

The Use of Edible Fibers as Carriers of Essential Oils of Spices for Sausage Items Manufacture

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**SUMMARY:** At present spicy flavourings are created and introduced into sausages using salt, sugar, red pepper and other substances as carriers of essential oils.

The possibility of use of microcrystalline cellulose (MCC) and of methylcellulose (MC) as carriers of spicy essential oils was studied.

Essential oils and their compositions were dispersed on MCC and MC by spraying of oils in a rotatable drum.

Resulted flavourings were dry granular powders with specific pure aroma, intensiveness of which didn't alter during storage.

**INTRODUCTION:** Creation of complex flavourings with different organoleptic tints makes possible to enrich range of new meat products, and especially of products manufactured with vegetable and animal proteins and other ingredients.

Development of spicy flavourings is based on compositions of essential oils extracted from native spices, that are uniformly dispersed on dry or liquid carriers. The main property of those "carriers" is their inertance to taste and aroma of flavouring.

From this viewpoint it seems interesting to use edible fibers as carriers, that are methylcellulose and microcrystalline cellulose. The main criteria for choice of edible fibers-carriers was their high adsorption and inertance to taste and aroma influence. The use of edible fibers also contributes to medical treatment of human organism. Edible fibers beneficially influence function of gastro-intestinal tract, gastric microflora, besides, they bind and neutralize harmful products of metabolism and drive from the organism salts of heavy metals and radionucleids. These properties ensure perspective of edible fibers use as carriers of flavour substances, namely of essential oils and their compositions.

**MATERIALS AND METHODS:** In the present work microcrystalline cellulose (MCC) and methylcellulose (MC) were used, characterized by the following parameters: MCC - size of particles 750-1400 Å, polymerization degree: 150-275 of repeatable glucose bonds in molecular chain, molecular weight 24000-45000, degree of crystallization 0.65-0.80; MC - (mark MC-100 TU 6-05-1857-78)-particle size 0.5 mm; polymerization degree - 340, molecular weight 62500.

Experimental samples of essential oils, dispersed onto edible fibers, were prepared in the following way: coriander essential oil in the amount of 1.0; 1.5 and 2.0% of carrier weight was applied to MCC or MC by injection. During 10-15 min. the substance was mixed in a closed vessel and kept for 2-3 hours. The received flavouring presented dry granular powder with well-expressed aroma of coriander essential oil. Stability and intensiveness of

aroma were preserved during 6 months and longer.

Chromatographic analysis of the flavouring (coriander essential oil or MCC) was done in comparison with chromatogram of pure essential oil coriander. GC analysis was done on gas chromatographer "Biochrom-3700" with capillar quartz column, gas-carrier-helium, mark A or B, rate of flow - 15 cm<sup>3</sup>/min., auxiliary gases - hydrogen, mark A or B, rate of flow - 30cm<sup>3</sup>/min. and compressed air, rate - 300cm<sup>3</sup>/min. Temperature shedule of analysis: evaporator - 200°C, detector - 150°C with temperature control of column from 70°C to 200°C, rate of heating - 4°/min.

The following samples were prepared: cooked sausage "Stolovaya", control (1), manufactured (according to standard) with mix of dry spices and two experimental ones - 2(2.1, 2.2, 2.3) with coriander essential oil on MCC and 3 (3.1, 3.2, 3.3) with the same oil on MC.

Quality assessment of samples was done by sensory methods: appearance, colour, aroma, taste, consistency were determined as well as total score, using 9-point hedonic scale. Colour parameters "L", "a", "b" were determined by instrumental method on "Spectrotone" device of "Cielab" system.

RESULTS AND DISCUSSION: Results of organileptical score assessment and values of colour parameters "L", "a" and "b" are given in the Table.

The table shows that increase in essential oils introduction in MCC and MC at the level of 1.0, 1.5 and 2.0% of carrier weight was accompanied with improvement of organoleptical and colour characteristics of experimental samples of sausage. 2% of essential oil of carrier

Table: Quality characteristics of "Stolovaya" sausage containing coriander essential oil on edible fibers MCC and MC

Type of sample	Amount of essential oil (on MCC or MC) per 100 kg of raw material	Organoleptical assesment					Colour parameters		
		colour	aroma	taste	consistency	total	L	a	b
1. Control	-	6.4	6.4	6.8	6.7	6.8	68.96	11.49	12.5
2. Experimental samples (coriander essential oil on MCC)									
2.1	1.0	6.8	6.5	6.6	6.5	6.7	67.01	11.89	12.0
2.2	1.5	7.6	7.2	6.8	6.7	7.0	66.13	12.07	9.5
2.3	2.0	8.0	7.6	7.0	6.5	7.1	68.08	12.55	8.0
3. Experimental samples (coriander essential oil on MC)									
3.1	1.0	7.0	6.8	6.7	6.7	7.0	68.35	10.55	12.0
3.2	1.5	7.5	7.2	6.8	6.5	7.4	66.83	11.03	10.5
3.3	2.0	7.9	7.8	7.4	6.9	7.5	65.15	12.28	9.5

rier weight was considered to be optimal concentration.

Further increase of essential oils amount was not necessary. Samples 2.3 and 3.3 possessed the most vivid and stable colour and well-expressed aroma. According to colour characteristics L, a and b - the most intensive red colour was shown by experimental samples 2.

and 3.3.

Panelists noticed slight deterioration of consistency of experimental samples, this being probably connected with characteristics feature of edible fibers to form strong gels in water medium during heating.

It was interesting to find out whether edible fibers changed aroma of essential oils or not.

Using gas-chromatography, chromatograms of coriander essential oil were obtained before and after its introduction into MCC. Results are shown in Fig. 1 (a and b). It could be seen that both chromatograms are practically identical, this evidencing about the fact that use of edible fibers as carriers does not change aroma of the applied essential oil.

Comparison of the obtained results showed that edible fibers as carriers of essential oils ensured stable quality parameters of the new flavouring.

**CONCLUSION:** It was established that edible fibers - MCC and MC are well retaining essential oils. Flavourings received on their basis, preserve initial intensiveness of aroma during 6 months and longer. Results showed that most optimal for aroma and colour of cooked sausages are dosages of essential oil equal to 1.5-2% of carrier weight.

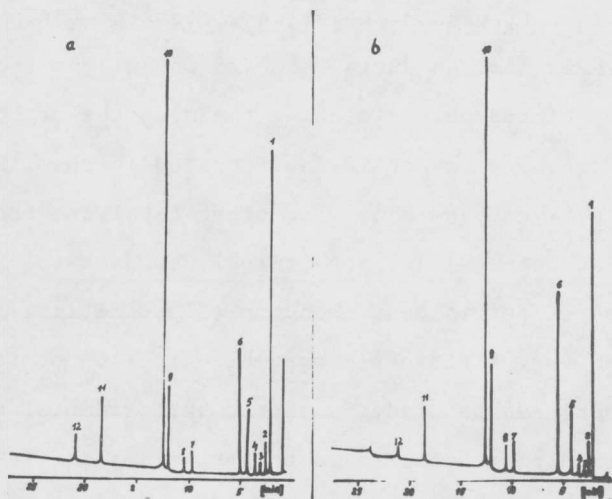


Fig. Chromatogram of coriander essential oil before (a) and after (b) dispersing on MCC

#### REFERENCES:

- BOYARSKAYA A.B., BELOUSOVA E.V. (1987): "Manufacture of Flavourings for Use in Meat Products" Myasnaya Industriya SSSR, N°8, 40-41.
- KUVAYEVA I.B., ORLOVA N.G., VESELOVA O.L. (1987): "Microecological System and Edible Fibers". Proceedings of the ALL-Union Conference 2 Edible Fibers in Rational Human Diet"-Moscow, 17-19 November.-M., 27.
- SOLNTSEVA G.L., ROMANOVA N.V., PRUIDZE V.G., CHELISHVILI R.B., NATSVISHVILI L.G. (1989): "Study of Quality Parameters of Sausage Items, Manufactured with the Use of Flavourings Based on Spicy Essential Oils"-Chemistry of Food Additives: Proceedings of the All-Union Conference - Chernovtsy, 1989.-Kiev, 1989, 100.