysis and Visualization
- Fabrication and Prototyping
- CAD Design and Modeling



Shreyas B Chandra

**Undergraduate Student,
Amity University, Patna**

- Electronics and Circuit Design
- PCB Design and Fabrication
- IoT Development and Integration
- Embedded Systems



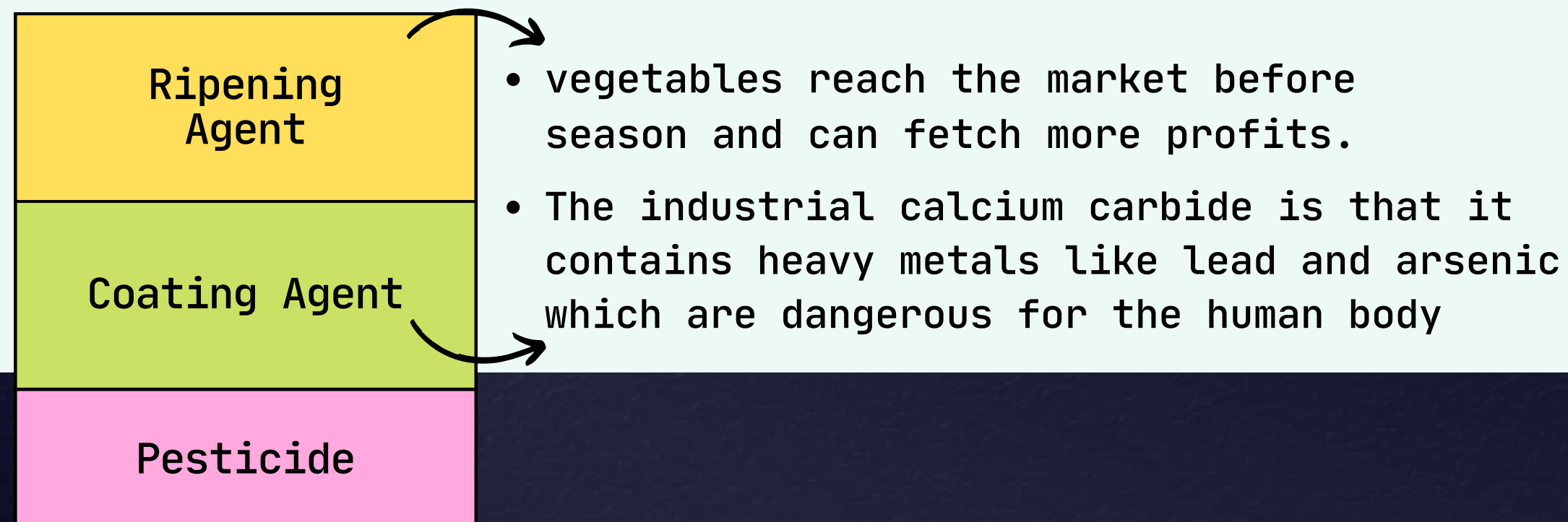
Shital Singh

**High School Student
DPS Patna**

- Theoretical Research and Analysis
- Content Creation and Research
- Survey Design and Analysis
- Project Management and Coordination

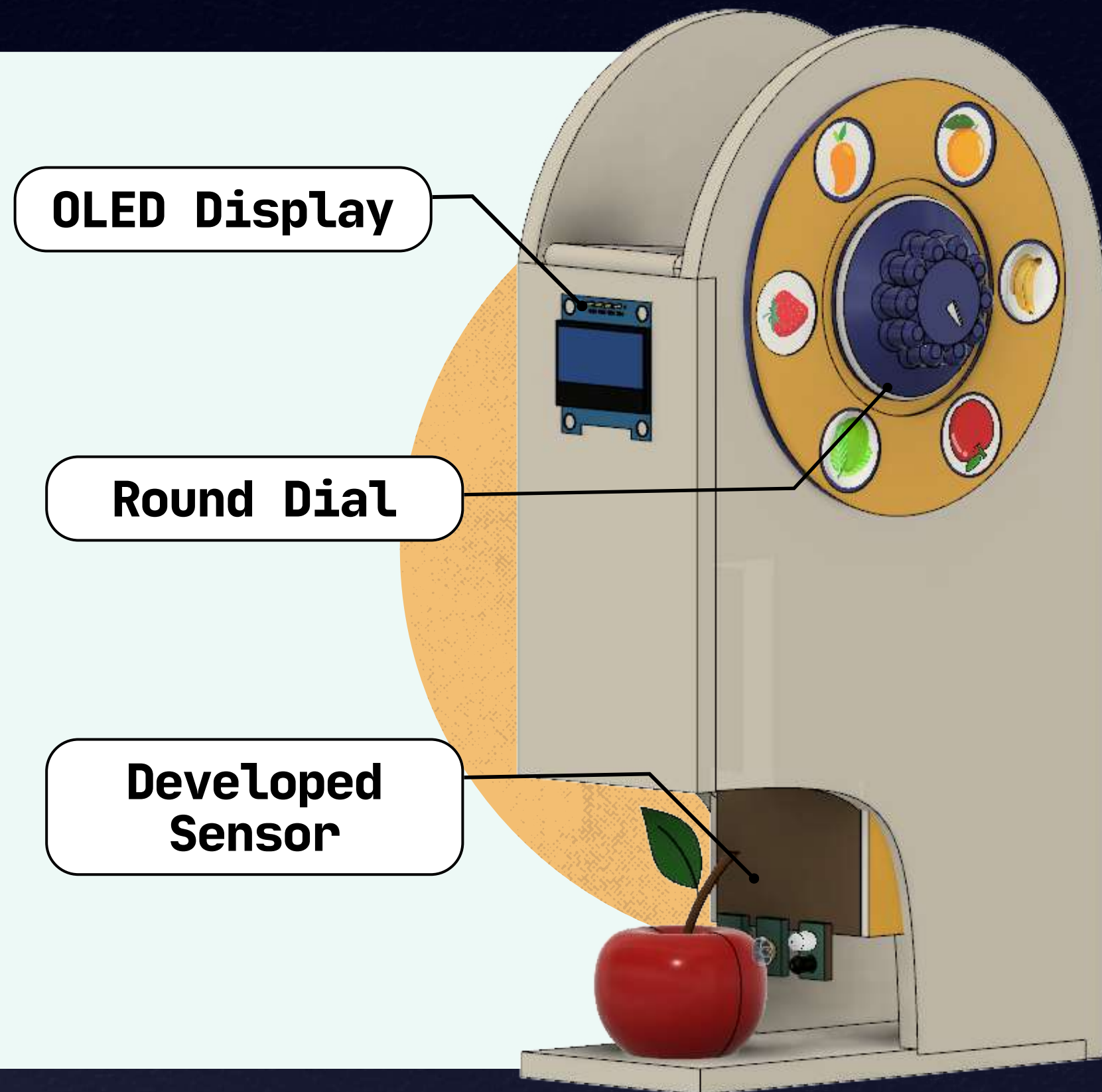
2. Customer segment and Problem Statement

- Pesticides are widely used in agriculture to protect crops from pests and diseases. However, the residue of these chemicals can remain on the fruits and vegetables and pose a risk to human health.
- The use of excessive pesticides has been linked to a range of health problems, including cancer, birth defects, and developmental problems.



3. Proposed Solution/Product

- Developing a device uses a combination of near-infrared (NIR) and visible (VIS) spectroscopy to detect pesticide residue in fruits and vegetables.
- This technology is based on the principle that different chemicals absorb light at different wavelengths, which can be used to identify the chemical composition of a sample.
- The device is designed to be highly accurate and fast, making it an ideal solution for the food industry.



4. Unique Value Proposition

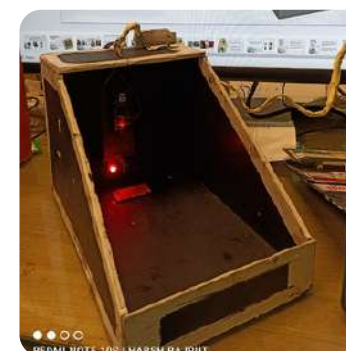
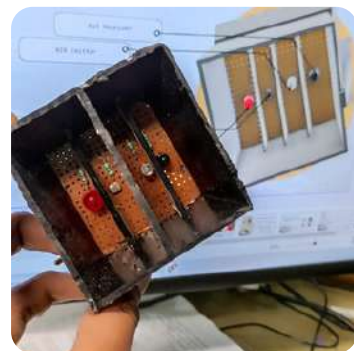
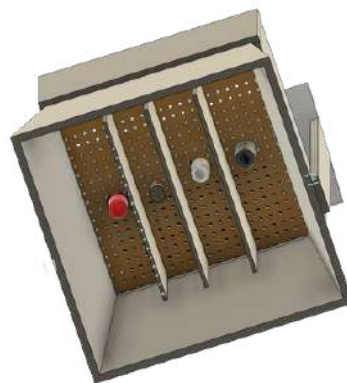
Non-Destructive
technique

Accuracy

Relatively low-
cost method

User Friendly,
fast, convenient

- One of the key advantages is that it is a non-destructive technique. Unlike traditional methods for pesticide analysis, such as sample extraction and chemical analysis, NIR and visible red spectroscopy does not destroy the sample and can be used to analyze the sample in real-time. This makes it a convenient and fast method for detecting pesticides in fruits and vegetables.
- It is also a relatively low-cost method for pesticide detection compared to traditional methods, as it does not require extensive sample preparation or the use of specialized chemicals and reagents



Prototypes of our device

5. Market Size

According to
Grand View Research

the global food safety
testing market size was
estimated at USD 22.6
billion in 2023 and is
anticipated to expand at
a compound annual growth
rate (CAGR) of 7.8% from
2024 to 2030

Target Audience

Secondary Customers:

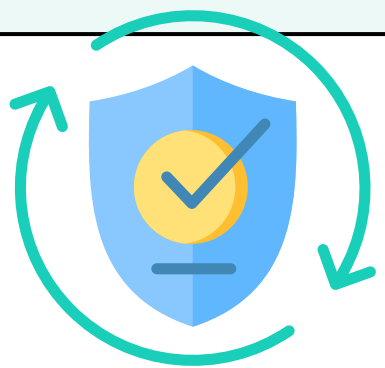
- Food safety organizations.
- Government agencies.

Growth Driver:

- Growing demand for organic and natural products.

Primary Customers:

- Consumers who prioritize their health and well-being.
- Individuals with dietary restrictions or allergies.
- Parents concerned about their children's health.
- Food industry professionals (farmers, retailers, distributors).



Regulatory



Researcher

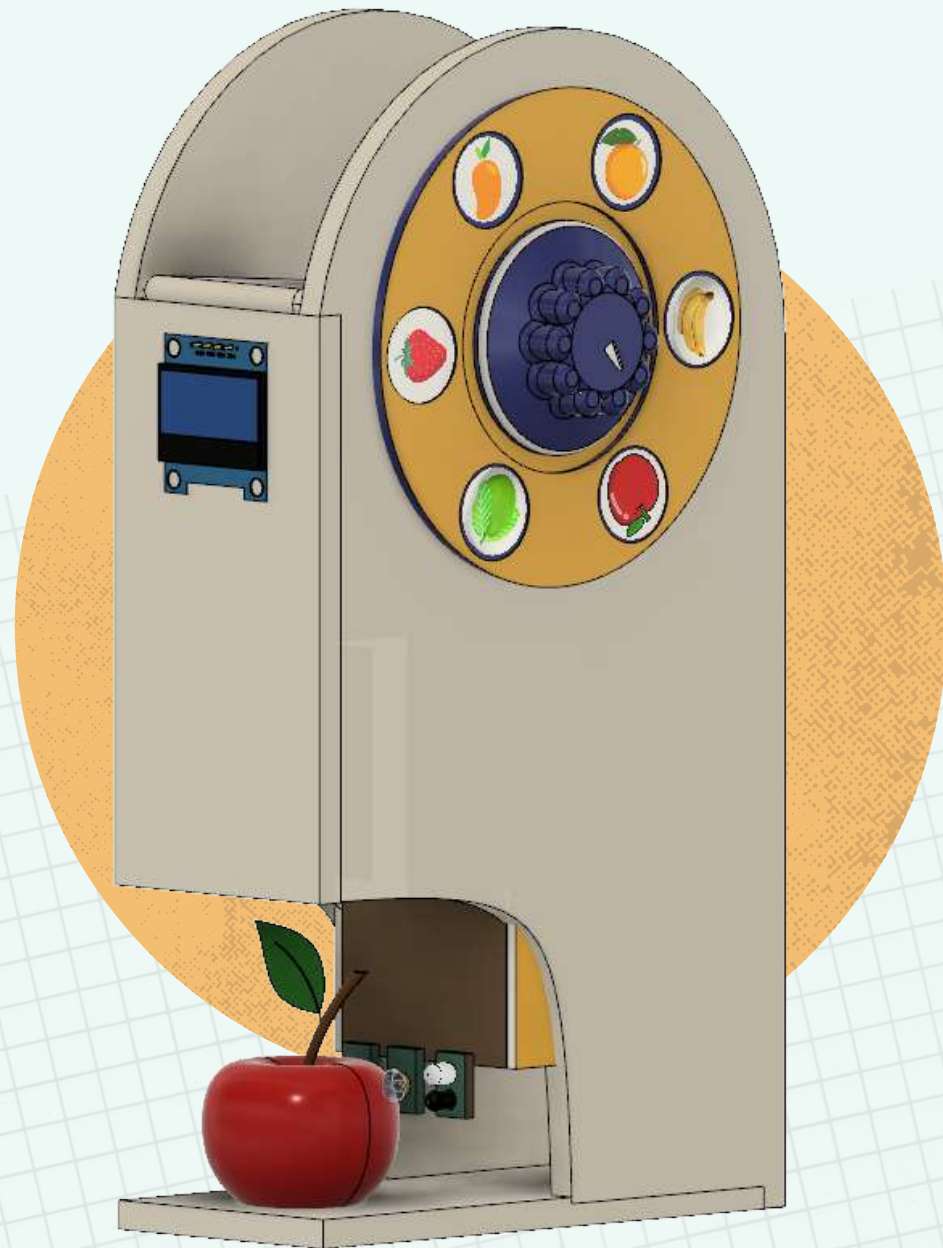


Seller



Consumer

6. Business Model



Revenue Streams:

- Device sales
- Software updates and maintenance
- Partnerships with food safety organizations, grocery stores, and farmers markets

Value Proposition:

- Convenience and ease of use
- Accurate and reliable results
- Peace of mind for consumers
- Contribution to a healthier and safer food supply

Cost Structure:

- Research and development
- Manufacturing
- Marketing and sales

7. Competitive analysis



Laboratory-based Methods:

- Gas Chromatography (GC): This is the gold standard for pesticide residue analysis but requires complex laboratory setups, skilled technicians, and significant time and cost.



Spectrophotometers:

- This device uses near-infrared spectroscopy to analyze various substances, including food. However, it is primarily designed for research and quality control applications and might not be suitable for consumer use.



Gas Detector

- This instrument employs gas detection for rapid food analysis but is more focused on compositional parameters like fat, protein, and carbohydrates rather than pesticide residues.

8. Validation

Completed Testing and Validation



6 Week Training

8. Market Traction

Targeted Marketing Campaigns:

Develop campaigns focused on health-conscious consumers, farmers, and retailers. Utilize social media, digital advertising, and public relations to reach our target audience.

Partnerships and Collaborations

Will do strategic partnerships with grocery stores, farmers' markets, and health organizations to expand distribution and credibility.

Community Outreach and Education:

Organize awareness campaigns, workshops, and educational events to inform consumers about the importance of food safety and the benefits of our device.

9. Future Plan

In built Round Dial

- Device is equipped with a round dial that allows the user to select the type of sample being tested.
- By rotating the dial clockwise, the user can select the sample, such as an apple or a tomato, and the device will automatically set the threshold value accordingly.

OLED Display screen

- The device has a display screen that provides the results of the analysis, including the chemical composition of the sample and whether it is safe to eat or not.
- The results are presented in an easy-to-understand format, making it simple for the user to understand the results and make informed decisions about their food.

Deisgnd Sensor:

User have to place sample infront of the sensor and a light source from the sensor, NIR and RED LED, is used to illuminate the sample and a Receiver, photodiode is used to measure the absorbed and reflected light,

Enhance Accuracy:

Invest in further R&D to improve the device's accuracy in detecting various pesticides and chemicals, including emerging contaminants.

Miniaturization:

Explore ways to reduce the device's size and weight for improved portability and convenience.

Cloud and AI Integration

Utilize cloud-based platforms to store and analyze large datasets collected by the device, providing valuable insights into pesticide usage patterns and emerging trends.

- Manufacturing Partnerships

- Distribution

- Durability and Aesthetics

10. Support required from Catalyst



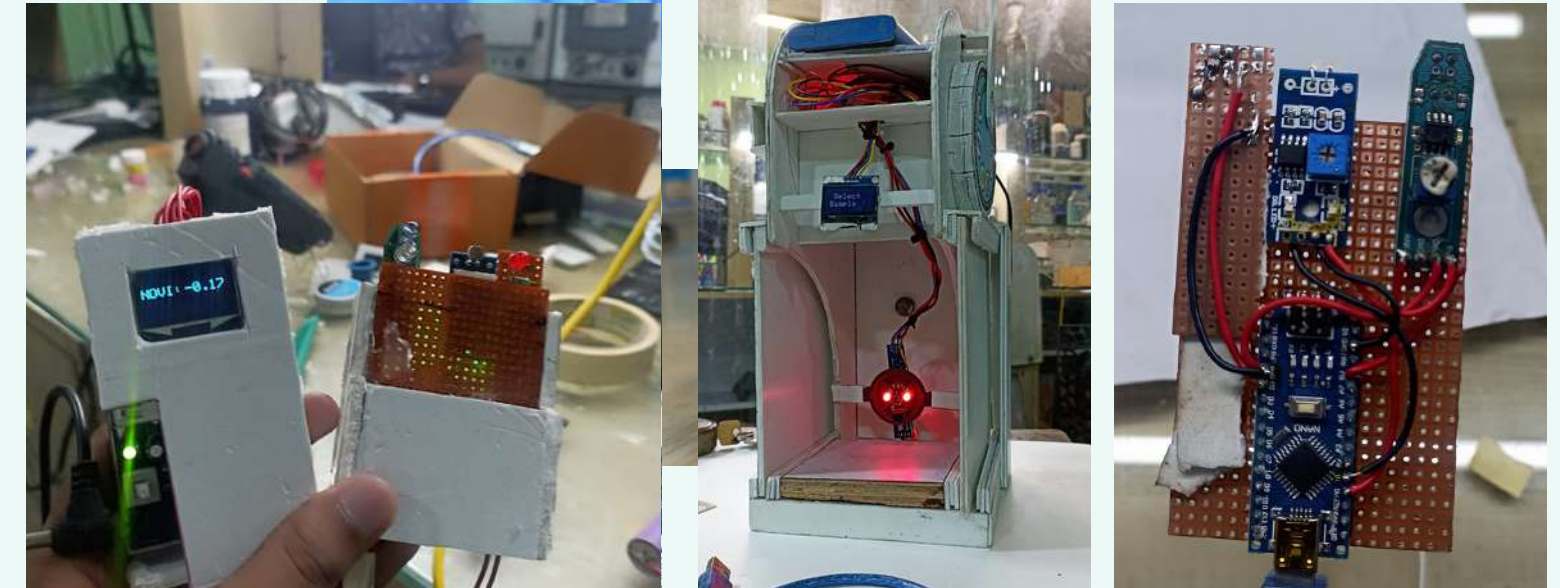
Mentorship

- Guidance from industry experts in food safety, technology, and business development.



Intellectual Property

- Protecting the technology through patents and trademarks.
- Assistance with patent filing and intellectual property management.



Funding / R&D Support

- Financial support to cover research and development costs, manufacturing expenses.
- Access to research facilities, equipment, and expertise to further refine the device and its capabilities.

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Thanks

For any questions kindly contact