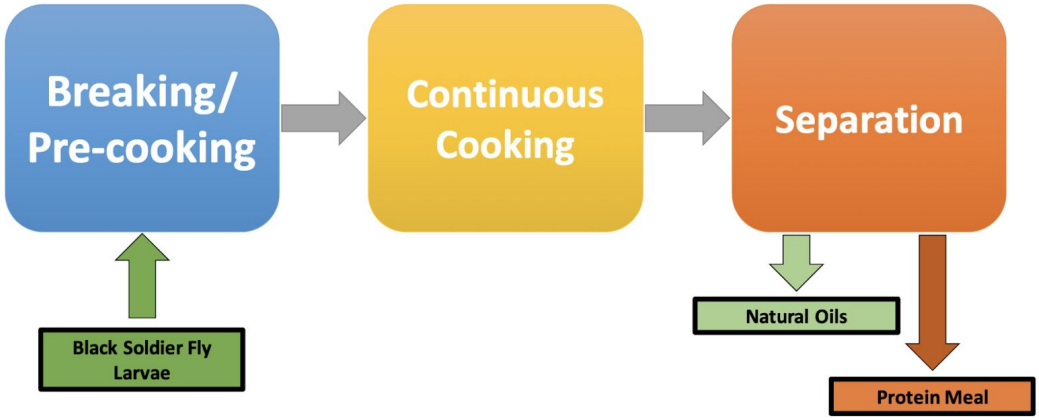
Design Iteration

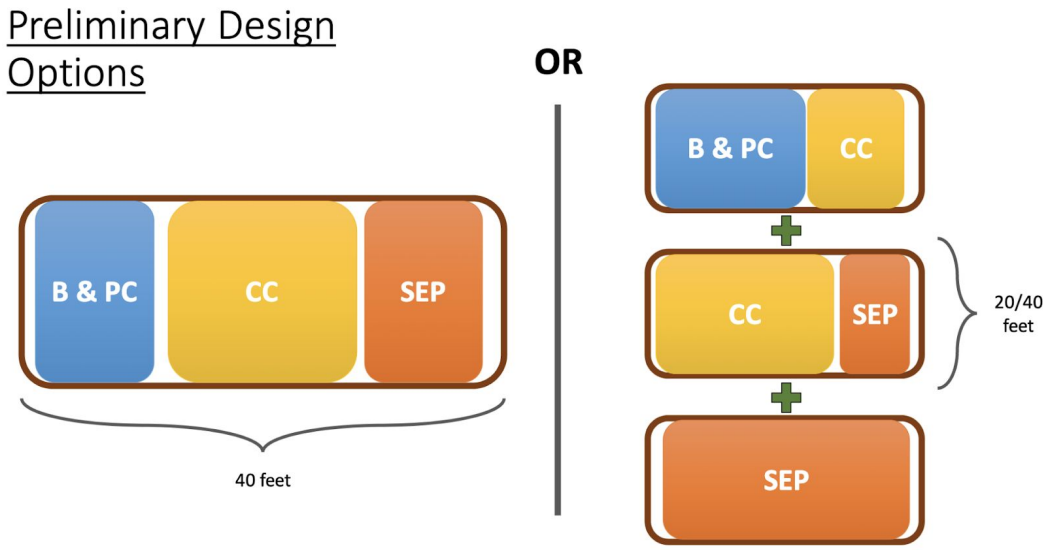
Please note, not every version has related 3D CAD design. We only made two CAD drawings one for version 2, and another one for version 4 to reflect the schematic changes.

Option 1, Version 1

Preliminary Design Idea

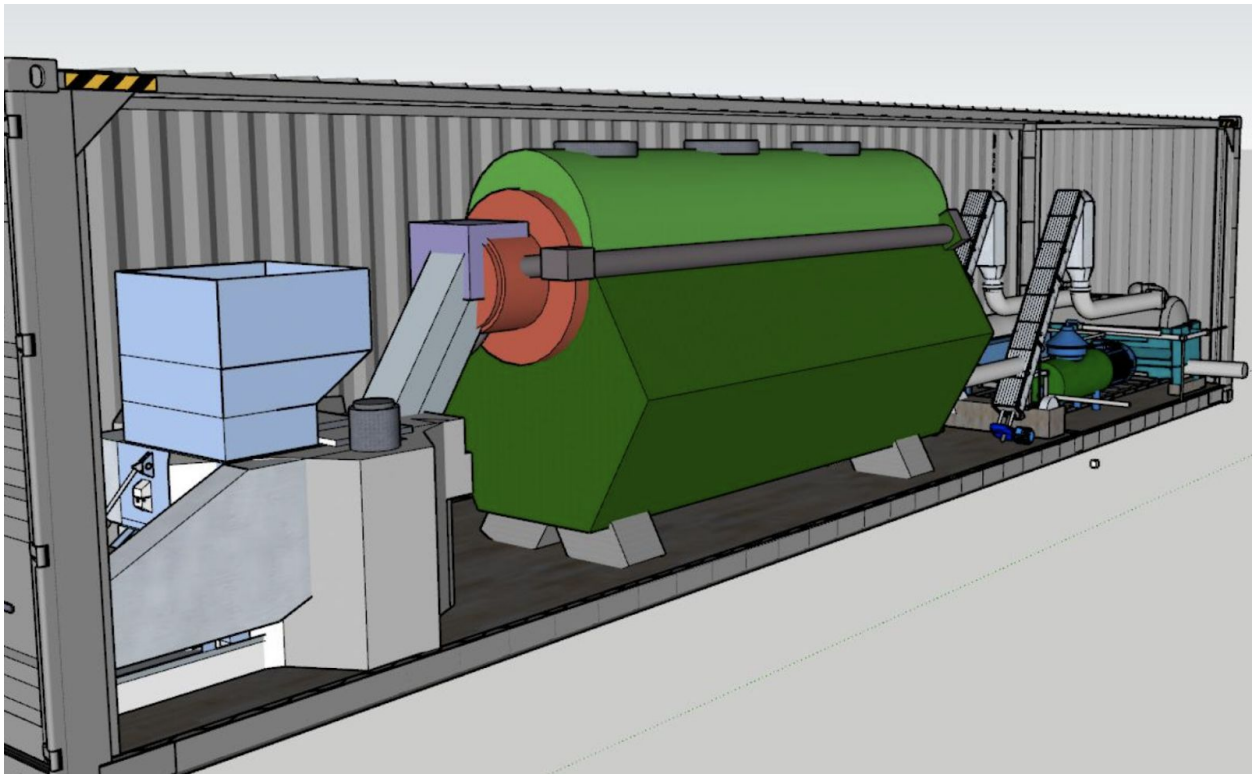
This design is based on the traditional rendering plant designed to process animal by-product materials. It was later realised that the design is not tailored for our need as the size and composition for insects are quite different from those of the animal by-product materials.

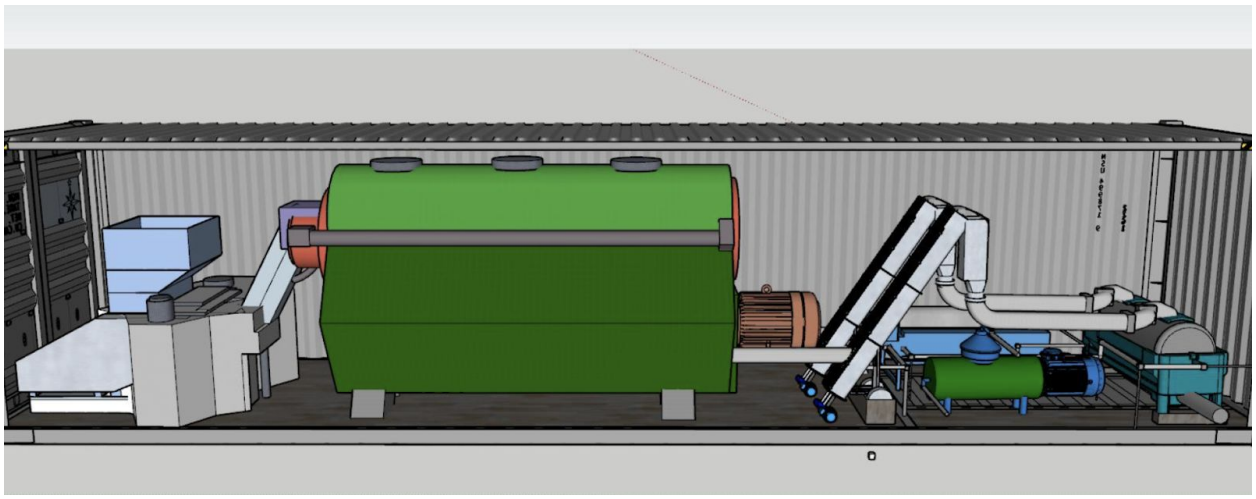




Option 1, Version 2

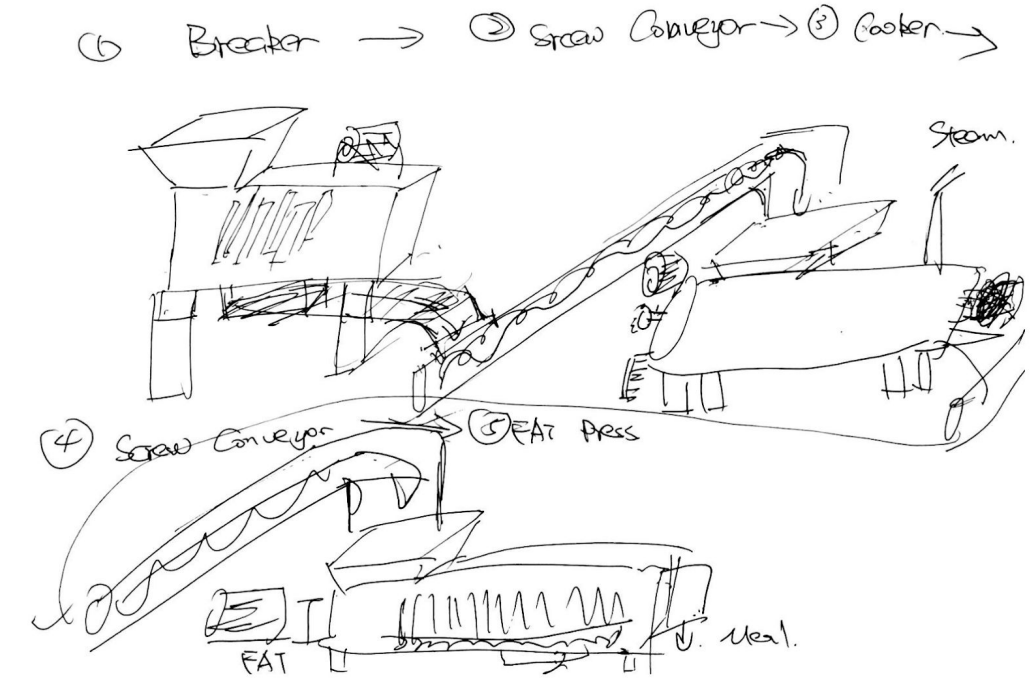
A SketchUp drawing was done to represent our initial design ideas.

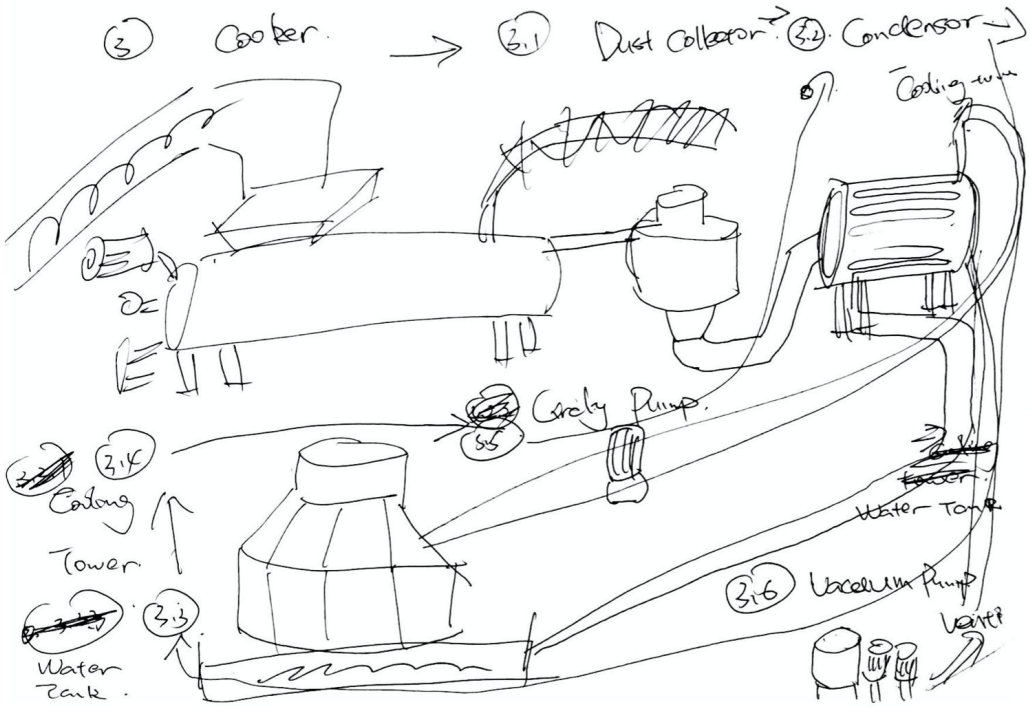




Option 1, Version 3 (major improvement)

After communicating with the industry experts from China, we sketched the schematic diagram of our design.

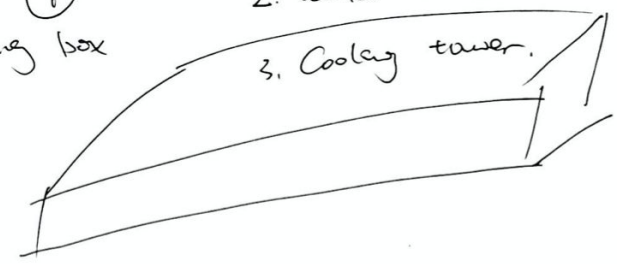




Option 1

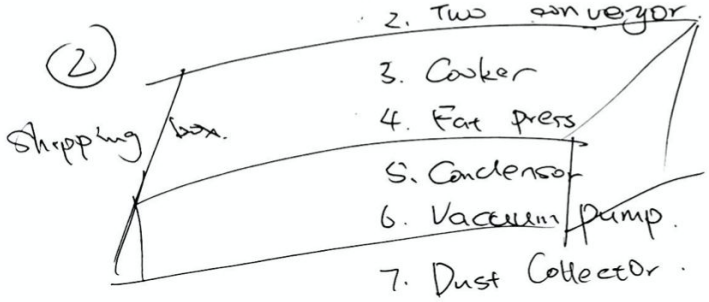
1. Electricity Heating Equipment.

(1) Shipping box



2. Water tank
3. Cooling tower.

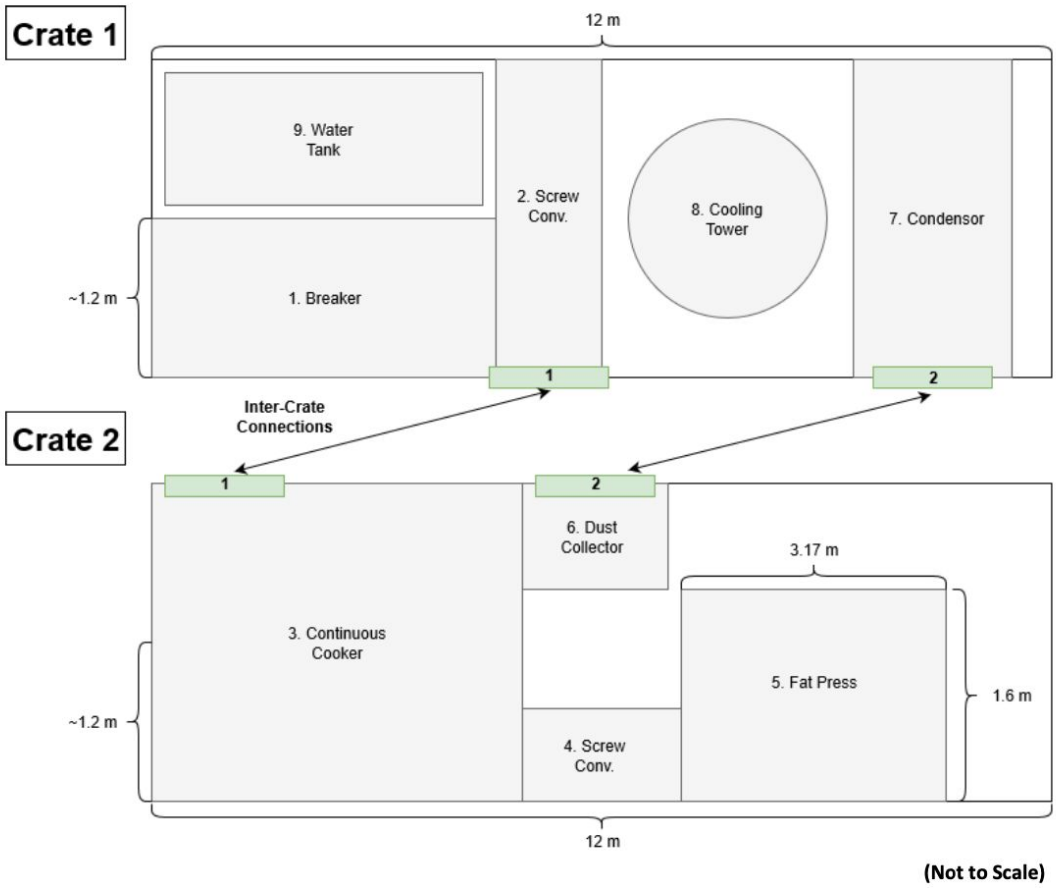
(2) Shipping box.



1. Breaker
2. Two conveyor
3. Cooker
4. Fat press
5. Condensor
6. Vacuum pump.
7. Dust Collector.
8. Controller.
9. Oil / Meal storage.
10. Ventilation system

Option 1, Version 5

This is the first version that we showed to our client, GoTerra. They were impressed by the work we have done and confirmed that we are going along the direction that they are expecting.



Current Dimensions:

Design specification				
	Diameter	Length	Height	Width
	mm	mm	mm	mm
Breaker		3000	1020	1000
Cooker		5450	2070	1600
Fat press		3170	1720	1600
Screw conveyor 1		2150	2150	480
Screw conveyor 2		1800	1800	480
Condenser	800	2000		
Cooling tower	1300		1200	

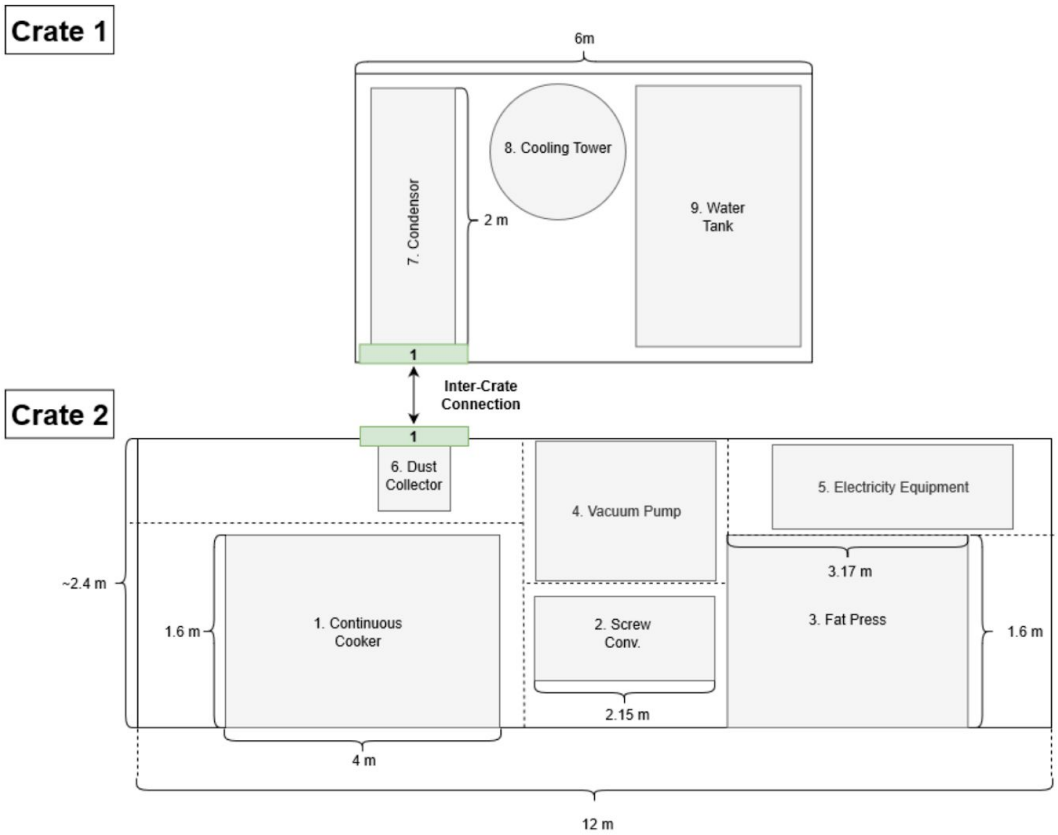
Option 1, Version 5 (final version)

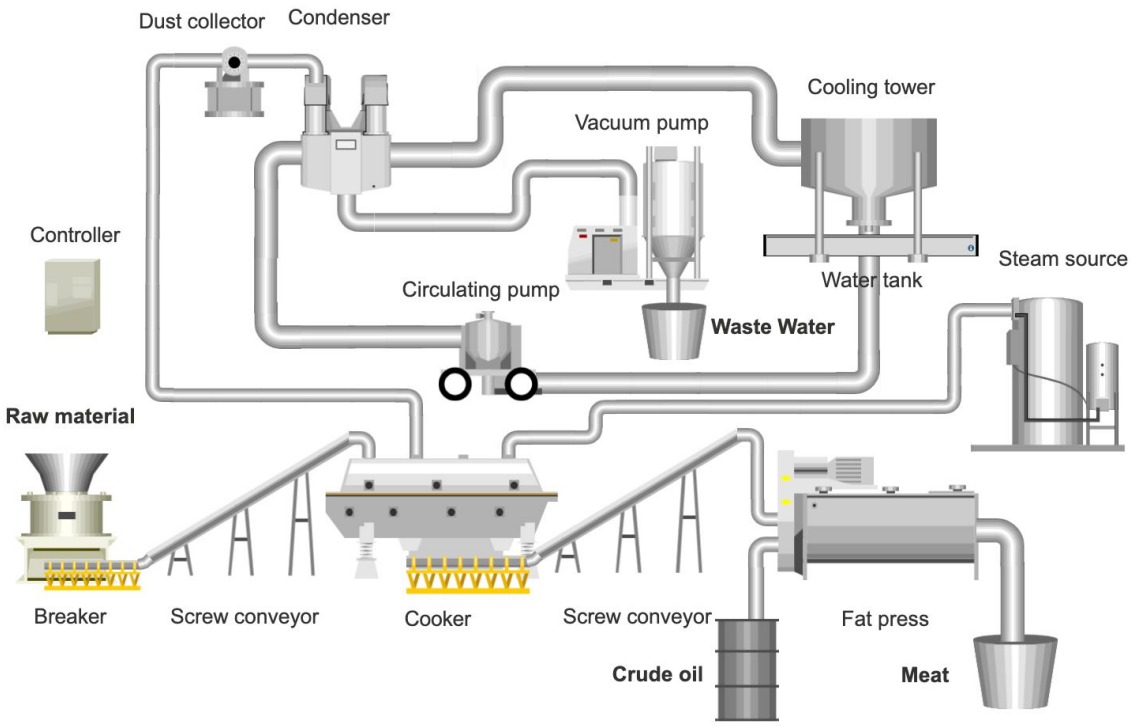
Based on the feedback from our client, GoTerra, we shifted our entire design from SketchUp to Solidworks. Because Solidworks is more sophisticated software that is widely used in the industry.

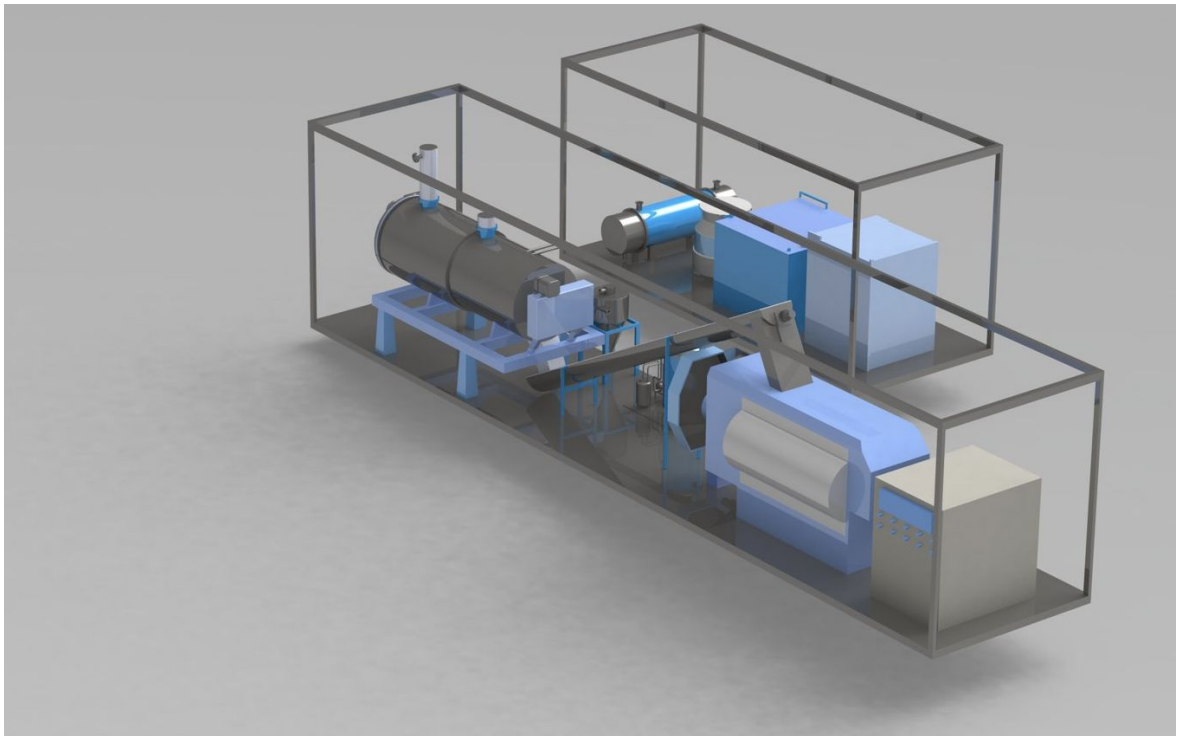
Based on the feedback from a Chinese rendering plant manufacturer, Sensitar, we removed breaker, as the insects are small enough to be processed straight away.

We moved the oil and meal storage system out of the container. Because they can be located out of the container and connected on the site.

An industry expert from Keith Engineering suggested that we must not let the waste steam go into the air. Instead, we need to condense it and collect it as wastewater that will be taken for further processing. Thus, a set of system related to this was added to our system. It includes a condenser, cooling tower, water pump and water tank.




Dust collector
Condenser
Cooling tower
Vacuum pump
Controller
Steam source
Water tank
Circulating pump
Waste Water
Raw material
Breaker
Screw conveyor
Cooker
Screw conveyor
Fat press
Crude oil
Meat



Option 2, Version 1

Schematic Diagram

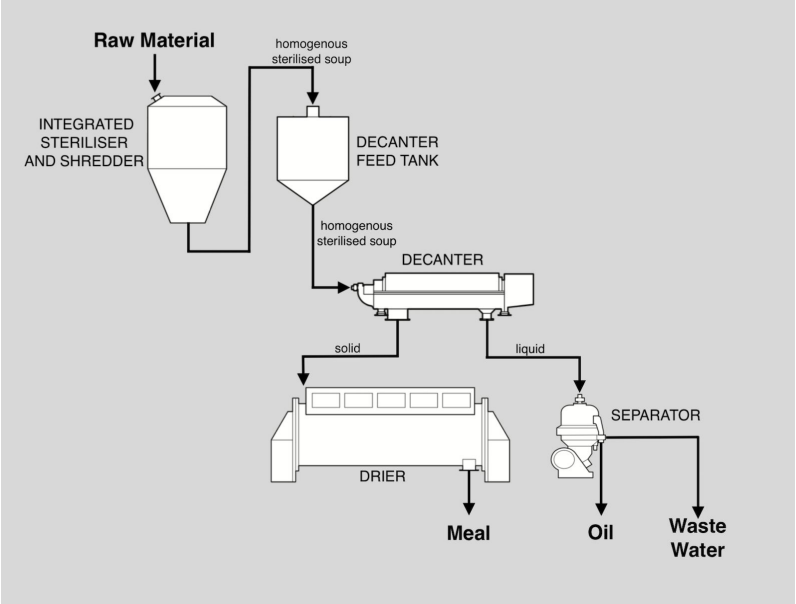


Figure 1, Schematic diagram of the alternative process

This diagram is based on the design of the ISS AGRI facility produced by Celitron.
A video demonstration is avaliable on https://youtu.be/yabpYFAT6sk

Figure 2, 3D drawing of the components (Celitron, 2017)

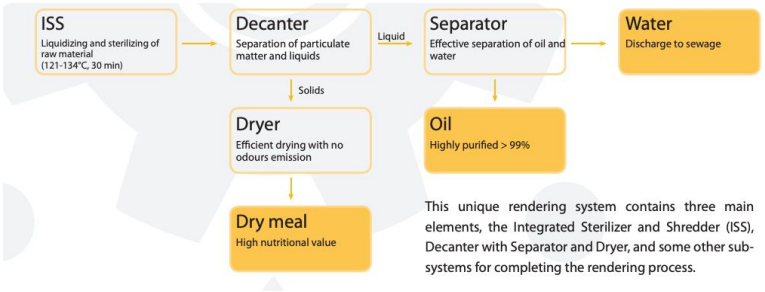


Figure 3, components and their functionalities (Celitron, 2017)