YOGHURT INCUBATOR

MANUAL AND SEMI AUTOMATIC

ITDG
PRACTICAL ANSWERS TO POVERTY

techical brief

Background

Yoghurt manufacturing is a popular small-scale food processing endeavour. Yoghurt is relatively simple to produce, can be done with a small amount of capital and there is a good demand for it in the market. According to the technical inquiries received by the Cathy Rich Memorial Food Processing Training Centre, 20% of the requests from small-scale entrepreneurs are for information on making yoghurt. The most important feature and function of this process is the incubation of the mixture since it acquires the needed flavour as this stage.

There are no small-scale industrial yoghurt incubators produced in the local market. The yoghurt incubators used by large businesses are too expensive and have a much larger capacity than is necessary for small-scale food processors (SSFP). Plus SSFPs do not have the capital or the space to accommodate an industrial sized incubator.

The SSFPs use makeshift incubators: rigifoam or wooden boxes, where the heat cannot be regulated or maintained, and do not produce good quality yoghurt. These makeshift models could only accommodate 250 cups per batch. They are also difficult to clean and are unhygienic. Therefore the SSFPs could not sell their produce and could not compete with the large scale producers.

ITDG South Asia along with the Cathy Rich Memorial Food Processing Centre responded to a request by SSFPs to design an appropriate incubator. It has improved the standard of the yoghurt produced, it is low in cost, has a greater capacity and easy to operate and maintain.

The incubators

The yoghurt incubators developed had slight modifications to the industrial incubator.

ITDG South Asia designed two models: one which is manual and one that is semi automatic: The basic structure is the same with the difference being the thermostat unit.

The incubators introduced by ITDG South Asia aluminium frames with rigifoam insulation. The rigifoam insulation is for heat retention which increases the efficiency and reduces the electricity consumption.

The incubator has two chambers with 6 removable shelves in each chamber.

Bulbs are installed at the base of the incubator to supply the required heat.

The incubator has a glass front so that it can be judged visually when the yoghurt has matured and ready to be taken out. In the manual model, the heat source (the bulbs) have to be turned on and off as required and the incubator temperature needs to be monitored.

In the semi-automatic version, the thermostat turns off when the required temperature is reached and does not need to be monitored.

The incubator could have an internal fan which helps regulate the heat (by 4-5 degrees) but optional. If the incubator has the fan, it will increase the cost of construction, operation (electricity) and maintenance. This would keep the same flavour and consistency in all the yoghurt cups in the incubator.

In the semi-automatic incubator, the internal chambers can be sterilised easily by setting the thermostat to 100°C. This allows the production process to be more hygienic by removing any unwanted bacteria that could spoil the yoghurt or alter its taste.

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The introduced yoghurt incubator has these advantages:

- The heat can be regulated
- It is insulated to minimise heat losses
- It can be easily cleaned after every batch
- It can be sterilised without dismantling
- It can be fabricated and maintained locally
- It is more efficient and durable

Technical details

Material required		
Material	Specification	Quantity
Aluminium Angles	½" X ½", 12ft lengths	03 Nos.
Aluminium Angles	¾" X ¾", 12ft lengths	10 Nos.
Aluminium Tee Sections	1" X 1" , 12ft lengths	06 Nos.
Aluminium "U" Sections	12ft lengths	01 No.
Aluminium sheet	gauge 20 x 8" x 4"	01.5 Nos.
Welded Mesh	75 mm^2	04 m^2
Plain Glass		0.8 m^2
Bulbs	40W	10 Nos.
Dial Type Thermometer	0° - 100°C	01 No.
Thermostat*	Wall mounted, adjustable	01 No.
Electric fan**	Low profile box fan - vertical operation	01 No.
Wires, teflon sleeving, connectors, self tapping screws etc.		As required

* The thermostat is needed for the semi-automatic model
** The fan is optional

Construction

- The incubator frame is rectangular with the glass sheeting in the front.
- The thermostat is attached to the external frame
- The size, shape and position of the trays are as shown in the drawings
- Bulbs will be placed at the base of the incubator (internally).

Specific requirements

- Electricity - 240V supply
- Floor Area - 600mm x 1225mm

Capacity

- The incubator has 2 chambers with 6 trays each and one tray hold 42
- The incubator can accommodate 500 cups of yoghurt in one batch (A "makeshift" incubator can handle a load of 250 cups per batch)
- The duration is 3-4 hours per batch depending on the strength of the culture.

Operations

- The incubator should be sterilised before a new batch is cured.
- The incubator needs to maintain a temperature of 45°C throughout the process.

- A batch would take between 3-4 hr. in the incubator. The incubation period is important for the flavour since too little or too much time will ruin the culture.
- It is advised to start loading from the top most tray and reach the bottom in the incubators where there is no fan. This will ensure the same flavour and the consistency of all yoghurt.
- The trays need to be cleaned after each batch.

Maintenance

- The incubator needs to be cleaned before and after use.
- Sterilisation is recommended.
- The bulbs need to be checked.

Cost details

The incubator cost would vary depending on the type (manual or semi-automatic), the availability of materials and transportation. The cost will also differ if fabricated along with the internal fan. Plus the electricity charges also have to be considered.
Estimated cost (1998):
Manual Rs.15,000.00
Semi-automatic Rs.19,000.00

Manufacturers

Industrial Development Board
Galle Road
Katubedda
Moratuwa
Sri Lanka

Nihal Ashoka
Ashoka Industries
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Further information

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The training centre was a subsidiary of ITDG South Asia until 1997. It is now an independent NGO, but ITDG South Asia still works closely with this centre.

References and further reading

Yoghurt Production, ITDG Technical Brief
Preparation of Dairy Products: Agrodok No 36, Agromisa, 1991
The Manufacture of Yoghurt and Cottage Cheese, Food Chain No 24, May 1999

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