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Giving Hospital Food Waste a New Lease of Life: Valorisation of Food Waste Through Usage of Black Soldier Flies (BSFL)

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Introduction

In Singapore General Hospital (SGH), the kitchen serves roughly 1,972,854 meals per year. An average of ***639,553 tonnes*** of food waste are disposed each year. The cost involved to dispose such amount of waste is estimated to be ***$46,022,234***.

Aim

To promote sustainable practices that support a circular economy by reducing the amount of general waste disposed meant for incineration through upcycling of clean food waste (e.g. bread, vegetables, egg shells and fruit peels).

The project also aims to close the food waste loop by upcycling the food waste and generating the waste into useful products.

Methodology - DMAIC

DEFINE

Food waste produced from the SGH central kitchen are currently being incinerated and thrown in landfills.

MEASURE

Waste disposed in kitchen estimated to account for up to 16% of SGH's general waste load. In-line with GreenGov requirements to reduce hospital's waste by 2030, we target to reduce waste disposal through valorisation of food waste.

ANALYSE

Taking into consideration space limitation, we explored re-processing hospital's food waste at off-site facilities.

IMPROVE

Waste generated during food preparation will be segregated into designated bins. After daily operations, food waste will be pre-treated with microbes for storage. Subsequently, the pre-treated food waste will be transported to an off-site facility; the nutritious food waste will be fed to larvae of BSFL reared in a regulated unit that optimizes their growth. Output of the bioconversion will undergo processing and become pellets/fertilisers, a high value resource for pet and agriculture industries. Part of the larvae will mature and continue the cycle.

CONTROL

Tracking records of hospital general waste disposal against food waste to monitor on the effectiveness of the upcycling initiative.

Process of Black Soldier Flies

Clean Food Waste from SGH Food Services (Kitchen)

Treatment with Microbes for fermentation and to prevent smell and pests

Fermented Food Waste transported to off-site facility for further treatment

Food Waste is then being grinded and mixed at an off-site facility before being fed to the BSFL that are reared in trays

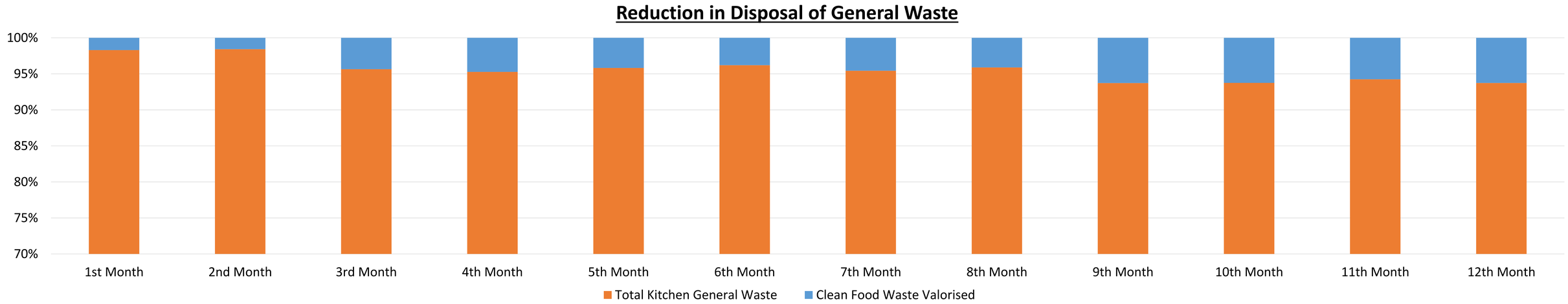
Trays are being brought to a machine for separation of frass and larvae

Frass of the larvae are being processed as fertilisers for agriculture industry

Part of the larvae will be processed into animal feed while the remaining will continue to reproduce and continue the cycle

Results

With the implementation of segregation of food waste for upcycling, the result will show a reduction in general waste disposal. Food Waste is given the opportunity to be upcycled to produce nutrient-packed by-products that can be used in industries such as landscaping and farming.



Estimated Amount of Food Waste Generated in a Year: ***763,190kg***

Estimated Amount of Clean Food Waste Upcycled in a Year: ***34,502kg***

Conclusion

Valorisation of Food Waste promote environmental sustainability through usage of BSFL. With proper treatment of food waste, waste disposed for incineration will be reduced and carbon footprints will be lowered. Overall, this project is instrumental to create more potential for treatment of other types of food waste that have yet been explored for valorisation.