

# Comparative view of regulations on quality of meat products

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Review

## Summary

Being familiar with the quality of meat products has a special significance. Regulations regulate chemical composition of meat products and oblige EFB (entities in food business) for making a manufacturing specification, i.e. a declaration for each meat product on the market. Even though many regulations that regulate the area of meat products production in Croatia have changed over time, the demands that are common for all of them are in terms of name and definition, labeling, composition and sensorial traits, kinds and quantity of raw material and other things that are used in production and processing, as well as the applied technological procedures. By successive changes in regulations, quality parameters have been changing too. By deregulation of quality, in this sense nowadays all the responsibility for the production of a meat product of good quality lies with an entity in food business.

**Keywords:** meat products, regulations, quality

## Introduction

Quality of meat products is defined by quality of raw materials and different additives, the chosen technological procedure of processing and the quality of materials for equipping a product (Živković, 1986). Production and quality of food products is always under consumers' scrutiny and producers are aware of the fact that the offer, the manner of presenting products on the market and production volume all depend on consumers' eating habits. One can attract a buyer by standardized quality, recognizable design and a competitive price of a product. In that way consumers can adopt a habit to buy certain products. Certainly, the emphasis should be on quality and safety of products.

It is difficult to describe what exactly the term product's quality designates because it is a complex and personal concept used to describe certain characteristics of a product and the way it can be compared to consumers' expectations. It can be said that food is of acceptable quality if it satisfies consumer needs. Quality implies the difference between the desired and achieved properties of food, as well as the degree to which buyers are satisfied. It also can be defined by terms as hygienic conditions, nutritional value and sensorial traits (color, taste, texture and odor). Mostly, quality is defined differently by producers and processors of food, consumers and trade network. Most definitions are based on a superficial determination of values which is used inappropriately as a synonym for quality. It is necessary to use acceptable and precise methods that will support sensorial assessment of quality. Quality is also the sum of physical, physiological and biochemical factors. Quality parameters of meat products that can be determined in chemical analyses are contents of water, fat, protein, carbohydrates, ash, pH,  $a_w$  (Kozačinski et al., 2012). Those parameters are regulated by provisions listed in many regulations (The

Regulation on Meat Products, Official Gazette 131/2012; The Regulation on Food Additives, Official Gazette 81/08; The Regulation on Nutrition Labeling for Foodstuffs, Official Gazette 74/08, etc.). The content of nitrites and polyphosphates, which affect health safety of meat products directly, will be determined in chemical analysis of food. All other listed ingredients (starch, vitamins) will also be determined. Except for the traditional conception, modern buyers perceive quality through a proper and humane treatment of animals during breeding and prior to slaughter as well.

In connection with the above, we set the assignment that we show the review of regulations that cover the quality of meat products and dynamics and reasons of changes in them within framework of this paper.

## Food safety

The area of food safety has been regulated in the European legislature by regulations that are applied directly in all member countries of the European Union, which was intended for achieving a uniform approach to food safety.

Food safety consists of the principles which the system of food safety is based on and which are determined on the level of the EU by the General Food Law (Regulation (EC) No 178/2002). Those principles are determined in Croatia by The Food Act (Anonymous, 2013). An entity in food business (EFB) has ensuring a health safety of food as its primary responsibility. The responsibility of EFB is additionally increased by the fact that along with the application and implementation of the principles of self-control toward the principles of Hazard analysis critical control point (HACCP), a good manufacturing practice is applied too. Control system is based on risk analysis in total food chain (Njari and Zdolec, 2012). Along with the changes in legislation in food safety, changes in legislation that regulate the quality of meat products occur

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too. Provisions that regulate the quality of meat products have gone through many changes which led to deregulation of individual ingredients in meat products. Old provisions (the Regulation of Quality of Meat Products from 1974) defined precisely the quantity of individual parameters of chemical composition that an individual meat product contains. Therefore, meat products were more uniform in their quality due to the fact that the producers did not have as much freedom in production as they do today.

### Regulations on quality of meat products: historical overview

The data on placing meat products on the market from the archive of the Department of Hygiene, Technology and Food Safety of the Faculty of Veterinary Medicine date back from 1950 (Francetić, 1950). The script lists definitions, classification and composition of meat products which comply with the Temporary regulations issued by the Management for the Production Improvement at the planning commission of the People's Republic of Croatia (MFPI). It is also mentioned that if regulations change, the changes will not be significant. Except for the mentioned script, Francetić wrote a chapter in the Veterinary manual (Francetić, 1953) under the term Veterinary sanitary supervision of food, where he mentions that Regulations on health supervision of food were brought by the Council for public health and social politics of the Federal People's Republic of Yugoslavia (FPRY) in its "Regulation on health supervision of food" (Official Gazette of FPRY

the MFPI.

The Regulation on quality of meat products published in 1974 prescribes general provisions that relate to the conditions which must be fulfilled by the products made of cattle for slaughter, poultry and game animals. The conditions are related to their basic and additional ingredients, chemical composition, sensorial traits and technological processing, then the conditions of packaging, transport and product storage. Producers must label meat products and the declaration must be clear, readable and easily noticeable, while the text must be in one of the languages of Yugoslav nations (Anonymous, 1974).

The Regulation also contains classification of meat into individual categories, meanings of individual expressions and terms, then classification of meat products as well as the description and composition of each individual product. Unless it is prescribed differently by regulations on health supervision of animals or regulations on quality of foodstuffs of animal origin, this Regulation prohibits the usage of water binding means, preservation, connecting stuffing ingredients and adding color additives. Also, meat products must not contain residues of antibiotics and hormones.

The Regulation allows the following products to be placed on the market: chopped meat and chopped meat products, sausages, cans, ready meals, cured meat products and bacon, fat and greaves and other meat products.

As we already listed, the description and composition of each individual product and a short description of a technological production process are also prescribed.

**Table 1.** Regulation provisions (Anonymous, 1974) for Srijem sausage and kulen

	Srijem sausage	Kulen
Definition	Product obtained from roughly chopped meat of 1st category and firm adipose tissue that can be added up to 10% beef meat of 1st or 2nd category	Product obtained from very roughly chopped pork meat of 1st category and firm adipose tissue that can be added up to 10% beef meat of 1st or 2nd category
Composition	The ratio between the meat and firm adipose tissue must be 65% to 35%. Garlic and paprika are used as additional ingredients.	The ratio between the meat and firm adipose tissue must be 65% to 35%. Garlic and paprika are used as additional ingredients.
Casing	The stuffing of Srijem sausage is filled into pig small intestine.	The stuffing of kulen is filled into pig appendix or other casings
Chemical analysis	There must not be more than 35% water	There must not be more than 35% water

No 45/48) and that based on that Regulation they made an Instruction on health surveillance of food. A special item in that Instruction says that veterinary supervision of cattle for slaughter, meat, meat products and other foodstuffs of animal origin is performed according to the existing regulations on veterinary supervision of production and trade of foods of animal origin. It is mentioned in the chapter with meat products, according to the regulations of the Management for the Production Improvement (MFPI), that cured meat products relate only to pork and it is listed for sausages that they are classified according to the regulations of the MFPI to: fresh, semi-durable and durable, with the proviso that semi-durable sausages also include Parisian, Tyrolean and some other sausages which are not included by the Temporary regulations of

The Regulation also prescribes the content of declaration. A declaration for durable sausages must contain the name of the product, company, name and headquarters of the producer and data on the kind and quantity of used additives and additional ingredients. The declaration is placed on the label which is fastened to one end of a product or on a banderole which is wrapped around a product.

In the Official Gazette of the Socialist Federal Republic of Yugoslavia (SFRY) on the 25 July 1980 there was published the Regulation on amendments to regulation on quality of meat products (Anonymous, 1980). Changes in the interpretation of individual terms appeared, so certain terms were complemented or new ones were introduced.

Thus, it was added in the article that regulates the declaration of sausages that "Sausage declaration must contain the name of the product, designation of type (e.g. boiled sausage), company, i.e., the name or the logo of the producer and data on the kind and quantity of used additives and additional ingredients. In article 19, paragraph 1 changed and it says that except for durable sausages, cured meat products and finely chopped minced meat, polyphosphates can be used in the production of meat products provided that in a finished product there must not be more than 0.3% added phosphates expressed as phosphorus pentoxide. A new article 153a was added and it says that poultry meat can be used for the production of different kind of sausages which can be added the meat of cattle for slaughter of the 1st, 2nd and 3rd category and adipose tissues 30% at the most. If more than 30% is added, it must be stated separately on a declaration.

When the Republic of Croatia joined the European Union it brought different changes related to the Regulation on meat quality, so in October 2005 the Ministry of Agriculture, Forestry and Water Management (MAFWM) appointed a Committee for making a new Regulation on meat products which would make a Draft proposal of the new regulation (Hadžiosmanović, 2006) in accordance with the article 35 of the Food Act, according to which MAFWM brings implementing regulation according to which food quality is determined. The procedure of adopting a new regulation was started considering the fact that in the Republic of Croatia there was still in force the Regulation on quality of meat products from 1974 and the amendments from 1980.

The Croatian Chamber of Economy informed the producers and sent them Draft proposal for the Regulation (Anonymous, 2007), so by the obtained opinions on that draft, the final Draft regulation on meat products (Hadžiosmanović, 2006) was brought.

Draft regulation under the working title "the Regulation on meat products" (Hadžiosmanović, 2006; Anonymous, 2007a) brings a series of changes that relate to changes in the name, more appropriate definitions, composition and kind of raw materials and quantity of other

substances used in the production and processing, technological procedures, additional or specific demands for declaration or labeling, then sampling and analytical methods in quality control. Novelty in the new Regulation in comparison to the old one relate to the classification which includes the following groups of products:

1. products made of fresh meat, 2. sausages, 3. smoked, thermally treated products, 4. cured meat products, 5. ready-to-cook and ready meat meals, 6. cans, 7. bacon and 8. other meat products.

The existing Regulation underwent some changes in the interpretation of terms as well, where individual terms were replaced or new ones were introduced. Quality criteria were not especially determined regarding the composition, and categorization of meat for the industrial processing was not prescribed as well. Quality was primarily determined by a chemical composition and a producer's specification, which is obligatory for all products.

On 2 January 2007, MAFWM published in the Official Gazette of the Republic of Croatia a new Regulation on meat products where significant changes occurred in comparison to the previous regulations and, as we already mentioned, it was based on the Draft and opinion for the new regulation (Cvrtila, 2007). It is clearly stated in the article 2. that provisions of this Regulation do not apply to products placed on the market of the Republic of Croatia that are produced and placed on the market of the EU member countries, if they are in accordance with their national legislation.

According to the previous regulations regarding the parameters of chemical composition for individual products, there were defined contents of water and fat, as well as protein content for durable sausages. According to the new Regulation (2007), protein content was defined for other kinds of sausages too, whereas water content as a parameter was completely deregulated (except for durable sausages where it can amount 40% at the most). Fat content is regulated for products made of chopped meat, boiled sausages (black pudding only) and cans containing chopped meat. The provision that requires water activity not to exceed 0.93 in durable cured products is also

**Table 2.** Comparative view of chemical composition according to requirements of different regulations on quality of meat products (product kind Durable sausages)

Parameter of chemical research	Regulation OG 29/1974	Regulation OG 41/1980*	Regulation OG 01/2007a	Regulation OG 131/2012
Water	Up to 30% (Srijem and kulen to 35%; by specification to 40 %)	Up to 30% (Srijem and kulen to 35%; by specification to 40 %)	Max 40%	Max. 40%
Fat				
NaNO <sub>2</sub>	Do 20 mg/100 g	Do 20 mg/100 g	Do 200 mg/kg	Do 50 mg/kg
P <sub>2</sub> O <sub>5</sub>	-	-	-	-
Meat protein			Min. 16%**	Min. 16%**

\* The Regulation on amendments to regulation on quality of meat products

\*\*Minimum quantity of meat proteins is defined additionally for some sausages (kulen and winter sausage min 22 %)

a novelty.

Except for determining the accordance of products with the regulation requirements, monitoring and control of product quality according to the norms for chromatographic and spectrophotometric determining of nitrates or nitrites was emphasized, then determining nitrogen content, total fat content, hydroxyproline, and measuring pH value.

Also, there weren't prescribed special requirements that relate to products (article 8, paragraph 3), so that they can be produced and placed on the market according to producer's documentation under the condition that a product which contains the name of the category, or a group or a subgroup in its name, or a product which it belongs to according to its characteristics, must satisfy minimum requirements prescribed for that category or a group or a subgroup or a product.

Also, in this Regulation (2007) provisions that relate to regulation of quality of lard produced industrially or in households, and beef tallow.

On 29 November 2012, the Ministry of Agriculture (MA) published in the Official Gazette a new Regulation on meat products (Anonymous, 2012) which prescribes quality requirements in the production and during placing on the market that meat products of slaughtered and game animals must satisfy.

The requirements which are prescribed by this Regulation (2012) relate to names, definitions and general requirements; kind and quantity of raw materials and other substances used in the production and processing; technological procedures which are applied in the process; additional or specific requirements for declaration or labeling, then sampling and analytical methods in quality control. The Regulation contains special provisions regarding systematization (products made of whole or cut pieces or minced meat; sausages; cured meat products; ready meat meals; meat products in pieces; meat products in their own natural juice; products made of chopped meat; bacon; and other meat products), then sensorial traits, processing, production and the composition of individual meat products. One must keep in mind that composition relates to contents of fat, protein, meat and salt in individual products.

## Conclusion

Meat products have a special place on the food market, so having knowledge of their quality is very important. According to today's regulations, the quality of foodstuffs including meat products is determined by a chemical composition and producer's specification, i.e., declaration. As opposed to regulation of the market which was in force for years, any kind of deregulation is a process of removing limits on some market and introducing market competition. In this sense nowadays, by deregulation of quality, all the responsibility for producing a quality meat product lies with the entity in food business.

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