

# Fermenting and drying of meat products

## Identification

<b>Key words</b>	Drying, fermented, meat product
<b>Latest version</b>	2010/12/21
<b>Completed by</b>	IRTA

## How does it work?

<b>Primary objective</b>	<ul style="list-style-type: none"><li>• To obtain a stable fermented meat product by drying.</li><li>• To increase the shelf life.</li></ul>
<b>Working principle</b>	The action of starters (e.g. lactic acid bacterial) reduces the pH of the meat. This pH reduction denatures the meat proteins leading to structure changes. Soluble proteins gelatinise forming a gel. During the drying the water is removed resulting in a different meat texture.
<b>Images</b>	
<b>Additional effects</b>	Density changes, mass reduction, flavour modification, microbiological changes (microbiological stabilization).
<b>Important process parameters</b>	water activity, product size, temperature, humidity and weight loss.
<b>Important product parameters</b>	composition (water, fat, protein, collagen...), salt, starters and pH.

## What can it be used for?

<b>Products</b>	Fermented meat products (pork, beef, poultry...)
<b>Operations</b>	Mincing, mixing, stuffing, fermenting, drying
<b>Solutions for short comings</b>	<ul style="list-style-type: none"><li>• Increase the yield of processing.</li><li>• Obtain new types of meat products.</li><li>• Due to new needs in western diets this type of meat product can easily introduce probiotics in diets by the use of specific starters.</li><li>• In the same way specific ingredients like flavonoids - fitosterols -probiotics and other active ingredients can be included in the formula.</li><li>• Special dietary requirements can be taken into account f.e. reduce salt content or low fat. The use of healthy ingredients doesn't influence the drying process. Nevertheless low fat content and the use of salt substitutes must be well controlled because the drying process will change notably.</li><li>• Increase the product stability during a long drying process (short coming).</li></ul>

## What can it NOT be used for?

<b>Products</b>	<ul style="list-style-type: none"><li>• Vegetarian products</li><li>• Non-fermented meat</li></ul>
<b>Operations</b>	Thermal treatment (cooking, pasteurisation, sterilisation)
<b>Other limitations</b>	
<b>Risks or hazards</b>	Microbial risk appears when the drying process is not completely achieved, due to an excess in water activity. Then, product could deteriorate or shelf life could be reduced.

## Implementation

<b>Maturity</b>	<p>This technology is widely described in the literature as this is a traditional process known for decades. Due to new technologies, new ingredients, new starters developments, introduction of artificial casings (improving microbiological stability and product stability) can be found.</p> <p>New developments in the drying process have been implemented. For example, better control of the water mass transfer is developed (weight loss, water activity) by the use of weight scales and probes connected to PLCs. A new process consisting of drying the sliced product instead of the whole sausage is being developed (QDS process®).</p>
<b>Modularity /Implementation</b>	This technology is easy to implement in the production line. Improvements in this technology are easily implemented in continuous production lines.
<b>Consumer aspects</b>	<p>New product developments with QDS need the acceptance of new flavours and textures by the consumer (1).</p> <p>Traditionally produced products are widely accepted by consumers.</p>
<b>Legal aspects</b>	<ul style="list-style-type: none"><li>• EC Regulation No. 2001/5/EC on food additives other than colours and sweeteners, EC Regulation No. 2073/2005 on Microbiological Criteria for Foodstuffs, EC Regulation No. 1924/2006 on nutrition and health claims made on foods.</li><li>• EUROPEAN PARLIAMENT AND COUNCIL DIRECTIVE No 95/2/EC of 20 February 1995 on food additives other than colours and sweeteners; Corrigendum to Directive 2006/52/EC of the European Parliament and of the Council of 5 July 2006 amending Directive 95/2/EC on food additives other than colours and sweeteners and Directive 94/35/EC on sweeteners for use in foodstuffs.</li></ul>
<b>Environmental aspects</b>	New technology developments (QDS®) are intended to reduce energy consumption during drying process (30% reduction) (traditional chamber drying has an impact in energy consumption).

## Facilities that might be interesting for you

<b>Title</b>	<b>Institute/company</b>
B-290- Mini spray dryer-HES-SO Valais-HEI	University of Applied Sciences and Arts Western Switzerland Valais
GPCG1-Fluidized bed dryer-HES-SO Valais-HEI	University of Applied Sciences and Arts Western Switzerland Valais
IRTAsim	IRTA
MP41/60, Zs240- Drum dryer- HES-SO Valais-HEI	HES-SO Valais-HEI
Microwave vacuum drying pilot system KEKI	NAIK EKI
QDS system IRTA	IRTA
Spray Dryer - TTZ	TTZ
Spray dryer - HES-SO Valais-HEI	University of Applied Sciences and Arts Western Switzerland Valais

## Further Information

<b>Institutes</b>	IRTA, CSIC - IATA, UNEX, University of Zaragoza, UCM, INRA, SSICA, DMRI - Danish Technological Institute
<b>Companies</b>	Casademont, Emboitits Artesants Monts, Beretta, Pick, Groupe Aoste, Reinert, Palacios
<b>References</b>	<ol style="list-style-type: none"><li>1. Ferrini, G., Guardia, MD., Arnau, J., Comaposada, J. Evaluation of color and texture of Chorizo at different drying levels by Quick-Dry-Slice (QDS processR). Congress: 55th International Congress of Meat Science and Technology (ICoMST) Copenhagen, Denmark, 2009.</li><li>2. Guardia, M. D., L. Guerrero, J. Gelabert, P. Gou, and J. Arnau (2008). Sensory characterisation and consumer acceptability of small calibre fermented sausages with 50% substitution of nacl by mixtures of kcl and potassium lactate. Meat Science 80: 1225-1230.</li><li>3. Advanced technologies for meat processing (2006). Edited by Leo M. L. Nollet, Fidel Toldrá; Boca Raton, CRC/Taylor &amp; Francis.</li><li>4. Research advances in the quality of meat and meat products (2002). Edited by Fidel Toldrá; Trivandrum, India, Research Signpost.</li><li>5. Fermented meats (1995). Edited by G. Campbell-Platt and P.E. Cook. London, Blackie Academic &amp; Professional.</li><li>6. Developments in meat science 4 (1988). Edited by Ralston Lawrie. London, Elsevier Applied Science.</li></ol>

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