

Fact sheet about sensory properties of organic salami

- recommendations for processing**
- recommendations for product development**
- recommendations for marketing**

Deliverable 6.3

FiBL Switzerland



Consumers' sensory preferences for organic salami



France

Organic consumers in France prefer salami that is not too salty and without a strong garlic odour.

Germany

German organic consumers prefer salami with a strong smoky taste and odour, non-fatty mouthfeel, a medium hardness of texture, a comparatively dark colour and a low intensity of granularity.

Italy

Italian organic consumers favour salami with a non-fatty taste, but with a fatty mouthfeel and an intense dark colour.

Netherlands

In the Netherlands, organic consumers prefer pork salami with an intense smoky taste and odour, a smooth and fatty mouthfeel and a medium intense darkness of colour. Furthermore, a slight sourness is preferred by Dutch consumers.

Poland

Among Polish organic consumers, salami with an intense garlic and smoky taste and odour, a rosemary odour as well as a medium hardness and firmness is most preferred.

Switzerland

Swiss organic consumers prefer salami with an intense bacon taste and odour, a rather low intensity of spicy taste and odour properties, a low saltiness and sourness, an intense edible mould-like taste and odour, a hard and fatty mouthfeel, as well as a rather pale colour.

Sensory properties of organic salami

The main purpose of the ECROPOLIS project was to provide and exchange sensory information on organic food to the industry (organic associations, producers, processors, retailers, wholesalers) as well as to the public at large: the consumers. Not only sensory profiles comparing organic and conventional food products were developed. Besides, the impact of regulations for organic food production on sensory properties of organic food and the labelling effect on consumers' sensory preferences were investigated. The consequences of the results can now be used for improvements in product development and processing, as well as for sensory marketing of organically produced food.

1 Impact of EU organic regulations and private organic standards on sensory characteristics

1.1 Regulatory impact on sensory properties of organic salami tested

The EC regulation 889/2008 for organic food production only allows additives that are listed in Annex VIII. Relevant for the production of salami are the preserving agents E250 sodium nitrite and E252 potassium nitrate, as well as the antioxidant agents E300 ascorbic acid and E301 sodium ascorbate. The amount of preserving agents allowed is limited to 80 mg/kg indicative ingoing amount and 50 mg/kg maximum residual amount. Flavour enhancers, such as E621 monosodium glutamate, are not listed in the annex of the above mentioned regulation and are, thus, prohibited. The addition of natural flavouring ingredients is allowed. With regard to the usage of microorganisms, the EU regulation requires the use of non-genetically modified organisms. However, the microorganisms do not necessarily have to be grown on organic substrate. Also the governmental regulations of Switzerland and the private standards of Bio Suisse allow the usage of preserving agents. In contrast, Bioland and Demeter (international as well as national) prohibit the use of preserving agents E250 or E251. The sensory analysis within the ECROPOLIS project showed that this leads to a difference in the appearance of pork salami: pork salami produced with E250 or E251 is significantly darker than salami produced without these agents.

1.2 Summarising impact matrix about regulatory impact on sensory properties of organic salami

The regulatory impact through EU regulations and Swiss governmental regulations for organic food production (EU/CH), as well as through private organic standards (Bio Suisse, Bioland, Demeter (national and international) and Biokreis) on sensory properties of salami is shown in the following table.

Table 1: Impact on sensory properties of salami through regulatory requirements

Relevant standard issues for sensory properties	Relevant restriction or general allowance	EU Regulation 889/2008	Private organic standards	Impact on sensory properties				Regulatory impact				
				Taste	Odour	Texture	Appearance	EU/CH	Bio Suisse	Bioland	Demeter	Biokreis
Ingredient of agricultural origin	Meat	A	A	XX	XX	XX	XX	-	-	-	-	-
	Sugar	A	A	XX	XX	XX	-	-	-	-	-	-
	Salt	A	A	XX	-	-	-	-	-	-	-	-
	Spices	A	A	XX	XX	-	-	-	-	-	-	-
	Flavouring ingredients	A if derived from natural substances	Bio Suisse: not allowed Demeter, Biokreis: spice extracts not allowed; Bioland: organic flavour extracts allowed	XX	XX	-	-	(X)	X	-	X	X
Additives	Preserving agents (E250, E252)	A if listed in Annex VIII	Bio Suisse: A if listed in the standards; Bioland, Demeter: not allowed; Biokreis: A up to restricted amount	-	-	-	XX	-	-	XX	XX	(X)
	Antioxidant agents (E300, E301)	A if listed in Annex VIII	Bio Suisse: A if listed in the standards; Bioland, Demeter: not allowed; Biokreis: A up to restricted amount	-	-	-	(X)	-	-	(X)	(X)	(X)
Processing aids	Starter cultures	A	A	XX	XX	XX	-	-	-	-	-	-
Processing methods	Cutting, Smoking	A	Bio Suisse: A; Bioland: smoking with wood from regional trees; Demeter: smoking with non-tropical wood Biokreis: A	XX	XX	XX	XX	-	-	-	-	-

A: allowed; -: no impact; (X): probable impact; X: relevant impact; XX: high impact

2 Factors that influence the sensory characteristics of salami

Salami belongs to the raw sausage group and thus develops its aroma through lactic fermentation. Therefore, the microorganisms added as starter cultures for the fermentation process have a strong influence on the taste and texture of salami. Furthermore, the sensory properties of salami are determined by the quality of meat, the sugars necessary for the fermentation, the salt, spices, other flavouring ingredients, preserving agents and antioxidant agents. Besides the ingredients used, other factors that impact the sensory characteristics of salami include the processing methods, such as measures for cutting the meat, conditions during maturing and drying and whether or not the salami is smoked.

2.1 Taste

Sugar

The kind of sugar added has an impact on the sensory properties of salami, because it serves as feed for the microorganisms, which transform sugar into lactic acid during the fermentation process. Thereby, sugar has an influence on the pH value. The difficulty in analysing the effect of different kinds of sugar is that they correlate strongly with the starter cultures.

Starter culture

The microorganisms added as starter cultures for the fermentation process have a strong influence on taste. The sourness of salami taste, especially, depends on the microorganisms used.

Processing methods

Also the processing methods, particularly the measures for cutting the meat, conditions during maturing and drying, and the question whether or not the salami is smoked, have an influence on the taste of salami. Also edible mould added on the salami surface during the ripening process of air dried salami has an influence on taste.

2.2 Texture

The treatment of meat with salt leads to a reduction of water in the meat and has, thereby, an impact on texture, as well as a microbiological purpose. Texture also results from a complex interaction of the *microorganisms*, the kind of *sugar* used and the addition of *additives*.

2.3 Appearance

Meat

The appearance of salami is influenced by the kind of meat (e.g. pork or beef) and the granularity size of meat and fat.

Sodium nitrite and potassium nitrate

Nitrite pickling salt and nitrates lead to a reddening of meat. At least 30-50 mg sodium nitrate per kilogram meat is necessary to achieve a sufficient colouring effect. The maximum amount of E250 and E252 allowed for conventionally produced meat products is 150 mg per kilogram.

2.4 Odour

Sugar

The kind of sugar added has an impact on the odour of salami, because it serves as feed for the microorganisms, which transform sugar into lactic acid during the fermentation process. Thereby, sugar has an influence on the pH-value.

Starter culture

The microorganisms added as starter cultures for the fermentation process have a strong influence on odour. The sourness of salami odour, especially, depends on the microorganisms used.

Processing methods

Processors' decision whether or not salami is smoked has a significant impact on odour.

3 Country-specific attributes of liking and recommendations to improve consumers' acceptance of salami

The country-specific attributes of liking and disliking are listed, starting with the most relevant characteristics identified.

France

Table 2: Consumers' salami attributes of liking and disliking in France

Attributes of liking	Attributes of disliking
<ul style="list-style-type: none">▪ None	<ul style="list-style-type: none">▪ Garlic odour

Germany

Table 3: Consumers' salami attributes of liking and disliking in Germany

Attributes of liking	Attributes of disliking
<ul style="list-style-type: none">▪ Smoked taste▪ Smoked odour	<ul style="list-style-type: none">▪ Beef odour▪ Beef taste▪ Dark colour

Italy

Table 4 Consumers' salami attributes of liking and disliking in Italy

Attributes of liking	Attributes of disliking
<ul style="list-style-type: none">▪ Garlic taste▪ Dark colour▪ Fatty taste▪ Salty aftertaste▪ Pungent/spicy aftertaste▪ Sourly odour▪ Edible mould taste▪ Hard appearance▪ Garlic odour▪ Sour taste	<ul style="list-style-type: none">▪ None

Netherlands

Table 5: Consumers' salami attributes of liking and disliking in the Netherlands

Attributes of liking	Attributes of disliking
<ul style="list-style-type: none">▪ Fatty odour▪ Pork taste▪ Fatty taste▪ Fatty texture▪ Fatty aftertaste▪ Smooth texture	<ul style="list-style-type: none">▪ Beef odour▪ Rye bread odour▪ Beef taste▪ Mustard odour▪ Ripe taste▪ Coloured appearance▪ Hard border texture▪ Pepper taste▪ Fragmented texture▪ Pepper aftertaste▪ Garlic odour▪ Rough taste▪ Pepper visible

Poland

Table 6: Consumers' salami attributes of liking and disliking in Poland

Attributes of liking	Attributes of disliking
<ul style="list-style-type: none">▪ Garlic taste▪ Garlic odour▪ Rosemary odour	<ul style="list-style-type: none">▪ Salty taste▪ Salty aftertaste▪ Noble mould (mouldy) odour

Switzerland

Table 7: Consumers' salami attributes of liking and disliking in Switzerland

Attributes of liking	Attributes of disliking
<ul style="list-style-type: none">▪ Hard texture▪ Edible mould odour▪ Edible mould taste▪ Bacon odour▪ Fatty texture▪ Bacon taste	<ul style="list-style-type: none">▪ Garlic taste▪ Rosemary taste▪ Garlic odour▪ Sour taste▪ Beef odour▪ Dark colour▪ Beef taste▪ Smoked taste▪ Sour aftertaste▪ Smoked odour▪ Pungent/spicy aftertaste

4 Label effect

An effect of the organic label (label effect) on consumers' liking of salami was found in France, Germany, the Netherlands, Poland and Switzerland, while in Italy, no significant impact of the organic label on the overall liking of salami was found.

A strong positive label effect indicates a largely positive image of the product characteristic 'organic'. In such cases, it is promising to highlight the attribute 'organic' as a unique selling proposition when marketing the product. In cases of no or even negative label effects, product improvement is required.

France

The organic label effect in France was diverse. One organic and one conventional salami sample scored remarkably lower with the respective label compared to the blind test (without labelling). In contrast, two organic salami samples received significantly higher scores in the branded test (with labelling). The other samples tested were evaluated similarly in the blind and the branded test.

No differences between heavy and light organic users of organic food were identified with regard to their salami preferences.

The positive organic label effect found in some cases in France indicates the positive image of organic salami. Thus, a promising marketing strategy in France includes using the label 'organic' as a unique selling proposition for salami.

Germany

In Germany, there was a slightly positive effect of the organic label on the preference for salami. Six out of nine organic samples got higher scores in the branded test compared to the results of overall liking in the blind test. The effect of conventional labelling was different. One conventional salami sample scored significantly lower in the branded test, whereas the other conventional sample was evaluated slightly, but not significantly better with the conventional label.

Furthermore, no significant differences between heavy and light users of organic food were identified with regard to their salami preferences.

The organic label effect found in some cases in Germany indicates the positive image of organic salami. Thus, highlighting 'organic' as a unique selling proposition for salami, represents a promising marketing strategy in Germany.

Italy

The results of the blind test and the branded test were nearly identical both for the organic salami samples and the conventional salamis so that neither the organic nor the conventional labelling had an effect on the liking of the tested products. Furthermore, no differences between heavy and light users of organic food were identified with regard to their salami preferences.

No significant differences were found between Italian heavy and light users' evaluation of salami. Given the low organic label effect, processors and providers of salami could increase

the consumer acceptance of organic salami by means of a product differentiation strategy based on consumer preferences measured in this country.

Netherlands

In the Netherlands, the organic label had a significant impact on the liking of the tested organic salamis. However, in the sensory analysis conducted within the project ECROPOLIS, no general differences in sensory properties between the tested organic and conventional samples were identified. Furthermore, no differences between heavy and light organic users of organic food were identified with regard to their salami preferences.

Given the strong label effect found in the Netherlands with regard to salami, highlighting 'organic' as a unique selling proposition is a promising marketing strategy. To reach a broad spectrum of consumers, product improvement strategies based on consumer preferences in the Netherlands are also promising.

Poland

In Poland, one organic sample got significantly higher scores with the organic label compared to the results of the blind test. Also, one conventional salami sample received higher scores when labelled with the organic label. The other organic salamis scored slightly lower in the branded test. Thus, the organic label has a significant impact on organic consumers' preferences for salami in this country.

In the blind test, heavy users of organic food gave regularly higher scores of overall liking to the salami samples than light users.

Given the low organic label effect, processors and providers of salami could increase consumers' acceptance of organic salami by means of a product differentiation strategy based on consumer preferences measured in this country.

Switzerland

No clear label effect was found in Switzerland. Four out of six organic salami samples scored lower with the organic label than in the blind test. One organic sample got even significantly lower scores. In contrast, organic salami was the most liked sample when labelled as conventional salami. Thus, the organic label leads to a decrease in consumer acceptance when it comes to salami. No differences between heavy and light organic users of organic food were identified with regard to their salami preferences.

Given the low organic label effect, processors and providers of salami could increase the consumer acceptance of organic salami by means of a product differentiation strategy based on consumer preferences measured in this country.

5 Strategic options regarding product development and communication measures for organic salami

Table 8 shows that different measures for product development and communication need to be taken, depending on which strategy a company is choosing. Country-specific issues as well as product related issues have to be kept in mind.

Table 8: Strategic options with regard to product development and communication

SALAMI Strategic options	Imitation / standardisation strategy	Differentiation strategy (freshness, authenticity)	Country specific issues
Product development	<ul style="list-style-type: none"> Standardised taste intensity, odour, colour and texture comparable with conventional benchmark products. Ensure intense taste: important in DE, NL, PL and CH but less important in FR and IT. Ensure appropriate fatty mouthfeel: more in IT, NL and CH; less in DE, PL and FR. Ensure appropriate colour: more dark in DE, IT and less in CH and NL. 	<ul style="list-style-type: none"> Main differentiation possibilities in use or non-use of nitrates/nitrites (and ascorbates). 	<ul style="list-style-type: none"> Different country-specific expectations regarding taste and odour (see product improvement strategies), e.g. low saltiness in CH.
Communication measures	<ul style="list-style-type: none"> Communicate main sensory characteristics preferred in the country. Communicate: “we are as good as standard products, but we are also organic” in those countries, where organic labelling has a positive influence (NL and partly in IT). 	<ul style="list-style-type: none"> Communicate specific organic restrictions not to use nitrates/nitrites what might lead to paler colour but could have health benefits. Make consumer tasting in shops: particularly organic sensory differences due to specific nitrite/nitrate restrictions. Offer training for sales staff. 	<ul style="list-style-type: none"> Preference for organic salami: CH, IT and NL: Preference for non-organic salami: DE (especially smoked salami) and France. Low or no influence of organic labelling for salami in DE, PL, FR: data in PL, CH: attributes other than organic should be communicated.

The following checklist helps to identify improvement potential regarding product development and sensory marketing of organic salami.

Check points	Yes	No	Don't know
Raw material:			
Are all ingredients organic? Refer to EU Reg. 834/2007			
Are non-organic ingredients listed in Annex VIII?			
Could non-organic ingredients be replaced by an organic ingredient?			
Additives:			
Are the additives listed in Annex VIII?			
If applicable: Are the additives listed in private organic standards?			
Could the additives be avoided?			
Could the additives be replaced by an ingredient?			
Could the additives of agricultural origin be replaced by an organic additive?			
Could prohibited additives (e.g. sodium nitrite, potassium nitrate) be replaced or other measures taken to improve the sensory quality?			
Processing aids:			
Are the processing methods allowed by the regulations and private organic standards (e.g. no GMO)?			
Are all processing steps really needed?			
Packaging:			
Is the packaging really needed for product protection (e.g. double packaging)?			
Is it possible to recycle the package?			
Is it possible to dispose it ecologically?			
Labelling:			
Are the minimal standards of the food law as well as of the organic regulations fulfilled?			
Could the declaration be extended for better consumer information (e.g. declaration of processing methods, origin of raw material, food miles)?			
Sensory Marketing:			
Could the restrictions on flavouring ingredients and their consequences on salami taste and odour be used in marketing in a positive way?			
Could the restrictions on preserving agents and their consequences on salami appearance be used in marketing in a positive way?			

6 Description of OSIS

OSIS offers information about sensory aspects of food and related issues. All relevant data gained from research in the Ecropolis project are made available to consumers, associations, producers and processors of the food sector. OSIS offers various levels of data access based on the needs of the target users and highlights the relevant specific information, e.g. in a “European-Sensory-Journey”, easy-reading fact sheets or detailed reports.

Imprint

Stolz, H., Espig, F., Kretzschmar, U. (2011): Fact sheets on all the tested products in the appropriate language. Deliverable No. 6.3 of ECROPOLIS Project. Research Institute of Organic Agriculture (FiBL), Frick, Switzerland.

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For further information please visit the project homepage at <http://www.ecropolis.eu>.