CHANGE OF THE COLOUR AGENT CONTENT OF PAPRIKA POWDERS WITH ADDED OLEORESIN IN THE COURSE OF STORAGE

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Abstract

The paprika oleoresin, that is an oil soluble extract from the fruits of Capsicum Annum Linn or Capsicum Frutescens, is used often to raise the colour agent content of paprika powders. We investigated how the colour agent content of paprika powder samples with added oleoresin changes in the course of storage. The colour agent content of 9 different quality powders was increased by 2-66 % using oleoresin. The initial colour agent content of samples changed between 59 and 167 ASTA unit. The powders were made from Hungarian, Chinese and Chinese germ-reduced paprika. The colour agent content of samples was measured through 6 months. The measured values were analysed using ANOVA. The decrease of colour agent content varied between 29 and 48 percent, the average reduction was 39 percent in case of Hungarian powders, the decrease changed between 14 and 21 % in case of Chinese samples, it was averagely 18 %. The decrease of colour agent content of the Chinese germ-reduced powders was between 9-18 %, it was averagely 15 percent. The effect of the quantity of added oleoresin didn't influence the colour agent content decrease significantly in case of the Hungarian and Chinese samples. The quantity of added oleoresin influenced the decrease of colour agent content of the Chinese germ-reduced paprika samples significantly.

Keywords: paprika, colour agent content, oleoresin

Introduction

The use of natural food colours is preferred to that artificial dyestuffs for modern alimentary purposes. Paprika is a spice plant grown and consumed in considerable quantities world-wide, and also used as a natural food colour. The colouring power of paprika powders is determined by quality and quantity of colouring agent of paprika squarely. The colour agent content of powders decreases in the curse of storage and is influenced by steps of the processing. The dehydration is the most critical step of the processing. The effect of the heat impairs the colour agent, aroma and flavour substratum of paprika. Several researchers investigated the optimal parameters

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of dehydration. (*Minguez-Mosquera et al*., 2000; *Ramesh et al.*, 2001; *Shin et al*., 2001; *Doymaz and Pala*, 2002; *Kim et al*., 2004; *Perez-Gamez et al*., 2005; *Simal et al*., 2005). *Topuz et al*. (2011) compared the Refractance Window (RWD) method to dry paprika in comparison with freeze drying, hot-air oven drying, and natural convective drying methods. It was depicted that the least colour agent content decrease was in the case of natural convective drying method. The colour agent content reducing is effected by condition of storage. There are many papers about the changes in the colour agent content of the paprika storage processes (*Park et al*., 2007, *Banout et* al., 2011, *Topaz et al*., 2011, *Chetti et al*., 2014).

The paprika oleoresin, that is an oil soluble extract from the fruits of Capsicum Annum Linn or Capsicum Frutescens, is used often to raise the colour agent content of paprika powders. We investigated how the colour agent content of paprika powder samples with added oleoresin change in the course of storage.

Materials and Methods

Materials

The colour agent content of 9 different quality powders was increased. The initial colour agent content of samples changed between 60 and 167 ASTA unit.

Table 1 The parameters of stored paprika samples

Samples	Initial colour agent content (ASTA unit)	Added oleoresin (g)			
Hungarian paprika	115	0.5	1.0	1.5	2.0
Hungarian paprika	134	0.5	1.0	1.5	2.0
Hungarian paprika	167	0.5	1.0	1.5	2.0
Hungarian paprika	60	0.5	1.0	1.5	2.0
Chinese paprika	77	0.5	1.0	1.5	2.0
Chinese paprika	91	0.5	1.0	1.5	2.0
Chinese paprika	144	0.5	1.0	1.5	2.0
Germ-reduced Chinese paprika	93	0.5	1.5		
Germ-reduced Chinese paprika	133	0.5	1.5		

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The powders were made from Hungarian, Chinese and gern-reduced Chinese paprika. The colour agent content was increased using 0.5 g-2.0 g oleoresin added to 100 g paprika powder. In Table 1 shows the investigated powder samples, their initial colour agent content and the quantity of added oleoresin.

Methods

After the homogenization of the powders the colour agent content of samples was measured. The ASTA (American Spice Trade Association) unit was used to give the colour agent content of paprika powders according to MSZ EN ISO 7541. The acetone extracts of paprika powder was measured by photometer at 460 nm. The ASTA unit was calculated using the following formula:

$$\mathrm{ASTA} = \frac{\mathrm{Absorbance} \cdot 16.4 \cdot \mathrm{f}}{\mathrm{weight\ of\ sample(g)}},$$

where $\boldsymbol{f}$ is a correction factor for the used photometer.

The samples were stored in room-temperature, protected from light. The colour agent content was measured monthly for 6 months.

The measured values were analysed using analysis of variance (ANOVA). To control for homogeneity of variances were applied Hartley, Cochran and Bartlett tests.

Results and Discussion

To evaluate the change of the colour agent content, we calculated the value of the decrease of the colour agent contents measured different times correlate to the initial value. The values were given in percent. The values showed that the reduction was the most in the case of Hungarian paprika powders and the loss was small for Chinese powders. So the change of the colour agent was investigated separately for Hungarian, Chinese paprika and germ-reduced Chinese paprika powders. We analysed how the colour agent content decrease was influenced, during 6 months, by the initial paprika samples and the quantity of added oleoresin. The ANOVA was applied.

In Table 2 we can see the results of tests for homogeneity of variances. The values show that the homogeneity was realized so the ANOVA was applicable. The result of ANOVA is shown in Table 3.

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Table 2 Results of tests for homogeneity of variances in the case of different paprika powder samples

Samples	Factor	Hartley F-max	Cochran test	Bartlett χ^2	Significant level
Hungarian paprika	Quantity of added oleoresin	1.06	0.20	0.26	0.999
	Storage time	2.89	0.22	6.50	0.260
Chinese paprika	Quantity of added oleoresin	1.57	0.27	1.20	0.877
	Storage time	5.11	0.32	9.85	0.079
Germ-reduced Chinese paprika	Quantity of added oleoresin	2.38	0.45	1.96	0.375
	Storage time	1.75	0.22	0.41	0.995

It can be established that the quantity of the added oleoresin didn't influence the colour agent content decrease significantly during storage in the case of Hungarian and Chinese paprika powders, but the colour agent content loss of germ-reduced Chinese powders was influenced by the quantity of added oleoresin.

Table 3 Results of analysis of variance in the case of different paprika powder samples

Samples	Factor	F value	Significant level
Hungarian paprika	Quantity of added oleoresin	0.26	0.902
	Storage time	53.87	0.000
Chinese paprika	Quantity of added oleoresin	0.20	0.939
	Storage time	47.98	0.000
Germ-reduced Chinese paprika	Quantity of added oleoresin	4.78	0.016
	Storage time	6.76	0.003

The Fig. 1 denotes the average decrease of the colour agent content for the different quantity of added oleoresin with confidence interval at a level 95% in the case of germ-reduced Chinese paprika powders. We can see that the colour agent content decrease of samples with 1.5 g added oleoresin was larger averagely by 3 percent.

The storage time affected the colour agent decrease significantly. In Fig. 2 -Fig. 4 we can see the average decrease in the different times with confidence interval at a level 95% . The Fig. 2 shows that the colour agent content of Hungarian paprika powders after a period of 6 months reduced by 38 % averagely.

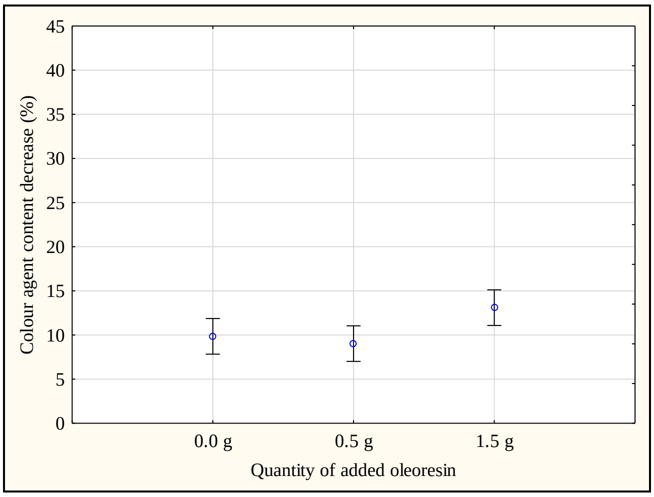

Figure 1 Results of ANOVA for colour agent content decrease in the case of germ-reduced Chinese paprika, affection of quantity of the added oleoresin
(averages with confidence interval at a level 95%)

After 2 months the loss of colour agent was 20 %. There is no significant change between the second and the third month and between the fourth and the fifth month.

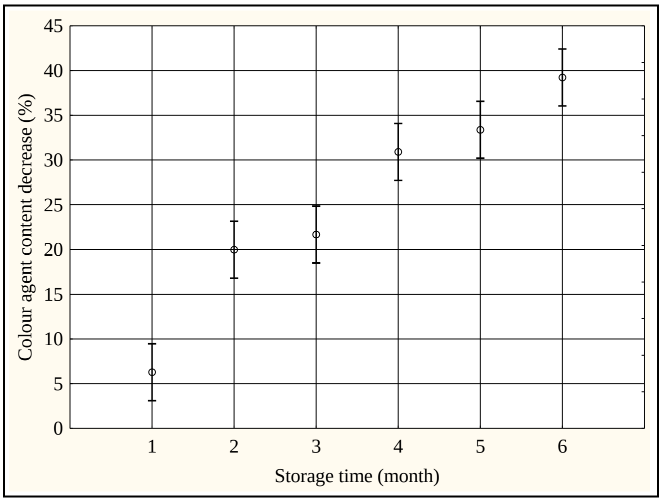

Figure 2 Results of ANOVA for colour agent content decrease in the of Hungarian paprika
(averages with confidence interval at a level 95%)

The colour agent of Chinese paprika powders (in Fig. 3) dropped after 6 months 18 % averagely. The rate of the loss was the most in the first month, it was 10 %. The colour content decrease wasn’t significant between the first and the second month and between the fifth and the sixth month. The reduction of the colour agent was the least in case of the germ-reduced Chinese paprika powders (in Fig. 4). The variation was averagely 15 % during storage. The

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loss was 7 % after the first month, the colour agent didn't decrease between the first and the third months and between the fifth and the sixth months significantly.

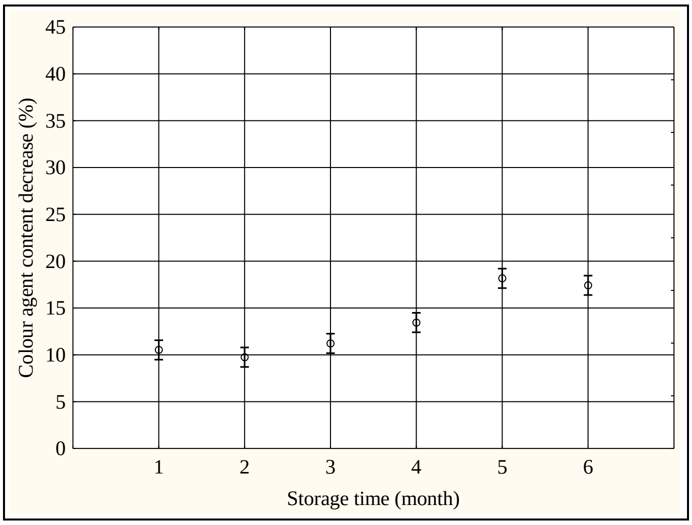

Figure 3 Results of ANOVA for colour agent content decrease in the case of Chinese paprika (averages with confidence interval at a level 95%)

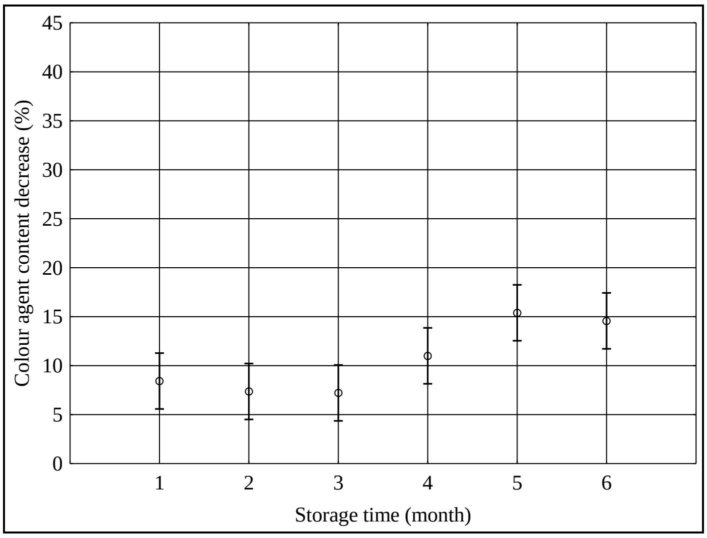

Figure 4 Results of ANOVA for colour agent content decrease in the case of germ-reduced Chinese paprika (averages with confidence interval at a level 95%)

Conclusion

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The quantity of the added oleoresin didn't influence the colour agent content decrease significantly during storage in the case of Hungarian and Chinese paprika powders. The colour agent content decrease of germ-reduced Chinese paprika powder samples with 1.5 g added oleoresin was larger averagely with 3 percent.

The color agent content decrease of the Hungarian paprika powders was the most during storage. The colour agent content of the Hungarian paprika powders was averagely 38% after six months, but the colour agent loss of the Chinese samples was only 18-20 %. This result corresponds with the conclusion of our previuos investigation (*Szabó and H.Horváth,* 2015)

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