PRACTICAL ACTION
Technology challenging poverty

QUALITY CONTROL IN THE FOOD PROCESSING BUSINESS

technical brief

Introduction

Quality control (QC) is not an optional extra in food processing; neither is it something done only by large manufacturers. It is an essential component of any food processing business. The purposes of quality control are:

- To protect the customers from dangers (eg contaminated foods) and ensure that they get the weight and quality of food that they pay for.
- To protect the business from cheating by suppliers, damage to equipment (eg stones in raw materials) and false accusations by middlemen, customers or suppliers.
- To be sure that food laws operating in a country are complied with.

Quality control need not be time consuming or expensive, and the results of quality control tests should help save money in the long run. In general, quality control procedures should be as simple as possible and only give the required amount of information. Too little information means the test has not done its job; too much information and management decisions may be delayed or confused.

Quality control is used to predict and control the quality of processed foods. It is no use producing a food, testing it to find the quality, and then trying to find a buyer for that particular batch of food. Quality control is used to predict the quality of the processed food and then control the process so that the expected quality is achieved for every batch. This means that quality specifications must be written and agreed with suppliers or sellers, and control points must be identified in the process.

Quality specifications

The quality of foods or ingredients can be measured in different ways but one popular method is to describe 'quality attributes', as in Table 1. A specification can then be written and agreed with the supplier or seller, which lists the quality attributes that are required in a food. An example of a quality specification for tomatoes to be used for processing into paste is shown in Table 1.

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Attribute	Accept	Reject
Colour	Orange/red	More than 10% green
Size	Any	-
Shape	Any	-
Damage - splitting - insect - mould	 Less than 5% Less than 5% None	 More than 5% More than 5% Any evidence of mould
Hardness	Soft to over-soft	More than 10% hard

Table 1: Quality attributes for tomatoes used for tomato paste.

A number of points arise from such a specification:

- A representative sample of the food must be tested to make sure the whole batch meets the specification. (For small batches it might be possible to examine every item.) The size of sample needed for testing can be calculated, but this is fairly complex, and usually unnecessary for a small-scale business.
- The percentage of substandard items which cause a batch to fail the test can be increased or decreased depending on how reliable the supplier is, or how important the particular attribute is to the seller/manufacturer.
- Some attributes may need to be tested with equipment in order to avoid arguments over interpretation. In Figure 1, for example, the hardness could be tested with a simple 'penetrometer' to define what is 'hard' and what is 'soft'.

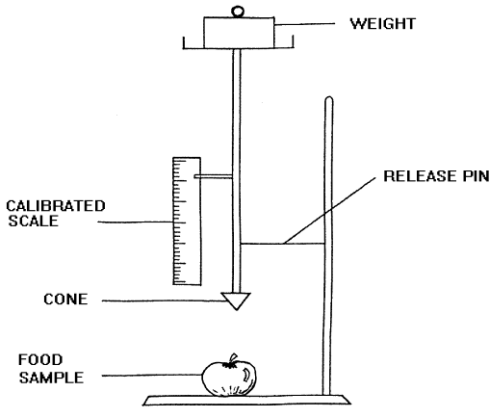

Figure 1: Fruit hardness test using a penetrometer.

The size and shape of the tomatoes is not important because they are to be crushed to a pulp. In other examples (such as fruit for bottling) the size might be important. The ripeness and flavour of the tomatoes - assessed by colour and hardness -, and damage caused by poor storage and handling, are very important: the specification concentrates on these. Each specification takes account of the intended use of the products and the most likely important faults that could be expected.

Quality attribute	Example
Quantitative	Required sugar content of fruit (eg 15%)
Hidden	
Harmful substances	Aflatoxin in groundnuts
Microbiological	Number of bacteria in a food
Nutritive value	Vitamin content of a food
Additives	Artificial flavours, thickeners etc
Sensory	
Colour	Ripeness of fruit
Size, shape (appearance)	Size of chopped food, particle size of flour
Thickness or texture	Juice consistency, toughness of meat
Taste	Saltiness, sweetness, sourness and bitterness
Flavour	Characteristic flavour of tomato

Control points

In every food process there are particular stages which affect the quality of the final product. For example, the amount of heating given to pasteurised juices affects their colour, flavour and storage life; in sausage making, the amount and type of grinding affects the texture of the meat. Such stages are identified as control points, and quality control checks are made at these points in order to control the process.

Manufacturers therefore need first to identify the control points in their process - using outside technical assistance if necessary - and then to set up a specification for operators to use.
For example, in jam making, the amount of pectin, fruit and sugar should be carefully controlled: therefore, the weighing of ingredients is a control point, as the weights of each ingredient must be specified and carefully weighed out.

In the same way, other control points would be: the acidity of the jam, the sugar content after boiling and the temperature of filling. The mix should be checked for correct acidity, the sugar content checked during boiling (using a thermometer or refractometer), and the temperature checked before filling (using a thermometer).

Checks at control points can therefore be used to control the process and to ensure that each batch of product is of similar quality.

References and further reading

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Useful organisations and contacts

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