FOOD TECHNICAL SERVICES

PROJECT: MOULD SPOILAGE OF SOUP - WANT WENT WRONG ?

Background:

A supplier of chilled ready meals had previously used our support services to develop manufacturing processes for long shelf life chilled vegetable based soup range for catering and retail trades (able to meet a 3 week shelf life).

The facility didn't have the ideal segregated and facilities for high care "long life" products, so we set up to pasteurising soup within its pack and used an existing on site rapid cooling system. The basic process became: 1)make soup, 2)heat to 100^{o}C, 3)hot fill with immediate lidding-sealing, 4) hold at >/=90^{o}C for 10 Minutes, 5)Rapid cool to their existing stds (to <5^{o}C within 2hr of heat off), followed by labelling and chilled holding/distribution.

Thus:

- Sealing packs at about 90^{o}C reduces "air-in-pack", thus surviving heat tolerant mould spores can't grow (they need air).
- 90^{o}C-10min heat eliminates pathogenic bacteria including cold tolerant Clostridium botulinum.
- Rapid cooling prevents growth of heat resistant surviving pathogens such as Bacillus cereus.
- As it's a chill storage product – any surviving spores heat tolerant warm liking Clostridium botulinum – cannot multiply.

Shelf life trials demonstrated that a >/=3 week shelf life was achievable from both quality and food safety perspectives.



The enquiry:

A year or so after the initial project a phone call from our client revealed that the business had grown – but a problem had arisen:

- One of their customers had rejected pre-packed soup products due to "masses" of mould growing on the top surfaces.
- Our client was wanting to know what could be done or added to the soup to prevent this mould growth.

During the call - our questioning revealed that the production process had been modified to accommodate larger packs of product.

- With the larger packs, the cooling stage had become too long at nearly 4 hours.
- The lidding stage was changed, so as to speed up the cooling stage lidding was done after cooling.



What went wrong and what is the solution?

The following explanation was given at the end of the call:

- In vegetables and vegetable soups, we should expect the presence of mould spores that can survive the heating stages, however the process of "hot fill & seal" reduces air levels and so moulds cannot grow (as aerobes they must have air).
- By changing the process to cooling <u>unsealed</u> (instead of sealed) packs, they'd created conditions ideal for:
  - Mould spores to activate and then show up as heavy growth on the now aerobic top surface.
  - Access by mould spores or bacteria (spoilage or pathogenic) that may be on the lid or in the air or on staff.
- Reverting back to the original <u>safer</u> process design: "*hot fill – lid & seal – cool*" would work.
- A 4hr cooling stage is generally accepted as adequate, so changing from the original 2hrs to 4hrs is acceptable.

Follow up:

A phone call revealed that the simple solution described during the phone call – had worked and all parties were happy.