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Workshop on Healthy Food Production Using Simple Chemical Technology at GBI Bukit Zaitun Medan

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ABSTRACT

Public health is strongly influenced by daily dietary habits. Field observations indicate a low level of community understanding regarding healthy food and limited skills in safely and nutritiously processing ingredients. The Healthy Food Production Workshop Using Simple Chemical Technology at GBI Bukit Zaitun Medan was conducted to address this need, aiming to improve participants' knowledge, skills, and awareness related to healthy food. The method used was a community service approach with a participatory-educational design based on learning by doing. The workshop was conducted in three sessions: a theoretical presentation on healthy food and simple chemical technology, hands-on practice in preparing healthy food using local ingredients and simple tools, and a reflective discussion to evaluate participants' learning experiences. Data were collected through observation, brief interviews, pre- and post-workshop questionnaires, and field documentation. Analysis was performed descriptively, both qualitatively and with simple quantitative measures, to assess changes in participants' knowledge, skills, and attitudes. The results showed an increase in participants' understanding from 35% in the pre-test to 85% in the post-test, as well as practical competence in producing healthy food products, including probiotic drinks, steamed low-oil foods, and natural preservation using spices. Furthermore, most participants demonstrated strong motivation to change their dietary habits and apply the skills learned at home. This workshop demonstrates the effectiveness of a community-based approach in enhancing healthy food literacy and practical skills, providing a foundation for the development of sustainable programs that support healthy living within local communities.

Keyword: *workshop, Healthy Food, Technology, Chemical, GBI Bukit Zaitun Medan*

ABSTRAK

Kesehatan masyarakat sangat dipengaruhi oleh pola konsumsi pangan sehari-hari. Fakta di lapangan menunjukkan rendahnya pemahaman masyarakat mengenai pangan sehat dan keterbatasan keterampilan dalam mengolah bahan makanan secara aman dan bergizi. Workshop Pembuatan Pangan Sehat dengan Teknologi Kimia Sederhana di GBI Bukit Zaitun Medan diselenggarakan untuk menjawab kebutuhan tersebut dengan tujuan meningkatkan pengetahuan, keterampilan, dan kesadaran peserta terkait pangan sehat. Metode yang digunakan adalah pengabdian masyarakat berbasis partisipatif-edukatif dengan pendekatan *learning by doing*. Kegiatan dilakukan dalam tiga sesi: pemaparan teori mengenai pangan sehat dan teknologi kimia sederhana, praktik pembuatan pangan sehat menggunakan bahan lokal dan alat sederhana, serta diskusi reflektif untuk mengevaluasi pengalaman belajar peserta. Data dikumpulkan melalui observasi, wawancara singkat, kuesioner pra dan pasca kegiatan, serta dokumentasi lapangan. Analisis dilakukan secara deskriptif kualitatif dan kuantitatif sederhana untuk menilai perubahan pengetahuan, keterampilan, dan sikap peserta. Hasil menunjukkan peningkatan pemahaman peserta dari 35% pada *pre-test* menjadi 85% pada *post-test*, serta kemampuan praktik dalam membuat produk pangan sehat, termasuk minuman probiotik, makanan kukus rendah minyak, dan pengawetan dengan rempah alami. Selain itu, sebagian besar peserta menunjukkan motivasi tinggi untuk mengubah pola konsumsi dan menerapkan keterampilan yang diperoleh di rumah.Workshop ini membuktikan efektivitas pendekatan berbasis komunitas dalam meningkatkan literasi pangan

sehat dan kemampuan praktis masyarakat, serta memberikan dasar untuk pengembangan program berkelanjutan yang mendukung pola hidup sehat di lingkungan lokal.
Kata Kunci: *workshop, pangan sehat, teknologi, kimia, GBI Bukit Zaitun Medan*

Introduction

Public health is one of the main indicators of quality of life (Alexander et al., 2025). One of the most influential factors on health is daily dietary consumption patterns (R. Silaban et al., 2024). Field evidence shows that the majority of Indonesians, including those in Medan, still face various challenges in selecting and consuming healthy food (Alexander et al., 2024). The rise of a practical lifestyle has led people to consume fast food, instant food, and snacks high in sugar, salt, and fat more frequently (Alexander et al., 2024). These foods often also contain excessive synthetic chemical additives (Silaban et al., 2025), which may have long-term adverse effects on health (Alexander et al., 2023). This condition contributes to the increasing prevalence of degenerative diseases such as diabetes mellitus, hypertension, obesity, and cardiovascular diseases, which now affect not only the elderly but also younger generations (Sirait et al., 2024).

From a theoretical perspective, chemistry plays an important role in explaining and developing food processing technology (Sirait et al., 2025). Food chemistry, as a branch of chemistry, focuses on the composition, properties, and chemical changes in food materials (Sirait et al., 2025). Simple chemical technologies—for example, fermentation to produce probiotic-rich products (Sinaga et al., 2024), the use of natural preservatives, and processing techniques that reduce excess fat or oil—can be directly applied by communities (Sirait et al., 2023). The application of simple chemical technology does not require sophisticated laboratory equipment but can be implemented using household tools available daily (Silaban et al., 2025). With this basic understanding, communities can process local food ingredients into products that are healthy, nutritious, and safe for consumption (Silaban et al., 2021).

In addition to theory, there are also legal and regulatory foundations that reinforce the importance of healthy food processing (Pardede et al., 2024). The Indonesian National Agency of Drug and Food Control (BPOM RI) consistently issues regulations on food safety standards, including the permitted use of food additives and their consumption limits (Pasaribu et al., 2024). The Indonesian Ministry of Health, through various nutrition programs, also emphasizes the importance of preventing the triple burden of malnutrition—undernutrition, overnutrition, and micronutrient deficiencies (Silaban et al., 2020)—which can largely be addressed through education and changes in dietary consumption patterns (Siahaan et al., 2023). These regulations serve as an important reference that

education on healthy food is not merely an option but an urgent necessity for communities (Alifianita et al., 2022).

Based on this reality, the author considers it important to hold a Workshop on Healthy Food Production with Simple Chemical Technology at GBI Bukit Zaitun Medan. This activity is motivated by the community's need for practical and applicable knowledge in processing healthy food (Sirait et al., 2023). The church, as one of the centers of community activity, was chosen as the venue because it plays a strategic role not only in spiritual formation but also in community empowerment through education, health, and life skills (Sinurat et al., 2024). This workshop is expected to serve as a learning platform that integrates scientific knowledge with hands-on practice, enabling participants to understand basic concepts while directly trying healthy food-making techniques using simple chemical approaches (Sirait et al., 2021).

The problems faced by the community service partner, GBI Bukit Zaitun Medan, stem from the congregation's limited knowledge and skills in independently processing healthy food. Based on observations and preliminary interviews with church representatives, most congregants still have consumption patterns dominated by instant and high-fat foods, while their understanding of hygienic and nutritionally balanced food processing remains limited. In addition, the lack of information regarding the application of simple chemical technologies—such as natural fermentation, fat reduction techniques, and the use of spices as natural preservatives—makes it difficult for the community to adopt healthier dietary habits. The church also expressed that there has been no community-based educational platform that provides direct, hands-on training in healthy food production using simple scientific approaches applicable to daily life. This condition highlights the need for empowerment activities capable of integrating scientific knowledge with simple and practical applications within the church community. The urgency of implementing this community service activity lies in the real need to improve the community's healthy food literacy while fostering awareness of the importance of a healthy lifestyle as part of social and spiritual responsibility. Through this workshop, it is expected that changes will occur in the congregation's knowledge, attitudes, and behaviors related to selecting and processing safe and nutritious foods. The main objective of the activity is to provide education and practical training on the application of simple chemical technologies in healthy food production using local ingredients, enabling the community to understand basic chemical principles in food processing and apply them independently at home (Simatupang et al., 2025). Furthermore, this activity aims to strengthen the role of the church as a center of community empowerment—not only in the spiritual dimension but also in improving quality of life through health and

life skills (Harita et al., 2025). Therefore, this workshop serves as a strategic step toward creating a more nutrition-aware and self-reliant community capable of contributing to the sustainable improvement of public health within its social environment (Silaen et al., 2025).

The benefits of this research can be divided into two main aspects. First, the theoretical benefit is its contribution to developing literature and studies on healthy food education based on simple chemical technology that can be applied in community activities (Pane et al., 2025). Second, the practical benefit is the improvement of community knowledge, awareness, and skills in processing healthy food, which can promote healthier lifestyles, reduce the risk of degenerative diseases, and create a more productive and higher-quality society. Thus, the Workshop on Healthy Food Production with Simple Chemical Technology at GBI Bukit Zaitun Medan is a relevant, contextual, and strategic activity to address public health challenges, while also demonstrating how the synergy between science, government regulations, and community roles can generate real positive impacts.

Methods

The Workshop on Healthy Food Production with Simple Chemical Technology was carried out as part of a community service program using a participatory-educational approach (Barus et al., 2024). This method was chosen because it provides space for two-way interaction between facilitators and participants, as well as enabling participants to directly practice the knowledge they acquire (Pardede et al., 2025).

1. Location and Time of Activity

The workshop was conducted at GBI Bukit Zaitun Medan, a church actively serving as a center for spiritual and social activities in the surrounding community. This location was chosen because it provides adequate space capacity and a heterogeneous congregation in terms of age, education, and social background.

2. Subjects and Participants

The participants of the workshop consisted of the congregation of GBI Bukit Zaitun Medan and the surrounding community, with a total of 30 people. Participant selection was voluntary, with attention given to gender and age diversity to ensure inclusivity. The participants ranged in age from 20 to 55 years old, with 18 female participants (60%) and 12 male participants (40%). Most of them were housewives, church volunteers, and young adults actively involved in community activities. This composition allowed the program to accommodate various perspectives and learning needs within the community.

3. Data Collection Methods

Data collection was carried out through several techniques, namely:

a. **Direct observation**, to examine participants' engagement during the activity, including their level of participation, enthusiasm, and challenges encountered during practice.

b. **Brief interviews**, conducted with several participants to explore their perceptions of the importance of healthy food and the extent to which they could apply simple chemical technology in daily life.
c. **Evaluation questionnaires**, administered before and after the activity to measure participants' improvement in understanding healthy food concepts and processing techniques.
d. **Documentation**, in the form of photos and field notes as visual evidence of activity implementation.

4. Implementation Procedure

The activity implementation method was designed in the following stages:

a. **Community needs identification**: conducted through initial discussions with church leaders and congregation representatives to determine the main issues related to healthy food consumption. The results indicated the need for education on healthy food processing using natural ingredients and simple technology.
b. **Activity preparation**: included preparing presentation materials, selecting easily accessible local food ingredients (e.g., soybeans, cassava, fresh vegetables, and spices), and providing simple tools (pots, stoves, blenders, fermentation containers).
c. **Workshop implementation**, consisting of three sessions:
    1) **Session 1: Theoretical presentation**, explaining the basics of healthy food, the impact of excessive instant food consumption, and the application of simple chemistry in food processing.
    2) **Session 2: Hands-on practice**, participants were divided into small groups to try producing healthy food products such as simple probiotic drinks, low-oil processed foods, and preservation with natural ingredients.
    3) **Session 3: Discussion and reflection**, where facilitators and participants discussed practice experiences, encountered challenges, and opportunities for application at home.
d. **Activity evaluation**: conducted by comparing pre- and post-workshop questionnaire results, as well as gathering participants' feedback regarding the usefulness of the activity.

5. Data Analysis Techniques

The data obtained from observation, interviews, and questionnaires were analyzed descriptively and qualitatively Quantitative analysis was used to determine changes in participants' knowledge and attitudes regarding healthy food and the application of simple chemical technology. The data were first tabulated and tested for normality. If the data met the normality assumption, the paired sample t-test was employed to compare pre- and post-test mean scores and evaluate significant improvements in participants' knowledge and attitudes after the workshop. Conversely, if the data did not meet the normality assumption, the Mann–Whitney test was applied as a non-parametric alternative .

Qualitative analysis was conducted by thematically reviewing interview transcripts and field notes to explore participants' perceptions, learning

experiences, and motivation to adopt healthy food practices at home. The combination of quantitative and qualitative methods provided a comprehensive understanding of the workshop's effectiveness in enhancing community literacy, awareness, and behavior toward healthy food processing (Silaban et al., 2024).

6. Strategies for Addressing Challenges

This activity was designed to address the main challenge of limited community knowledge and skills in processing healthy food. The solutions offered through this method included:

a. Delivering materials in a simple and easily understandable manner according to participants' educational backgrounds.
b. Hands-on practice that enabled participants to learn by doing.
c. Selecting affordable local food ingredients to allow participants to independently replicate the practices at home.
d. Adopting a community-based approach through the church, ensuring greater acceptance and continuity with institutional support.

Through this method, it is expected that participants would not only acquire knowledge but also internalize new skills relevant to daily needs and develop collective awareness of the importance of a healthy lifestyle based on nutritious and safe food (Sibarani et al., 2023).

Results and Discussion

Results

The implementation of the Workshop on Healthy Food Production with Simple Chemical Technology at GBI Bukit Zaitun Medan proceeded successfully and received positive responses from the participants. The activity was attended by 30 participants (adjusted to the actual number) consisting of church members and the surrounding community. The workshop was conducted in three main sessions: theoretical presentation, hands-on practice in healthy food production, and reflective discussion. The results of the activity can be summarized as follows:

1. **Improvement in Participants' Knowledge**

Based on the results of the pre-test and post-test administered to participants, there was a significant improvement in understanding healthy food concepts and simple chemical technology. Before the workshop, only about 35% of participants correctly understood the concept of healthy food, while after the activity this figure increased to 85%. Participants' understanding of the dangers of excessive consumption of synthetic food additives also increased from 40% to 88%. A total of 30 participants took part in the pre-test and post-test evaluations. Quantitative analysis using the paired sample t-test showed a significant increase in participants' knowledge scores—from an average of 35% in the pre-test to 85% in the post-test ($p < 0.05$). Similarly, participants' attitude scores, reflecting motivation and awareness toward healthy eating, increased from 3.1 to 4.6 on a 5-point Likert scale.

2. **Participants' Practical Skills**

During the practice session, participants successfully produced several simple healthy food products, such as probiotic fermented drinks, low-oil steamed

foods, and food preserved with natural spices. Observations showed that 90% of participants were able to follow the instructions well, while the rest still required more intensive assistance, particularly during the fermentation stage.

3. **Participants' Response and Enthusiasm**

Field documentation indicated high enthusiasm among participants, as reflected in their active questioning, discussion, and sharing of personal experiences in daily food processing. Brief interviews conducted after the activity revealed that most participants considered the workshop relevant to their daily needs and expressed their intention to replicate the techniques learned at home.

4. **Measurable Impact**

Evaluation results showed that 82% of participants stated that the activity increased their motivation to reduce instant food consumption and shift toward healthy food processing. Around 75% of participants reported their willingness to try reproducing the healthy food products practiced during the workshop using easily accessible local ingredients.

The improvement in participants' knowledge and attitudes aligns with constructivist learning theory, which emphasizes learning through active participation and direct experience (*learning by doing*). According to Sirait et al. (2023) and Silaban et al. (2025), community-based training that integrates practical activities with conceptual understanding tends to result in more sustainable learning outcomes. This finding is consistent with Alexander et al. (2024), who reported that participatory workshops significantly increase community awareness in digital literacy and healthy living programs.

Furthermore, the results affirm that simple chemical technologies—such as fermentation, fat reduction through steaming, and natural preservation—can be effectively implemented without sophisticated laboratory equipment (Sirait et al., 2025). The integration of scientific principles into daily life practices demonstrates the transformative role of chemistry education beyond classrooms, particularly in promoting food safety and nutrition literacy at the community level. When compared to similar community service studies, such as Pane et al. (2025), which focused on innovative teaching materials for schools, and Pardede et al. (2024), which applied participatory education to promote civic awareness, the present activity offers a distinctive contribution. It connects *chemical literacy* directly with *community health empowerment*, filling a gap between scientific knowledge and everyday application—an aspect that remains underrepresented in previous outreach programs. Thus, this workshop strengthens the bridge between science education and community well-being through the contextualization of simple chemical practices.

Discussion

The results of the activity indicate a significant change in participants' knowledge, attitudes, and skills related to healthy food and simple chemical technology. The post-test scores, which were nearly twice as high as the pre-test

scores, demonstrated that the participatory-educational approach applied in the workshop was effective in transferring knowledge.

Hands-on practice (learning by doing) proved to be the most appropriate method in this activity, as it provided participants with real-life experiences. Most participants reported that they found it easier to understand simple chemistry concepts when directly applied in food processing, such as fermentation or preservation with spices. This finding is consistent with constructivist learning theory, which emphasizes the importance of active involvement in the learning process.

In terms of impact, the activity not only improved knowledge but also shifted participants' mindsets and attitudes toward the importance of healthy food. The majority of participants expressed their intention to reduce fast food consumption and replace it with healthier homemade food. This positive response reflects the potential sustainability of the program, particularly if the church community can adopt the workshop as a regular empowerment initiative for its members (Pardede et al., 2024).

Furthermore, the involvement of the church community as a partner proved strategic, as it enabled outreach to a wider group through a community-based approach. The church functioned not only as a place of worship but also as a center for education and community empowerment. This strengthens the literature suggesting that community-based institutions play a crucial role in accelerating information dissemination and fostering social behavior change.

In conclusion, this community service activity successfully addressed the initial challenge of limited community understanding and skills in healthy food processing. The impact was evident not only in the improvement of knowledge scores but also in participants' intentions and motivation to apply the acquired skills in their daily lives.

The comparative results between pre-test and post-test demonstrate that integrating chemical education with food literacy yields tangible community outcomes. Unlike many previous studies that focused solely on nutrition counseling, this activity combined theoretical chemistry concepts with hands-on local food production. The novelty of this program lies in its application of simple chemical technology as a medium for community health empowerment, particularly within a religious community setting—a context rarely explored in existing literature. The success of this workshop reinforces the potential of interdisciplinary approaches—linking chemistry, health education, and community service—to promote sustainable healthy living practices. The positive response from participants indicates that the model could be replicated in other community or faith-based institutions, contributing to broader social transformation through science-based empowerment.

Conclusions

The implementation of the Workshop on Healthy Food Production with Simple Chemical Technology at GBI Bukit Zaitun Medan yielded positive results and had a tangible impact on the participants. The workshop successfully enhanced

the community's understanding of the importance of consuming healthy food while introducing the application of simple chemical technology in everyday food processing. Based on pre- and post-activity evaluations, there was a significant improvement in participants' knowledge regarding healthy food concepts, the risks of excessive consumption of food additives, and safe and nutritious food processing techniques.

Beyond knowledge enhancement, the workshop also promoted participants' practical skills. Participants were able to produce various healthy food products, such as probiotic drinks, low-oil steamed foods, and food preserved with natural spices, using simple equipment and local ingredients. This hands-on practice provided a real learning experience, allowing participants to better understand theoretical concepts and be ready to apply them at home. The impact of the workshop was evident not only in knowledge and skills but also in participants' attitudes and motivation. Many participants expressed their intention to reduce instant food consumption and replace it with healthy food products they prepared themselves. This demonstrates that the workshop effectively fostered collective awareness of the importance of a healthy lifestyle based on nutritious and safe food.

Overall, the workshop successfully addressed the previously identified problems: low community understanding of healthy food, limited knowledge of simple chemical technology, and the scarcity of practical community-based educational platforms. By utilizing the church as the activity center, the workshop demonstrated the effectiveness of a community-based approach in improving knowledge, skills, and healthy behaviors.

In summary, the workshop has significant implications for sustainable community development. It shows that simple chemical technology, when combined with participatory learning, can serve as an effective catalyst for improving public health, strengthening food literacy, and fostering self-reliant communities. The success of this activity opens opportunities for developing sustainable programs that integrate education, practical experience, and community empowerment, potentially yielding long-term positive impacts on public health in Medan.

Suggestion

Based on the results of the workshop implementation and impact analysis, several recommendations can be provided to stakeholders and relevant parties to enhance the effectiveness of healthy food processing programs in the future.

First, for church leaders and local community organizations, it is recommended to establish this workshop as a routine or periodic program. This will allow participants to practice healthy food processing techniques more frequently and reinforce behavior changes toward a healthier lifestyle. Follow-up programs could also involve family members to broaden and sustain the educational impact.

Second, for participants or the general community, it is advised to continue applying the techniques learned during the workshop—such as preparing probiotic drinks, low-oil steamed foods, and preserving food with natural spices—at home

on a daily basis. Repeated application will help establish healthy eating habits and raise awareness of food safety.

Third, for academics or community service institutions, it is recommended to develop more comprehensive educational modules and practical guides, including visual instructions or video tutorials, so that participants can learn independently outside the workshop sessions. Further research can also be conducted to evaluate the long-term impact on dietary behavior changes and public health.

Fourth, for government agencies and related institutions, it is advised to support community-based healthy food education programs through the provision of facilities, facilitator training, and access to local ingredients. Such support will enhance the program's reach and sustainability, as well as strengthen the synergy between health regulations and community empowerment.

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