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INTERNATIONAL TINKER INNOVATION & ENTREPRENEURSHIP CHALLENGE (i-TIEC 2025)

"Fostering a Culture of Innovation and Entrepreneurial Excellence"



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23 January 2025
PTDI, UiTM Cawangan Johor
Kampus Pasir Gudang

ORGANIZED BY:

Electrical Engineering Studies, College of Engineering
Universiti Teknologi MARA (UiTM) Cawangan Johor
Kampus Pasir Gudang
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PREFACE

It is with great pleasure that we present the e-proceedings of International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), which compiles the extended abstracts submitted to the International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), held on 23 January 2025 at **PTDI, Universiti Teknologi MARA (UiTM) Cawangan Johor, Kampus Pasir Gudang**. This publication serves as a valuable resource, showcasing the intellectual contributions on the invention and innovation among students, academics, researchers, and professionals.

The International Tinker Innovation & Entrepreneurship Challenge (i-TIEC 2025), organized under the theme "Fostering a Culture of Innovation and Entrepreneurial Excellence," is designed to inspire participants at various academic levels, from secondary students to higher education students and professionals. The competition emphasizes both innovation and entrepreneurship, encouraging the development of product prototypes that address real-world problems and have clear commercialization potential. By focusing on technological and social innovations, i-TIEC 2025 highlights the importance of turning creative ideas into viable, market-ready solutions that can benefit users and society. The extended abstracts in this e-proceedings book showcase the diverse perspectives and depth of research presented during the event, reflecting the strong entrepreneurial element at its core.

We extend our sincere gratitude to the contributors for their dedication in sharing their innovation and the organizing committee for their hard work in ensuring the success of the event and this publication. We also appreciate the support of our collaborators; Mass Rapid Transit Corporation Sdn. Bhd. (MRT Corp), Universitas Labuhanbatu, Indonesia (ULB), Universitas Riau Kepulauan, Indonesia (UNRIKA) and IEEE Young Professionals Malaysia, whose contributions have been instrumental in making this event and publication possible.

We hope that this e-proceedings book will serve as a valuable reference for researchers, educators, and practitioners, inspiring further studies and collaborations in both innovation and entrepreneurship. May the knowledge shared here continue to spark new ideas and market-ready solutions, advancing our collective expertise and fostering the growth of entrepreneurial ventures.

B-SS136: EMPOWERMENT OF SMALL AND MEDIUM ENTERPRISES (SMES) IN SHRIMP FARMING IN BARELANG, GALANG ISLAND, BATAM THROUGH MARKETING DIGITALIZATION: BUILDING SUSTAINABLE COMPETITIVENESS	790
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B-SS144: UTILIZATION OF RUBBER SEEDS (HEVEA BRASILIENSIS) THROUGH CYANIDE DETOXIFICATION FOR CULINARY APPLICATIONS: A SUSTAINABLE APPROACH TO INCREASING ECONOMIC VALUE

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ABSTRACT

Indonesia is one of the largest rubber producers and exporters in Asia with a major contribution to the global industry. In addition to producing latex, rubber trees also produce seeds, known as kelatak. These seeds have an economic potential that has not been fully utilized, although they contain toxic cyanide acid (HCN) so that they require special processing to be safe for consumption and used as a basic ingredient for making cracker snacks. This study examines an effective traditional method for detoxifying (HCN) in rubber seeds with the aim of proving its suitability as a high-value cracker ingredient. The detoxification process is carried out through two main stages: (1) soaking rubber seeds in clean water with (NaCl) solution for 72 hours to dissolve the (HCN) content, and (2) boiling rubber seeds with (COOH)₂ solution for 6 hours, adding water again when repeated three times. Analysis shows that this method is successful in reducing HCN content significantly, so that rubber seeds are safe to consume and can be processed into cracker snacks. This study proves that traditional processing can turn rubber seeds that are considered waste into products with economic value. This has the potential to help rubber farmers diversify their income. In addition, this innovation encourages the adoption of sustainable practices and opens up opportunities to develop products based on agricultural by-products. Further research is needed to improve efficiency and production.

Keywords: Rubber seeds, traditional processing, economic added value, culinary innovation.

1. Product Description

Aek Pamienke Plantation, located in Aek Natas sub-district, North Labuhanbatu regency, Indonesia, is known for its rubber plants as its main commodity. This plantation supports the existence of PT Socfin Indonesia (Socfindo) factory, which focuses on the rubber industry. Rubber trees (*Hevea Brasiliensis*) thrive in tropical climates and produce latex, an important raw material for the textile and petrochemical industries, such as car tires and cables. However, the abundant rubber seeds are often considered waste and are not utilized. Local people generally assume that rubber seeds cannot be processed into food because they contain toxins. Although there is knowledge that rubber seeds can be consumed, the lack of understanding on how to remove toxins, such as cyanide acid (HCN), is an obstacle.

In this village research program, Labuhanbatu University students took the initiative to empower rubber seed waste by educating the community on how to process it into crackers that have economic value. The traditional low-cost rubber seed processing process through

soaking and boiling stages can reduce the toxic content, so that rubber seeds can be used as safe and useful food products, for example making cracker snacks.

2. Pictures of Rubber Seed Crackers Processing Process



Figure 1. Initial stage of rubber seeds processing

Figure 1. It is explained that this is the initial stage for processing rubber seeds, namely looking for rubber seeds in the community's rubber gardens, in this case we looked for them in the Aek Paminke plantation village area owned by PT. Sucofindo. The rubber seeds taken are of course those that have fallen from the tree and still have a bright, shiny color.



Figure 2. Washed rubber seeds

Figure 2 shows the next stage is the process of washing the rubber seeds. Here the rubber seeds that have been collected are first cleaned with clean water.



Figure 3. Separated seeds from the shell

After being cleaned, the rubber seeds are separated from the shell with the seed flesh and cleaned again as depicts in **Figure 3**. This aims to allow us to know which seed flesh is suitable for use or not so that it will not affect the taste of the cracker product to be made, also known as the sorting process.



Figure 4. Soaking rubber seeds

Figure 4 shows the most important stage in the detoxification process of cyanide acid (HCN) levels simply, namely by soaking rubber seeds that have been separated from their shells for 72 hours or 3 days with water that has been given a salt solution (NaCl). When the water has changed color for 6 hours, the water must be replaced or discarded periodically with the aim that cyanide acid (HCN) can also be discarded.



Figure 5. Boiling rubber seeds.

In addition to soaking, the next detoxification stage is boiling the rubber (**Figure 5**). . The rubber seeds are boiled with a solution of betel lime (Ca(OH)_2) as much as 3-5 tablespoons for 6 hours. When the water has reduced, add water again, this is done 3 times so that the cyanide acid (HCN) can be completely neutralized so that it can be processed further. Then drain and after that separate it from the skin on the seed flesh.

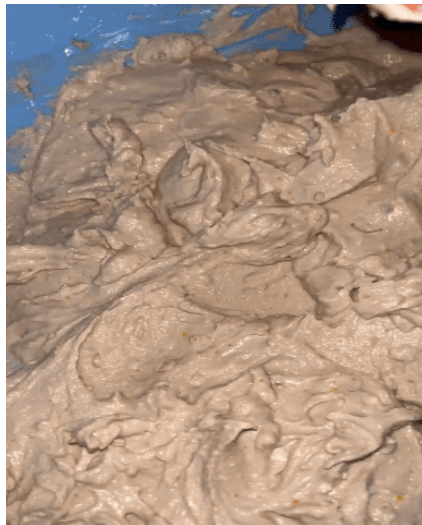


Figure 6. Rubber seeds dough

Then, after being boiled and peeled from the skin, the rubber seeds are ground using a grinding machine to make a dough (**Figure 6**).



Figure 7. Spices added to the dough

After going through the boiling and grinding process, enter the stage of giving spices that will make the rubber seeds have a savory taste (**Figure 7**). The ground rubber seeds are mixed with ingredients such as flour, spices such as coriander, garlic, salt, flavoring, red chili according to the measurements and tastes, then add water to make the basic cracker dough. Trials on various composition comparisons show that mixing 60% flour and 40% rubber seeds produces a crispier cracker texture.



Figure 8. Molding the dough

Figure 8 presents the stage of molding the dough that has been given additional flour and spices so that later the rubber seed crackers have texture and shape.



Figure 9. The molded dough

The molded dough (**Figure 9**) is then put into a container to be steamed, wait until the steamer is completely cooked then remove it, and it is desirable in the freezer to make it easier when cutting the cooked dough into thin plates.



Figure 10. Drying flat plates

Figure 10 shows the half-cooked dough ingredients have been cut into flat plates and then dried in the sun until completely dry to produce raw crackers that become crispy when fried.



Figure 11. Packed crackers

The raw crackers are fried after being cooked and given a flavoring powder such as balado to add a spicy taste. Put it in the packaging (**Figure 11**) so that the crackers remain crispy and last longer and the crackers are ready to be consumed.

3. Novelty and uniqueness

Culinary innovation that utilizes rubber seeds, a material that is often considered waste from the rubber industry and toxic. The novelty of this product lies in the use of unconventional raw materials, making it a sustainable and environmentally friendly choice. The taste of this cracker is unique, providing a different taste experience compared to other traditional snacks.

Rubber seed crackers are rich in fiber, protein, and minerals, making them a healthier snack alternative in an increasingly health-conscious global market. This product also reflects Indonesia's cultural heritage, with a traditional processing process of soaking and boiling rubber seeds for a long time, it can neutralize the toxic substances contained. Then the increasing interest in innovative and sustainable food, in addition, with this product, it can boost additional business opportunities for rubber farmers so that it can become an additional source of income.

4. Benefit to mankind

Rubber seed crackers have a number of benefits that make them a potential product to be widely introduced. This product is made from rubber seeds that have undergone a simple detoxification process, it can be a unique snack among snack lovers if the processing process is right to neutralize the levels of toxic substances (HCN). Consumption of rubber seed crackers can support a more nutritious diet.

In addition, this product also contributes to environmental sustainability by utilizing raw materials that are often overlooked, thereby helping to reduce waste from the rubber industry. Rubber seed crackers also represent Indonesia's cultural heritage, allowing international consumers to experience the distinctive taste and local traditions.

Then, by supporting production by local craftsmen, rubber seed crackers contribute to improving the community's economy. Therefore, promoting rubber seed crackers to the international market not only offers a delicious snack, but also supports aspects of health, sustainability, and cultural preservation.

5. Innovation and Entrepreneurial Impact

The innovation of rubber seed crackers lies in the utilization of rubber seeds, which are usually considered waste, as raw materials for healthy and delicious snacks. The unique and simple processing process produces a product with a distinctive taste, providing something new in the snack market. The entrepreneurial impact of crackers will certainly be very promising, opening up opportunities for rubber plantation owners and local rubber farmers to increase income and create jobs. With the increasing demand for healthy food in the global market, rubber seed crackers have the potential to attract attention and increase the competitiveness of innovative local products. Introducing these crackers supports sustainability and cultural preservation and is certainly environmentally friendly.

This rubber seed cracker product certainly needs support and involvement from the relevant government for its sustainability, so that it is truly able to expand comprehensively in the local and international markets. especially regarding laboratory tests, BPOM certification and halal labels as claims of product suitability that are safe for consumption.

6. Potential commercialization

Rubber seed crackers have promising prospects in the context of today's global market. As consumer awareness of the importance of a healthy diet increases, this product offers a nutritious snack that is rich in fiber. The use of rubber seeds as a raw material that is generally considered toxic waste when utilized provides added value while supporting environmental sustainability.

On the other hand, rubber seed crackers can be positioned as an ethnic product that reflects the richness of Indonesian culture, thus attracting the interest of international consumers who are interested in new culinary experiences. The global trend towards innovative and environmentally friendly foods also provides a great opportunity for a wider market.

7. Acknowledgement

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1. Assoc. Prof. Ade Parlaungan Nasution, SE,M.Sc.,PhD
2. Labuhanbatu MSMEs

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Fauziah Hanum, S.Pd., M.Pd. is an academic in the field of education. Currently, Fauziah serves as an Assistant Expert and is active in teaching and research. With high dedication, she continues to contribute to the world of education and research.



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