

# The advantages of the quick-dry-slice process for dry cured meats

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Dry cured meat products are well known for their singular sensory characteristics. Traditional methods require long processing times. However, Quick-Dry-Slice (QDS) process technology makes it possible to reduce this time by accelerating the drying period, which is the slowest part of the process.

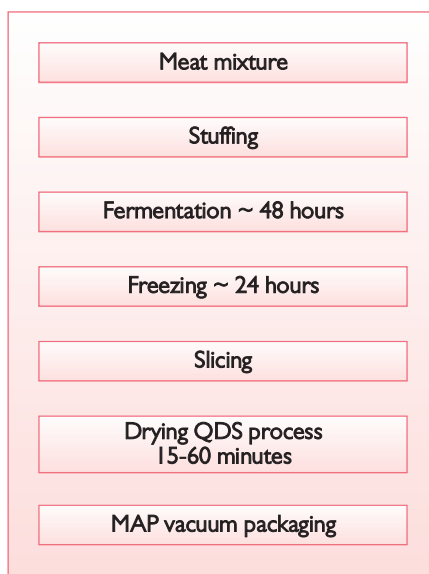
QDS process technology is based on a continuous system that combines air drying and vacuum drying of the meat product's slices. Industrial implantation of the process has been carried out, in an initial stage, in the processing of fermented sausages, which can also be smoked.

There is a wide variety of these products in European, American and Asian markets, each of them with its peculiarities.

Some are marketed with a weight loss of only 10%, while some reach weight losses that exceed 40%. Each product has its optimum moisture content by which it is characterised.

## QDS process drying

The drying technology of the QDS process is based on a drying-maturing system proposed by Comaposada, Arnau, Gou and Monfort (2004) for sliced products, whereby the dry-cured chorizo undergoes a stage of fermentation until the desired pH is obtained, then are frozen until the optimum



**Fig. 1. The processing steps for the production of a stuffed fermented product dried by means of the QDS process.**

slicing temperature is reached, after which they are sliced and then dried by means of the QDS process, which requires times of under 60 minutes depending on the weight loss desired (Fig. 1).

## Industrial equipment

On an industrial level, the QDS process cannot be understood as an isolated piece of equipment, but as an element that must be

integrated in a complete line that includes slicing of the product and delivery of the slices to the nucleus of the process, which is QDS drying.

Also, once dried and cooled, the slices must be overlapped in the desired format and packaged in vacuum or modified atmosphere packets. A QDS process line with an average production capacity of 400kg/h is illustrated in schematic form in Fig. 2.

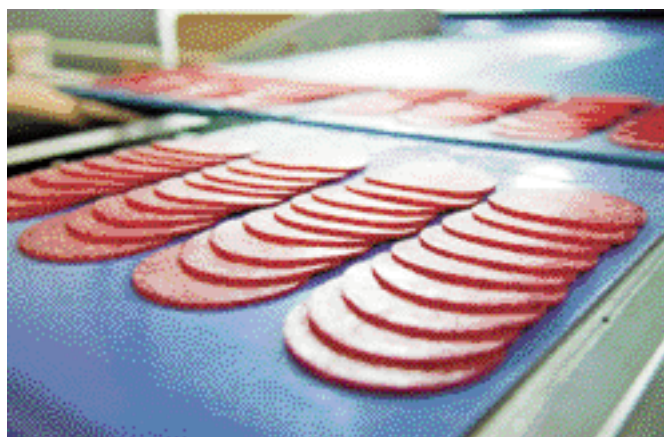
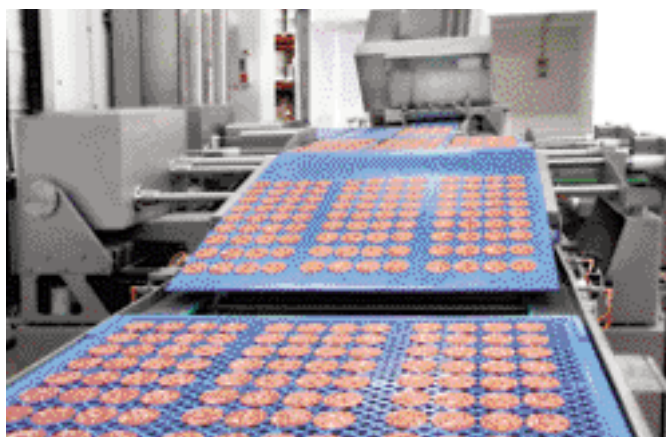
## Technological advantages

● **Improvement of the regularity in product:** The QDS Process lines control individually the weight variation of the sliced product transported on each tray (identified by means of an RFID tag) ensuring a much better homogeneity inside the batch and between batches.

This better regularity also has an economic impact as reducing the standard deviation of the weight loss allows the average yield to approach the upper limit allowed by the product legislation.

● **Reduction of the risk of alteration:** The quick drying and the high degree of control in the QDS Process lines avoid most of the risks which a traditional product undergoes during its long drying stage, as irregularities or malfunctions in the drying chambers with variations in moisture and temperature or as crossed contamination with undesired microbial flora.

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● **Higher degree of food safety:**

Although the microbiological studies show that pathogens, such as *Listeria monocytogenes*, *Staphylococcus aureus*, salmonella and *E. coli*, show a very similar behaviour in the QDS process product and in the traditional product, we can say that, as a consequence of the better regularity and control and the reduction of the alteration risks, the QDS process offers a higher degree of food safety.

● **More flexible research and development:**

The shortening in the product process allows for drastically improving the R&D efficiency, by being able to increase the number of new product design tests. Additionally, the QDS Process lines design allows for the introduction of test samples in the normal production line without serious disruption.

● **Possibility of developing new product shapes other than the traditional round one:**

The traditional process restricts the possible shapes of raw cured products to the cylindrical shape, the only one which guarantees uniform drying. The QDS Process lines permit any possible shape of slice, regular or irregular, even if it may be necessary to adapt the line for the handling of such slices.

● **Possibility of developing new products that are not viable with traditional process:**

The traditional process requires that the product, to be viable, enters the drying stage with a water activity level already reduced to avoid microbiological damage in the first drying days, when aw is still high. The high speed of the QDS process avoids this requirement without damaging the product and opens the door to the development of such products.

Examples of such product lines are those without added sodium, which are extremely difficult to develop with standard technologies.

● **Avoids formation of a mould cover:**

The speed of the QDS Process completely avoids the growing of moulds on the product surface.

● **Better colour of the final product:**

During the traditional drying process, the long time produces oxidation reactions in the fat with a release of intermediate peroxides that oxidises the meat pigments, causing a degradation in the product colour. QDS process products always show a more intense and less brown colour than the standard products as most of these oxidation reactions do not happen because of the short processing time.

● **Avoids crusting on the external slice:**

The traditional drying process forms a crust of drier product on the surface of the sausage that, if excessive, prevents drying of the internal part of the sausage, producing slices too soft in the centre and too dry on the outside. The QDS process completely avoids this effect obtaining totally uniform slices.

### Economic advantages

● **Less space requirements:**

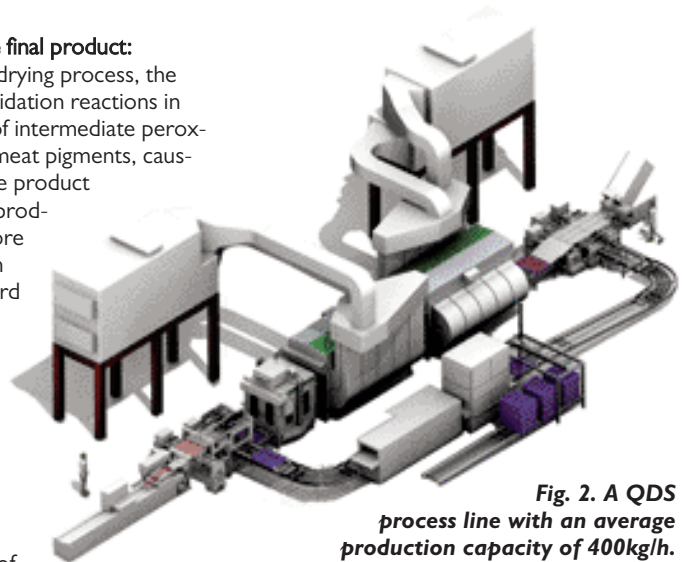
A QDS Process line for the production of 400kg/h represents a reduction on the floor occupied by drying chambers of some 800m<sup>2</sup> for a product with a four week drying period.

● **Reduced working capital:**

In the traditional system a drying product stock equal to the production capacity of all the drying time has to be kept in the drying chambers. The QDS Process lines allow for releasing this capital and saving the associated financial costs.

● **Reduced energy consumption and environmental impact:**

The fact that the QDS Process drying can be done at higher temperatures than the traditional process without risking product safety allows for the use of free-cooling technologies which take advantage of the outside air



**Fig. 2. A QDS process line with an average production capacity of 400kg/h.**

for drying. The energy savings will depend on the climate characteristics of the factory area and also on the product manufactured, but can be quantified at around 30% in the Mediterranean area and will be higher the cooler the climate.

● **Use of cheaper casing:**

As the product spends less time inside the casing, cheaper casings with different characteristics can be used. In some products it is also possible to think of using plastic casings, which are much cheaper.

### Operational advantages

● **Simpler production planning:**

One of the great barriers for manufacturing raw cured products is the long anticipation time required to plan the production. The reduction of the process time to 2-3 days enables a new and much faster reaction to changes in market demand (especially regarding marketing promotions of large distribution companies).

● **Independent fermentation and drying:**

The QDS process allows for fermenting product batches, freezing them and keeping them frozen for long periods, drying them in hours when required. ■

