

# Manufacturing process for whole muscle cooked meat products I: The selection of a process

Manuel Molina



The production of whole muscle cooked meat products is motivated by different factors according to the customs and the socio-economic, cultural characteristics of different countries or depending on the particular problems of the moment.

From the sophistication of some developed markets and traditional consumers of this product, to the necessity of "extending" the meat due to the low purchasing power of others, there exists a wide range of motivations, which underline the difficulty of deciding on the installation of the most suitable plant.

Experience shows that, in most cases, the selection of a manufacturing process involves certain preliminary steps, such as:

- Market research.
- Definition of the products to be manufactured.
- Design of the factory and distinction of zones.
- Planning.
- etc... etc...

which are usually carried out without the presence or advice of technical professionals of the finished product.

This fact, together with the complexity of what is required and the complete lack of coordination among the various professional groups involved in the project, makes optimum realization of the project difficult. There are certain necessary characteristics that a project planned with foresight should have:

- Versatility
- Productivity
- Reliability
- Rationality
- Automation
- Profitability
- Homologability
- Vanguard (state-of-the-art technology)

- Control/Traceability
- Hygiene and safety

Versatility

Flexible production lines or "Processes", with the possibility of manufacturing different products with varying characteristics, of differing qualities and final yields, are increasingly in demand. Much importance is also given to being able to process a variety of meat pork, beef, chicken, turkey, etc..., with the same line, as well as produce other products such as bacon, belly, chopped and even bone-in products like ribs or simply Virginia-type ham.

This diversity of products can be manufactured with the same line, thereby assuring a perfect adaptation of the finished product to the demands of the market at all times, its definitive "competitiveness".

Productivity

It is very common to find highly productive [Kg./day] manufacturing lines of a single product. It is another matter to obtain the same production rate [Kg./day] of differing products with the same line. For this, it is essential for the line to have been conceived as such from its inception. Once the productivity of the line for all products has been achieved, the stock reduction is obvious.

Reliability

A little-known feature, and one rarely demanded up to now, has been Reliability. A manufacturing "Process" of cooked products must be reliable in terms of exactitude in the attainment of the finished product's quality and yield. This is so because most countries have established norms which regulate the products to be manufactured, limiting permitted water content in relation to protein (Feder Index), to fat (HPD), etc...

A process that is not reliable will produce some pieces which analytically fall below the established

norm (loss of yield), and others which exceed the norm (failure to comply with regulations).

On the other hand, an exact installation provides products which are constant in terms of quality and presentation, an attribute much appreciated by manufacturers as a bolster to their brand's image.

Rationality

This is perhaps one of the most neglected characteristics in the first steps toward the execution of a plan, due to the absence of technical professionals of the finished product during this phase. It is evident that in order to design a factory rationally, it is indispensable to know all the practical and technical aspects of manufacturing the products to which it will be devoted.

Ignorance of these aspects will produce a lack of co-ordination among different phases, with the resulting loss of time and even real technical problems with repercussions in the finished product (maturation in inappropriate ambiances, mixture of incompatible bacterial flora, etc...).

Automation

Independent of the degree of automation of each machine which forms part of a single "Process", often unachieved due to previous lack of knowledge, is the automation of the process itself.

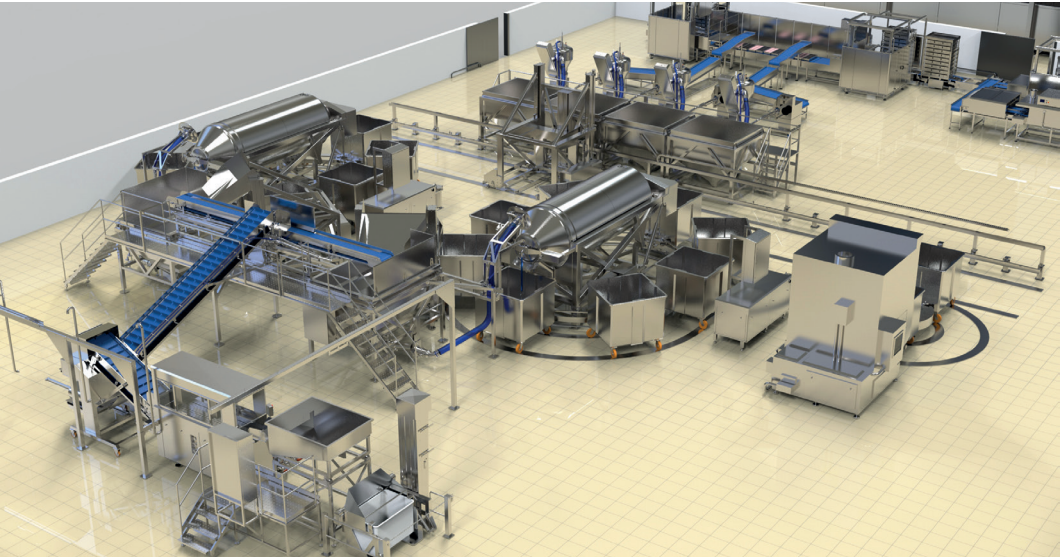
A modern line must eliminate the unnecessary moving of raw material or products in the manufacturing phase, as well as provide for the automation of transport, loading and unloading, giving a continuity to the "Process" and avoiding interruption.

The degree of a plant's automation can become infinite, possibly giving rise to a system that is too rigid and with little versatility, so that the hoped-for advantages turn into disadvantages for the process. In order to avoid these inconveniences, it is important to plan the degree of automation according to the needs of each company.

Profitability

Each of the above-mentioned characteristics has its particular impact on the profitability of the

▼ High-Productivity Automatic Plant: TWINLINE.



plant, the complexity of which makes maximum profitability difficult to achieve if this has not been anticipated from its very inception.

Homologability

There are increasingly numerous technical aspects which must be joined together in a manufacturing plant of meat products for its homologability to facilitate the sale of its products in foreign markets. (EU, USA, etc ... ). This is another aspect which makes indispensable the knowledge of the manufacturing process of the various products, as well as the established norms of the different markets.

Vanguard

It is quite common when grouping together machines to make up a Process, if this has not been previously conceived as such, that some of them will not be equipped to carry out the state-of-the-art technology which distinguishes the finished product and facilitates its penetration into the market.  
This is why it is important to have available versatile lines capable of adapting to new products.

Control/Traceability

The control and traceability of products has great importance in the food industry, due to the fundamental role it represents for food safety. Therefore, it is indispensable to have available all the information possible associated with the process, to be able to offer safe products as well as provide manufacturing details that contribute to improving product quality.

Hygiene

Food safety, mentioned above, is closely linked to product hygiene and concerns both the sanitation methods used by the processor and how easy it is to clean the equipment.  
The lack of proper hygiene can result in serious economic damage to a company due to a loss in sales and the damage done to a product's reputation. To avoid these negative consequences, the entire process must be designed in such a way that each processing unit facilitates cleaning of the equipment itself and of the surrounding area.

CONCLUSIONS

The lack of one of these characteristics is often detected when the project has already materialized, to the resulting disappointment and detriment of the manufacturer. On the other hand, the existence on the market of innumerable brands of individual machines capable of making up a "Process" makes their rational co-ordination extremely difficult, due to the disparity of their characteristics and functions, since they have not been designed with such co-ordination in mind.  
It is like trying to put together a puzzle with the pieces of several different puzzles. One solution to the problems set forth here, and one increasingly favoured by manufacturers for their new projects, is "Complete Plants".  
**These consist of component machines making up a single Process designed, planned and constructed toward that end and guaranteed by the same brand or firm.**  
It follows from the above definition that the companies devoted to the manufacture and sale of said category are not simply constructors of machinery, but rather entail a complex organizational structure and a high degree of specialization which allows for research

and development of the finished product to be manufactured with said Process (.Ham, Shoulder, Bacon, Loin, Chicken, Turkey. etc ... ).  
These companies have at their disposal a Pilot Plant, research and analysis laboratory, departments of technology and engineering, technicians, etc... which guarantee the complete study and materialization of a project with all the characteristics we previously supposed it should have.  
The integrated completeness of such a company can even provide the possibility of supplying chemical additive mixtures, brine ingredients of the product to be manufactured, as a technological contribution to a Complete Plant. With the absolute mastery of product manufacturing technology, execution of planning, manufacture of machinery, composition of brines, and with the knowledge of problems presented by different markets, it is easy to conclude that it is within this framework of security that such companies "Dare" to guarantee the finished product, introducing a recent sales category of "Processes" which has come to be known as "Conditional sale", which consists of closing the purchase commitment upon attainment of anticipated results, thereby offering a Genuine Sale of Processes with Guarantee of the Finished Product.

