

A study of the influence of aqueous-alcoholic extracts of herbs on flavoring-aromatic characteristics of meat products

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By the gas chromatographic method it was studied and identified the structure of flavoring-aromatic substances in aqueous-alcoholic extracts of *Ocimum Gratissimum* and *Ziziphora Bungeana* Zuz herbs as well as the structure of dried cured sausages that contained the above mentioned herbs.

Comparing the quantitative shares of 56 compounds typical for raw meats, curing smoke, spices and aqueous-alcoholic extracts of herbs allowed us to discover the components that form specific flavor and smell in dried cured sausages.

Introduction

A question of multipurpose use of some kinds of vegetable substances and, in particular, spicy and flavoring aromatic herbs and plants with pharmacological effects during manufacturing of food products raises considerable scientific and practical interests. These interests are mainly caused by the specificity of structure and characteristics in the present oil raw material (5,6) that predetermine a broad range of potential-technological and medico-biological results.

Before there has been done a classification of a number of the culinary, spicy-aromatic and medical herbs according to the chemical-technological characteristics (1), and established the possibility of acquiring positive results with the use of aqueous-alcoholic extracts of *Ziziphora Bungeana* Zuz (3,5) and *Ocimum Gratissimum* (3,4) in technologies of raw salted and dried smoked meat products. In particular, it is shown that the use of these aqueous-alcoholic extracts provides inhibition of lipid oxygenizing (9, 10), intensifies the course of color forming reaction (11), accelerates the process of drying (12), suppresses the development of microorganisms that cause decay (2) and improves organoleptic characteristics of products.

Under the last circumstance it was expedient to study the qualitative-quantitative structure of volatile components that exist in aqueous-alcoholic extracts of *Ziziphora Bungeana* Zuz and *Ocimum Gratissimum* as well as in ready meat products that are prepared with their use.

Materials and methods. Carrying out the experiment

As the objects of this study we used aqueous-alcoholic extracts of *Ziziphora Bungeana* Zuz and *Ocimum Gratissimum* herbs as well as the dried cured sausages in receipts of which we injected cognac (checkup) and extracts of both *Ocimum Gratissimum* (experiment 1) and *Ziziphora Bungeana* Zuz (experiment 2).

The gas chromatographic analysis was carried on a chromatograph made by Hewlett Packard with a plasmatic-ionizing detector. Splitting up the components-concentrates of volatile substances was conducted on a quartz-capillar column with the fixed phase SPB-1 (60m*0.32 mm, the thickness of phase layer was 0,25 micrometer made by Supelco, USA)..

The relative share of volatile substances was calculated in direct ratio of the Square of a peak of substances and the square of an internal standard peak, which was accepted as equivalent to the share of substances in the sample 5.0 mg/kg (1).

Results and discussion

Identification of substances was carried out by the method of correlating of retaining indexes of components of studied samples on two columns of different polarity with the standard, acquired in the analogous environment (7).

The results of the study of aqueous-alcoholic extracts of the herbs witnesses that both samples have a number of same compounds but they differ over structure of the main components and over concentration of some substances. In *Ocimum Gratissimum* the main components are limonene, linalool, camphor and L-terpineol.

In the quantitative comparison of these compounds *Ocimum Gratissimum* is similar to coriander, in ether oil of which the above mentioned components are main. The structure of volatile of *Ziziphora Bungeana* Zuz components is unique, where the main compounds are menthone, isomenthone and pulegon. These compounds are rarely met in famous spicy-aromatic plants.

The analysis of the quality-quantity structure of volatile components of cured dried sausages showed that smell of these kinds of products is formed with the participation of a great number of organic compounds of different classes.

These compounds have different origin. Aldehydes, ketones, furans and carbohydrates are derived chiefly from meat (oxidization of lipids, splitting proteins).

Curing smoke and spices are responsible for the existence of phenol derivatives and terpenes. The qualitative structure of the volatile substances in the three samples is the same, but the quantitative shares of some substances differ 2-5 times. The character of smell of the three samples is similar; there are substantial differences in the smell nuance; the experimental samples have more subtle and pleasant aroma. The differences in smell nuances are determined by the quantitative ratio of volatile components of organic substances. Moreover, the contribution of each substance to forming the general smell of products is not the same. Some of the substances, which have high values of the crucial smell concentrations, influence insignificantly the general aroma of products if their shares in them are



several times lower than crucial. The compounds with low crucial smell concentrations can (not changing the general tone) give the main aroma more subtle and piquant tint even over slight difference in their share in samples of the same kind. Hence, exceeding some concentration of unsaturated aldehydes that are necessary for forming valuable meat aroma can give products crude "greasy" tint that is peculiar to oxygenated fats.

Analysis of Table 1 data witnesses that use of aqueous-alcoholic extracts of the above mentioned herbs modifies the course of maturing of meat process and influences oxygenating processes in ready products. In general, in the experimental samples there were fewer quantity of aldehydes, ketones and phenols in comparison to the checkup sample. The crucial concentrations of aldehydes were 0.004-0.5 mg/kg (in milk), terpenes and phenols 0.006-0.1 mg/kg. The shares of these substances in the sausage samples are more than the crucial values, thus reducing the volatile substances quantity in the experimental samples provides their higher organoleptic values. Apparently, aqueous-alcoholic extracts of *Ziziphora Bungeana* Zuz and *Ocinum Gratissimum* herbs have biologically active components that reduce the point of oxidization of raw meat. The found in the share of terpenes differences also confirm the participation of the aqueous-alcoholic extracts in splitting precursors and creating free terpenes.

Total quantity of the compounds that belong to:

	Checkup, mg/kg (l)	Experiment-1, mg/kg (l)	Experiment-2, mg/kg (l)
- meat raw material	32.49	25.85	21.73
- curing smoke	12.90	6.75	5.90
- spices and herbs	99.64	89.38	73.88

According to the structure of volatile components it is possible to obtain an objective picture that reflects the influence of food additives, variations in technological regimes on the quality of produced products. Tasting different kinds of meat products (dried cured sausages, raw salted and curing smoked beef) which were made in conditions of pilot factories and laboratories showed positive advantages of the products that were prepared with use of aqueous-alcoholic extracts of the herbs. These products had better characteristics such as smell, taste and color.

Conclusion

The obtained empirical data let us say several assumptions about the influence of aqueous-alcoholic extracts of *Ziziphora Bungeana* Zuz and herbs on the formation of flavor-aromatic substances during the process of producing dried cured sausages. In particular, it is possible to assume that injecting alcoholic extracts causes inhibition of processes of lipid oxygenation and alterations in developing analytical and fermenting-microbiological processes that is reflected in changing the quantitative share ratio of terpenes and phenols as well as in reducing carbonyl compounds. As a result, the products, which are produced with use of aqueous-alcoholic extracts of the herbs, had more subtle and pleasant taste and smell in comparison to the checkup samples that had sharply distinguished flavor-aromatic characteristics.

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