

## CONSUMER AND PROFESSIONAL JUDGMENT OF PAPRIKA POWDER - RESULTS OF A QUESTIONNAIRE SURVEY COMBINED WITH SENSORY ANALYSIS

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### Abstract

Paprika powder is the most frequently utilized spice in Hungary. The most traditional paprika products are produced in the area of Szeged and Kalocsa. However nowadays Hungarian consumers, producers and controlling authorities have to face the problem of mixed paprika products (Hungarian with other countries' products).

Thus in order to analyse Hungarian consumers' (N=223) and catering professionals' (e.g. chefs, cooks) (N=48) preference of paprika powder, a questionnaire survey combined with sensory analysis (ranking) was completed. Results of the study were analysed with the help of SPSS 21 statistical software (frequency, mean, ANOVA and Chi square test), as well as results of the sensory ranking were evaluated with the application of the current standards (Kramer and Friedman test).

From the results it can be concluded that the "contamination free (e.g. mycotoxins)", and the "spicy taste" are the most important factors during the consumers' (N=223) shopping decisions. For the catering professionals (N=48) the "taste and the flavour" are the most determining factors from the point of view of the prepared dishes' quality. Neither the professionals, nor the consumers were aware of the Hungarian paprika quality classifications ("special", "delicate" and "noble sweet"). However both the consumers and the professionals believe that the Hungarian paprika is deservedly world-famous. Utilization of Hungarian product is important for them and they opposed for the mixing of Hungarian paprika with other countries' products, even if it results a better quality.

On the basis of the sensory analysis (ranking) preference of the Hungarian products were not unambiguous. Thus during the image formation it is important to emphasize and familiarize the features of the Hungarian paprika products with the consumers and the professionals, too.

**Key words:** Paprika powder, Questionnaire, Sensory analysis.

### 1. Introduction

Paprika is the national spice of Hungary because it is the basic ingredient of the traditional Hungarian dishes like goulash soup and stew. The paprika plant was brought into Hungary by the Turks in the 16 - 17<sup>th</sup> century. At the first time poor people tried to replace pepper with paprika; however, it became the symbol of the Hungarian cuisine. The paprika of Kalocsa is a so-called Hungaricum which is a term used for unique Hungarian products like 'pálinka', 'téliszalámi' and 'Tokaj wine'.

The Hungarian paprika became world-famous due to the acclimatized species, the favourable climate and geographical position of the country, the rich flavour and the final pleasant paprika-red colour of the products. In the southern part of the country Kalocsa and Szeged are the main paprika producer areas. In these regions the amount of the sunny hours is high, which is essential for the plant to ripe and to become sweet.

The Hungarian inhabitants' paprika powder consumption is approximately 1.3 g/day, and this means a half kilo in a year (Biró, [1]), which is around the quadruple amount of an average European inhabitant's paprika powder consumption (Korbász, [2]).

According to the previous Hungarian directive (MÉ 2-8720/2, [3]) regarding the sensory requirements (colour, clearness and grain size) there are four categories of paprika in the Hungarian shops: 'special quality' (according to the MSZ ISO 7540:2007, [4] first-class), 'exquisite delicate' (second-class), 'noble sweet' (third-class) and the most rare 'rose' (fourth-class). Results of a previous study showed that there is a complete misunderstanding concerning the knowledge of these four

categories (Bódi *et al.*, [5]; Szegedyné *et al.*, [6]).

Although, in 1994 there was already a food safety scandal in Hungary during which the Hungarian paprika was diluted with lead oxide (minium) causing human health problems, the most significant 'paprika scandal' was in 2004 when due to the mixing of Hungarian paprika with imported paprika aflatoxin was found in a number of Hungarian paprika products (Lakner *et al.*, [7]). Due to the scandal, the unfavourable weather conditions and the decreasing purchasing prices, a number of growers turned away from paprika cultivation. On the basis of the Eurostat data [8], Hungary exported 2338.2 tonnes of paprika into 28 countries, mainly to Germany, Slovakia and the Czech Republic in 2011. However, to satisfy the high national demands (both consumer and manufacturer) Hungary imports a remarkable amount of paprika (in 2011 were imported 2392.1 tonnes) from 21 countries, mainly from Spain, Serbia and China. The imported foreign paprika often appears not in itself on the shelves in the shops, but as mixed ones with Hungarian products. Mixing of foreign paprika with Hungarian into one product makes the consumers unsure and these products destroy both national and international fame of the Hungarian paprika.

The aim of our study was to analyse the Hungarian paprika powder's preference, in comparison with national and foreign products with the help of consumers and catering professionals.

## 2. Materials and Methods

To analyse Hungarian consumers' and catering professionals' (e.g. chefs, cooks) preference of paprika powder,

a questionnaire survey combined with sensory analysis (ranking) was completed in the frame of the SIRHA exhibition in summer of 2014. For the sensory ranking seven paprika powders were selected from the same quality ('special') (Figure 1.). There were three foreign paprika powders: *Bulgarian* (B), *Chinese* (C) and *Spanish* paprika (F); one *Mixed* paprika from Hungarian (80%) and Spanish (20%) powder (A); and three Hungarian samples: a *Hungarian* paprika (100% Hungarian produced) (D), a paprika powder from *Kalocsa* (E) and one from *Szeged* (G).

For the sensory tasting bread and fat were used, which had been selected in advance with the help of ten trained sensory experts. The aim was to try to find the most inert bread and fat combination where the paprika taste was the most intensive. The experts suggested the combination of white bread and lard for this purpose. The questionnaire was finalized after a group interview (trial filling out and tasting). As a further help to demonstrate the colour of the paprika, samples were presented in a hermetically closed Petri dish, and to take a smell of the samples each of them were presented in a weighing bottle, too.

During the data collection 223 consumers and 48 catering professionals filled out the questionnaire and tasted the samples (at the same time). During the three days of the SIRHA exhibition three different sets (simultaneously five samples) were presented.

Results of the study were analysed with the help of SPSS 21 statistical software (frequency, mean, ANOVA and Chi square test), and the results of the sensory ranking were evaluated with the application of the current standards (Kramer and Friedman test) (MSZ 7304-7:1980, [9]; ISO 8587:2006, [10]).

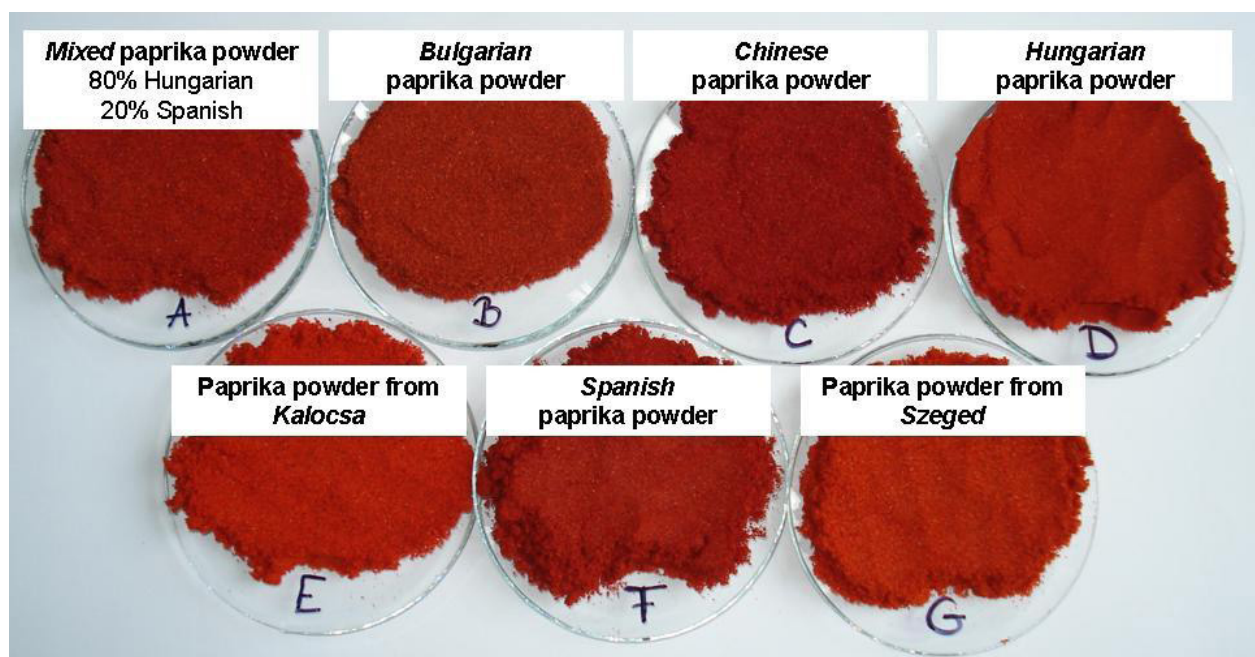


Figure 1. Paprika samples selected for the study

Regarding the consumer sample it can be said that most of them were female (63.7%), between the age of 45 - 59 years (30.5%), metropolitan (Budapest) (52.0%), higher educated (59.7%) and having average income (70.4%). More than half of them (55.2%) answered that they were the responsible for the food shopping, and that they preferred dishes prepared at home (67.3%). 84.7% of the participants said that they consumed paprika powder at least once a week. The main sources of the paprika are the pre-packed product bought in the food shops (36.3%) and buying with help of friends (31.3%).

Most of the catering professionals were male (79.2%), between the age of 25 - 44 years (58.4%), having school leaving examination or finished an industrial school (62.5%) and working as a cook or chef (77.2%). 70.8% answered that they had an impact on the selection of paprika powder. Main sources of the purchasing are the wholesale (43.8%) and small-sale producers (31.3%).

### 3. Results and Discussion

#### 3.1 Importance of the factors connected to paprika

In the questionnaire respondents were asked to evaluate the listed factors according to their importance (1: not important at all; 5: really important).

For the consumers the most important product characteristic is to be 'contamination-free (e.g. mycotoxins), followed by the sensory characteristics, like the 'spicy taste, pleasant flavour', the 'colour' and the 'odour'. The qualitative features follow the sensory attributes and as an unfavourable result the 'production in the area of Kalocsa and Szeged' were the least important factors for them (Table 1).

For the catering professionals the 'taste and flavour' of the paprika is significantly ( $p \leq 0.05$ ) the most important

factor from the point of view of the cooked food. The 'colour' and the 'colouring ability' have similar importance, while the 'odour' and the 'grinding fineness' were indicated as less relevant characteristics (Table 2).

#### 3.2 Knowledge of the categories

Both consumers and catering professionals were asked to rank the paprika categories ('special quality', 'exquisite delicate' and 'noble sweet') according to their quality. Only 31.4% of the consumers answered correctly that the 'delicate' brand is a middle quality product, however less knew that the 'special quality' brand was the best (26.5%) and that the 'noble sweet' was the poorest quality product (17.5%). These results verify the result of a previous consumer study, that there is a perplexity in the knowledge of the quality categories (Bódi *et al.*, [5]; Szegedyné *et al.*, [6]). Surprisingly professionals had lower knowledge than the consumers, they were not able to correctly qualify the listed categories. Most of them thought that the 'special quality' product is the worst (39.6%), and more professionals classified into the middle category the 'noble sweet' paprika (37.5%) than the 'delicate' (33.3%).

#### 3.3 Opinions about the paprika

On the basis of the listed statements it can be stated that Hungarian consumers and professionals have similar ideas about the paprika. Both groups agreed that Hungarian paprika is well-deserved world known, they trust in their quality, they use them in their household/kitchen and they thought that good quality paprika could be produced just in Hungary. However, they perceived a small quality decreasing during the last years. They are unambiguously against the mixing of the Hungarian paprika with imported products, even if it results a better quality (Table 3).

**Table 1. Importance of the factors according to the consumers**

Factors	Mean	SD
contamination-free (e.g. mycotoxins)	4.78	0.764
spicy taste, pleasant flavour	4.37	0.579
colour	4.59	0.735
odour	4.53	0.728
Hungarian varieties, Hungarian origin	4.48	0.929
good colouring ability	4.39	0.889
do not contain imported paprika	4.38	1.120
good storage life	4.35	0.862
guarantee of Protected Designation of Origin	3.97	1.179
known brand, usual purchasing source	3.75	1.182
price	3.71	1.154
made by traditional technology	3.60	1.248
produced in the area of Kalocsa	3.26	1.196
produced in the area of Szeged	3.16	1.185

1: not important at all; 5: really important

**Table 2. Importance of the factors according to the catering professionals**

Factors	Mean	SD
taste, flavour	4.10	1.246
colour	3.31	1.199
colouring ability	3.26	1.211
odour	2.83	1.124
grinding fineness	1.52	0.890

1: not important at all; 5: really important

**Table 3. Consumer and professional opinions about the paprika**

Statements	Consumers		Catering professionals	
	Mean	SD	Mean	SD
The Hungarian paprika is well-deserved world known.	4.62	0.790	4.64	1.009
Similar good paprika can be produced elsewhere as in Hungary, moreover that is cheaper.	2.63	1.215	2.36	1.131
The worldwide fame of the Hungarian paprika can be preserved only if we use it also at home.	4.41	1.014	4.66	0.760
Quality of the utilized paprika gets a special attention in our household/kitchen.	4.13	0.968	4.09	0.880
Quality of the paprika became worse during the last years.	3.24	1.112	3.34	1.128
I do not rely on the available paprika products very much so I do not buy them as a present for my foreign friends.	2.56	1.367	2.94	1.325
There are producers who mix the handmade/small producers' paprika also with imported paprika and sell them as Hungarian.	3.30	1.334	3.23	1.417
I am against the mixing of the Hungarian paprika with imported products.	4.55	1.047	4.64	1.051
The packed products of big producers are safer than the small producers' ones.	2.22	1.156	2.06	1.258
I agree with the mixing if it results favourable characteristics.	2.33	1.348	2.00	1.67

1: do not agree at all; 5: totally agree

### 3.4 Result of the sensory ranking

The consumers' results show high standard deviation during the three days. On the first and the second day the *mixed* sample was on the first place. From the point of view of the Hungarian paprika samples the second day was the most successful. The *Hungarian* paprika was the most preferred one, followed by the paprika powder from *Kalocsa* and *Szeged*. The *Bulgarian* sample resulted in the last places. According to the statistical analysis, it can be said that the *mixed*, the *Hungarian* and occasionally the paprika from *Kalocsa* got significantly favourable preference, while the paprika from *Szeged*, the *Chinese* and mainly the *Bulgarian* samples on the contrary (Table 4).

Ranking of the catering professionals shows high deviation value, too. However, it was favourable that on the first and on the second days the paprika from *Kalocsa* resulted on the first place. As it was observed in case of the consumers on the second day the Hungarian powders resulted on the first three places of the ranking. On the third day the *Chinese* sample was the most preferred one; however - as the professionals said after the ranking - it was due to the intensive colour of them. The paprika from *Kalocsa* and the *Hungarian* sample got significantly better preference than the others, while the *Spanish* paprika powder significantly the worst (Table 5.).

**Table 4. Result of the sensory ranking by the consumers**

	1.	2.	3.	4.	5.
<b>Day 1.</b> (N = 54)	<i>Mixed</i> paprika powder	<i>Chinese</i> paprika powder	<i>Spanish</i> paprika powder	Paprika powder from <i>Kalocsa</i>	<i>Bulgarian</i> paprika powder
<b>Day 2.</b> (N = 90)	<i>Hungarian</i> paprika powder	Paprika powder from <i>Kalocsa</i>	Paprika powder from <i>Szeged</i>	<i>Spanish</i> paprika powder	<i>Bulgarian</i> paprika powder
<b>Day 3.</b> (N = 79)	<i>Mixed</i> paprika powder	<i>Hungarian</i> paprika powder	<i>Chinese</i> paprika powder	<i>Bulgarian</i> paprika powder	Paprika powder from <i>Szeged</i>

1: the most preferred; 5: the less preferred

**Table 5. Result of the sensory ranking by the catering professionals**

	1.	2.	3.	4.	5.
<b>Day 1.</b> (N = 9)	Paprika powder from <i>Kalocsa</i>	<i>Bulgarian</i> paprika powder	<i>Mixed</i> paprika powder	<i>Chinese</i> paprika powder	<i>Spanish</i> paprika powder
<b>Day 2.</b> (N = 19)	Paprika powder from <i>Kalocsa</i>	<i>Hungarian</i> paprika powder	Paprika powder from <i>Szeged</i>	<i>Bulgarian</i> paprika powder	<i>Spanish</i> paprika powder
<b>Day 3.</b> (N = 19)	<i>Chinese</i> paprika powder	<i>Mixed</i> paprika powder	<i>Hungarian</i> paprika powder	<i>Bulgarian</i> paprika powder	Paprika powder from <i>Szeged</i>

1: the most preferred; 5: the less preferred

#### 4. Conclusions

- Ground red paprika is a traditional and unique Hungarian product. For the consumers and the catering professionals the most important sensory characteristics are the 'spicy taste' and the 'pleasant flavour' in case of paprika powder. Respondents of both the consumer and the professional groups believe that the Hungarian paprika is well-deserved word-famous. Utilization of Hungarian product is important for them and they opposed for the mixing of Hungarian paprika with other products from foreign countries, even if it results a better quality. Knowledge of the quality categories showed confusion in case of both asked groups. For the conscious consumer and catering professional paprika shopping decisions and utilization is crucial to clarify the meanings of the categories. As a first step into this direction two new directives of the Hungarian 'Food Book', Codex Alimentarius Hungaricus came into force in this year (MÉ 2-108 [11], and MÉ 2-211, [12]), which nominate three paprika categories: 'special quality', 'first class' and 'second class'. In case of the imported products, or the products mixed with imported paprika only the 'first class' and 'second class' denominations can be used (Horváth & Falus, [13]). On the basis of the sensory analysis (ranking) preference of the Hungarian products were not unanimous. However, it is important to highlight that the *Hungarian* and mainly the paprika from *Kalocsa* were highly preferred products, these got favourable judgement from the consumers and the catering professionals, too.

- From the results of this study one main conclusion can be concluded, namely that during the Hungarian paprika image formation it is important to emphasize and familiarize the features of the Hungarian paprika products (mainly the paprika from *Kalocsa* and *Szeged*) with the consumers and the professionals, too.

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