

Transforming used cooking oil into soap- How small effort makes a big impact

Buddhist Tzu-Chi Dialysis Centres

Demographic information

Buddhist Tzu Chi Dialysis Centres are providing free dialysis treatment, EPO injections, blood tests and regular specialist check-up for all patients irrespective of race, religion or creed. Presently we have 3 Tzu-Chi Dialysis centres in Malaysia, Penang (PGDC), and Butterworth (BWDC) and in Alor Star (KDC).

As at 30/11/2022:

PGDC has 100 Patients with 43 HD Machines and 24 Staff

BWDC has 70 Patients with 40 HD Machines and 13 Staff

KDC has 80 Patients with 30 HD Machines and 30 staff

Tzu Chi Environment Protection Education centre

Lebuh Bukit Kecil 1, Taman Seri Nibong, 11900 Bayan Lepas, Penang

Tzu Chi Bukit Tambun Environment Protection Education centre

6, Taman Indah, 14100 Simpang Ampat, Penang

Tzu Chi Butterworth Environment Protection Education Center (Taman Pandan)

3478, Taman Pandan Indah, Mukim 14, 13400 Butterworth, Pulau Pinang

GGHH agenda goals

- Leadership
- Waste

Case study summary

The case study is about the upcycling of used cooking oil to be made as all purpose soap that can be used inside the center. This initiative has helped the facility to avoid disposing of the used cooking oil in drainage and earn additional savings from cutting the cost from buying soaps. This project was also translated to the community by mobilizing them to donate their used oil instead.

The issue

With the high volume of food cooked 6 days per week, the kitchen produces quite a bit of used cooking oil (UCO) which was generated when frying food. It is inappropriate to dispose of UCO directly into the sink which could exacerbate environmental pollution, block drains and contaminate terrestrial and aquatic habitats. The consumption of UCO could deleteriously impact health and there is no reuse of UCO for cooking.

In view of this issue, the kitchen immediately collects the UCO to prevent pollution. On average the kitchen produces 1000 - 1150 boxes of lunch and about 4-5 litres of UCO/week.

The increasing production of used cooking oil from household or food industrial sources is a growing problem in Malaysia. The used cooking oil is regularly poured down directly to sink or drain even though there is a recycling platform for used cooking oil collection services. Fat, oil and grease cause major problems with drains and sewers.

The accumulated oil and grease also known as “fatbergs” which release harmful gasses, harming those who clean the sewers as well as passers-by. It also costs a ridiculous amount of money to remove this solidified, gunky, solid waste from our sewers. These fatty masses can grow bigger and clog pipes or even make pipes burst. This leads to flooding, backwashes, rising repair bills and also being environmentally destructive. Sewer floods and backwashes can deposit garbage and raw sewage into the surrounding area. This contamination is toxic to plants and wildlife and damaging to the local environment.

It is a complicated issue which involves many different parties, but we are looking forward to kicking off some at community level with this soap making project from UCO. It is clear that the government will have to play a part in ensuring responsible disposal of UCO, through awareness, proper enforcement, monitoring and also the creation of incentives for people to do the right thing. But unfortunately we are far behind from this long term sustainability programme.

A survey of UCO management among the community of Teluk Bahang, Penang, Malaysia was conducted by USM Penang which was published in Health and the Environment Journal, 2013, Vol 4, No.1. The survey revealed that 17% of respondents discarded the UCO into dustbin while another 7% and 60% discarded the UCO onto soil and into drainage system, respectively. The remaining 16% sold the UCO and/or consumed it completely in their cooking. As a conclusion, the preliminary study shows that the respondents are lack-awareness about proper UCO management.

Hospital goal

- Transforming used cooking oil into soaps to reduce ecological footprint and improve the health and reduce the contamination of the water system
- Reduction of carbon footprint by avoiding questionable chemicals and non-packaging in cleaning detergents
- Community networking and a way to create awareness and encourage participation in the environment project – power of influence through community work

Sustainability strategy implemented

Some Malaysians reuse cooking oil until all of it is eventually consumed back into the stomach but most will pour it down the drain or just leave it outside for the garbage truck to collect it. There are registered

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companies who collect it to turn it into biodiesel from which UCO can also be reused in many ways, for example to make soaps, candles, as well as renewable energy.

The problem is that not much awareness has been raised, and not many people know that UCO can be turned into something useful. As a result, many discard it inappropriately, causing a series of problems.

After some discussion and review of the problems, we decided to turn the UCO into household soaps or sometimes be referred to as eco soap or green soap. These soaps are considered fashionable nowadays and help to protect the environment. Such soaps are manufactured by many private companies or individuals and encourage consumers to adopt sustainable choices by recycling UCO.

It is very important to ensure that UCO is collected and recycled properly to help protect the natural environment. Soap made from UCO is also called recycled soap because it reduces used oil waste and is thus eco-friendly. The only ingredients needed are used cooking oil, NaOH (caustic soda), and water. No additional or extra harmful chemicals are added. These soaps are made through a reaction called hydrolysis of natural oils or fats in a chemical reaction called saponification. Soap is actually salt after the chemical reactions. These soaps are eco-friendly because the end product dissolves in water and can clean oil. The suds that flow down the drain after washing will fully and completely decompose, making it 100% safe for the environment and the aquatic and marine animals. They are ready to be used with no fancy or extra packaging. These soaps clean well, saving time and water. These soaps contain glycerine which is created as a result of the splitting of these fats and oils. In other words, glycerine helps to ensure that the skin will maintain its own moisture in order to protect it from damage caused by dryness. These soaps can literally clean everything from clothes, dishes, tables, floors, oily cooker hood, sticky residue on surfaces, stubborn stains even toilet. These soaps are used in the kitchen as well as gifts to the volunteers.

Implementation process

The initial collection of UCO was only at the “Great Love Kitchen”. But September 2022 we had a fund raising drive in which we put these soaps on sale. The demand was overwhelming and we are running out of UCO. To get more of these UCO, we started to promote our community volunteers and to gather UCO or expired cooking oil for soap making. To our surprise the response was very encouraging and at the same time more and more people are aware of this project.

With team work effort and the love to protect the environment, more and more UCO were collected from the community. Within 2 months, more than 250 litres of UCO were collected in 2 community area.

We seize this opportunity to do more education and create awareness in the community through Tzu Chi Education & Environment Protection Centres in the community. We held discussions and meetings with those interested and formed a team to take charge of this project.

We conduct demo sessions and classes on how to make soaps from UCO at the community level at Tzu Chi Environment Protection Education centres.

The emphasis is on education and stress on the importance of what can happen of small amounts of UCO that pour into the sink. What impact can a small change bring? Huge.

The blocked sewage water systems which accumulated over the years through our oblivious act of pouring the UCO into the sink. The amount of UCO we throw out might seem insignificant but collectively

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however, it could be costing the local council a lot to clean up otherwise avoidable clogs. The sewage system is just like our vascular system, our blocked blood arteries are due to consumption of high cholesterol and fried foods over the years causing medical problems like heart attack. Bad cholesterol builds up just like the oil poured into the sewage system, start building up in the sewage system and quickly cause a clog.



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Tracking progress

The UCO collected were measured and recorded. During the initial stage, the UCO collected were not recorded as the soaps made were only used in the kitchen. The response and feedback was very encouraging and in September 2022, we started to promote this project at the community level and they keep their own tracking of UCO collection. The response was very positive and more UCO were collected if not would ended up in the water system.

Educational talks and sharing were done along the way to ensure that all participants aware of the UCO contaminations and why homemade soaps are more environmental friendly.

Year	UCO collected (Litres)	Soap Bars (155-165 Gram/bar)
2020 (July)	213	1,775
2021	253	2,108
2022 (15 th Dec)	390	3,250

Not only were the UCO salvaged but also saved the cost of washing detergents which may have harmful chemicals that harm the water system.

Progress achieved

According to the Water Encyclopedia website, approximately 706 million gallons of oil waste, a majority of it being palm oil, enter the ocean every year, with more than half coming from land drainage and improper waste disposal.

Journal of Environmental Science, Toxicology and Food Technology (2014) reported that around 50,000 tonnes of waste cooking oil produced from vegetable oils or animal fats, are disposed of to the environment without proper treatment yearly in Malaysia.

A SINGLE LITRE OF WASTE COOKING OIL CAN POLLUTE A MILLION LITRES OF WATER which means every litre of UCO salvaged is a million litres of water saved.

Transforming UCO into green soaps started in July 2020 and only from a kitchen until September 2022, where more people from the community started to participate in this project and more UCO were salvaged.

Within a short few months, more people are aware and are doing their part in creating an environment that is more sustainable. We are working together to build a greener community. We hope to create a

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UCO awareness campaign to the public on the importance of proper disposal and recycling of UCO through community networking.

The amount collected may seem small, but it is a great start to a greener future and proper management of UCO, we are able to reduce environmental pollution, save space in landfill and reduce the costs of maintaining drainage/water treatment.



Challenges and lessons learned

In the year 2020/21, the domestic consumption of palm oil in Malaysia was around 3.37 million metric tons as Published by Statista Research Department, Oct 5, 2022.

Malaysia faces UCO management problems resulting from poor participation and lack of full consumer compliance in waste management activities including waste collection and recycling.

Cooking oil has a way of adding some unpleasant smell to the environment; contributing to pollution and reducing the quality of the air we breathe in. It can be toxic materials for the environment as well as plants and animals due to free discharges into the environment without proper waste treatment by housewives or small household cooking. Cooking Oil is one of the most commonly reported types of water pollution and causes nearly a quarter of all pollution incidents. Careless disposal of UCO into drainage systems, onto land or to watercourses is not only an offense but can be harmful to river birds, fish and other wildlife. Although oil does break down in water it uses up vast amounts of oxygen in the process, hence removing oxygen that would otherwise have remained in the waterways for wildlife. Because of the way oil spreads, even a small quantity can cause a lot of harm.

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While the government is on its way to explore new probabilities, we, as individual and NGO organizations can contribute our tiny bit in eradicating the impact of UCO. We should make it a habit to discourage the use of oils for deep frying and adopt healthier food options like baked, steamed or even air fried delicacies.

Create awareness and through education to ensure UCO generated from individual households not discarded into the kitchen sink, drain or sewer. Through community projects like soap making not only reduce the contamination impact but save money and convert waste to something useful while taking care of the environment. We are now actively promoting this project at Tzu Chi Environment Protection Education Centre in the local community.

Next steps

Engaging in community projects and networking provides an opportunity for members of the community and positive impact on society at large. Community volunteerism enables us to acquire life skills and knowledge, as well as provide networking which connects us to the community and makes it a better place for all of us to live in.

The best, and correct, thing to do with the UCO is to recycle it and make it into something useful. This process is simple and can have a lasting impact on the environment. Recycling UCO gives it a productive purpose long after it leaves the fryer and is our responsibility by doing our part to contribute to a more sustainable environment and a healthier future.

The Environmental Protection Act 1990 places a Duty of Care on every industry to ensure "that all reasonable steps are taken to look after any waste you have and prevent its illegal disposal by others", this includes waste cooking oils and fats.

We may not be able to do a lot or be ready to make big changes, but that small and consistent efforts over time can bring substantial results. We often ignore the power of a small step that can eventually take our life to a higher scale. We believe that "the smallest step in the right direction can be the biggest step of our life." We hope by taking the first step and keep moving towards the goal and making progress. Environment pollution is not easy to deal with but we have to be persistent to protect and put in every little effort we could to make changes.

People can prevent oil pollution by simply collecting the used oil in a container or bottle and send them to local recycling services. This can greatly reduce the amount of oil going into wastewater treatment systems and disposal sites."

Always remember, every effort, however small, counts.

Links

Promoting Health and Sustainability by Advocating Plant Based Diet during COVID-19 Pandemic (Published 10th August 2020)

DaAi Channel: 【新聞】大哉教育廚房 回鍋油的蛻變

<https://www.facebook.com/DaAi.Channel.Malaysia/videos/341015680221167>

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Knowledge, Attitude and Perception towards the Consumption of Waste Cooking Oil between Suburban and Rural Communities

<https://core.ac.uk/download/pdf/296919535.pdf>

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