FOOD TECHNICAL SERVICES

PROJECT: VENISON CHORIZO DEVELOPMENT AND GOVERNMENT APPROVAL

Food Technology in product development - venison meat culturing curing and drying

Background:

A wild venison processor (developer of a range of cultured cured dried ambient stable sausage), requested assistance with getting their product through the Process development stages and onwards through the Local Government Food Safety Approval system.



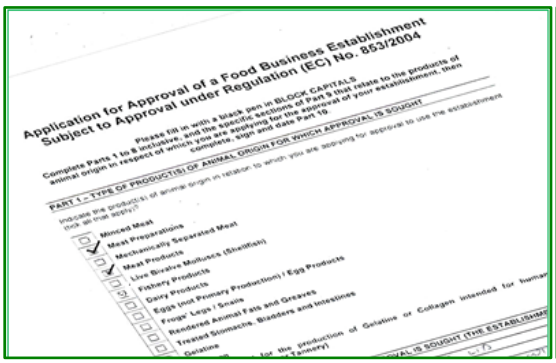
Despite similar products being around for centuries, they're still surprisingly complex to make. Recent biotech (culture) development & advances in the understanding of culture-cure-drying relationships, have given manufacturers more control over product & safety. However as we'd expect for such high-risk product, Government approval inevitably relies upon evidence of robust safety systems.

Summary of the final processes developed:

- Mincing and mixing of meat, fat, spices and water of the appropriate qualities and quantities (ie optimal proportions).
- Adding to that mix, the microbial cultures (eg specific strains of Lactobacillus, Staphylococcus and Pediococcus) mixed with fermentable sugars so that when immersed in the meat as "active cultures" they're immediately able to multiply and:
  - Ferment both the added and native sugars to develop lactic acid which correspondingly begins to lower the pH,
  - Compete with and inhibit the native bacteria (which may include spoilers and pathogens),
  - Develop colour, flavour and texture changes to the meat.
- Adding curing chemicals (salt, nitrate, nitrite), after which the cultures begin to reduce nitrate into more effective nitrite and so contribute further to the process by:
  - Inhibiting both: i) pathogen/spoilage bacteria and ii) oxidation damage to the product,
  - Creating desired colour and structural/textural changes to the meat proteins.
- Fermentation temperatures are regulated in order to meet predetermined process control set points of pH so that:
  - pH falls are rapid enough to make the mix resilient to growth of pathogen species associated with raw meat.
  - pH falls are slow enough so as not to harm the textural properties/moisture balance & eating quality of final product.
- The fermenting/curing sausage mixture is filled into permeable skins & then hung to continue fermentation/cure & then dry. At this stage both air humidity and temperatures are controlled such that the rate of drying is appropriate ie:
  - Air starts most & warm - to aid appropriate culture activity creating further falls in pH and rises in nitrite.
  - Air becomes slowly drier - bacterial activity slows, drying becomes the main activity, salts & nitrite then concentrate.
  - Drying is kept below the rate at which a pellicle can form, so as to avoid a moist and microbially unstable/unsafe core.
- Progress is monitored to ensure safety & quality parameters are met - by measuring: Rates of pH and moisture drop.
- Drying ends & product is packed when the moisture (ie water-activity) has met the setpoint (whereby microbial activity halts).
- As ruminant meat is theoretically susceptible to carrying pathogenic strains of acid tolerant E.coli such as O157, it was thought prudent - with this particular process - to positive release each batch on microbe test results.

Process and product approval by Government Authority:

A thorough HACCP based system was developed and staff given appropriate training. The Authority were provided with application and documentation that demonstrated that processes & hazard controls were suitable, properly controlled monitored recorded & validated. Government Approval to make/ launch/sell ambient stable cultured cured dried venison product was given.


Application for Approval of a Food Business Establishment Subject to Approval under Regulation (EC) No. 853/2004