



CANNING FOOD

If practised properly, canning is a safe and useful method of preservation. Food is placed in a can and the top of the can is sealed. Heat sterilisation during the canning process destroys the enzymes and micro-organisms that would otherwise spoil foods. The atmosphere inside the can remains aseptic and food spoilage cannot subsequently take place. As different enzymes and micro-organisms are likely to be present in different foods the amount of heating (both the temperature and time) needed to safely process the food will vary according to the type of food being canned. In addition, the temperature and time will vary according to the size and shape of the can being used.



Figure 1: Canning. Photo: Neil Noble / Practical Action.

If the food is not heated sufficiently there is a risk that micro-organisms will survive and grow inside the can. In some foods (especially vegetables, meat, fish, milk and other 'low acid' foods) a particular type of bacteria called *Clostridium botulinum* can grow and cause severe food poisoning (see Technical Brief on Food Poisoning).

Conversely, if the food is over-heated the quality is reduced and it can become colourless, tasteless or burned and have a soft mushy texture which customers will find unpleasant. It is therefore essential that the correct heating conditions are carefully established and maintained for every batch of food that is canned. This requires the skills of a qualified food technologist or microbiologist. When foods are heated in a sealed can, there must be an equal pressure outside the can as inside (otherwise the can will explode). This is achieved by heating the cans in a strong metal vessel called a retort (similar to a domestic pressure cooker but much more robust), using high-pressure steam. When the hot cans are cooled using water, the pressure in the retort is kept the same as that inside the can using compressed air. The retort must therefore withstand pressures of up to 60psi and be fitted with a safety valve and other pipework for water, steam and compressed air. All the equipment described above requires a controller and will need regular maintenance by a skilled technician.

Assuming that cans are available, they are usually considerably more expensive than other types of packaging materials. The inside of the cans should be lacquered to prevent foods reacting with the metal during storage. Different types of lacquer are needed for different foods (fruit products, vegetables, meat and fish each require a different type). In addition a 'seamer' is needed to correctly fit the can lid and regular checks are needed to make sure that the seams are properly formed. This needs training and experience and specialized equipment (a seam micrometer).

Finally, because of the potential dangers from food poisoning with some types of food, it is necessary for a trained microbiologist to routinely examine samples of canned food that have been subjected to accelerated storage conditions. This requires a supply of microbiological media and equipment.

technical brief

In summary the canning process requires:

- a considerable capital investment
- the need for trained and experienced staff
- regular maintenance of the sophisticated equipment
- a supply of the correct type of can and
- comparatively high operating expenditure.

Although it is possible to obtain small-scale canning equipment obstacles described above are difficult and costly to overcome at the small-scale level. Additionally there is a requirement for equipment to prepare the food before filling the cans as well as actually filling the cans themselves. This aspect of the process has not been discussed in this brief and such operations require considerable hygienic handling to produce safe products prior to canning. For these reasons Practical Action does not recommend canning for small-scale producers as a business enterprise.

References and further reading

Packaging food in Glass, Technical Brief, Practical Action

Packaging Materials, Technical Brief, Practical Action

Small-scale Food Processing: A guide to appropriate equipment, Edited by Peter Fellows & Ann Hampton, ITDG Publishing/ CTA 1992

Downloadable at: <http://www.fao.org/WAIRdocs/x5434e/x5434e00.htm#Contents>

Includes names of equipment suppliers.

Appropriate Food Packaging by Peter Fellows & Barry Axtell, ILO/TOOL 1993

Packaging, Food Cycle Technology Source Book, ITDG Publishing/ UNIFEM 1996

Methods of Canning Ivon E. McCarty, Professor Emeritus, and William C. Morris, Professor Food Science and Technology. The University of Tennessee

<http://www.utextension.utk.edu/publications/spfiles/SP325-A.pdf>

Low-acid foods: Fact sheets for the small-scale food entrepreneur. Cornell University. New York State Agricultural Experiment Station.

http://www.nysaes.cornell.edu/necfe/pubs/pdf/FactSheets/FS_LowAcidFoods.pdf

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