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FLAVOUR FORMING OF CHINESE GUANGDONG SAUSAGE

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Please refer to Folio 61.

INTRODUCTION

According to historical records, sausage processing in China began at the 6th century, using pork as a raw material, adding some additives and then with a long time of curing and toasting. During curing, meat produces a special flavour through fermentation and the action of enzymes. Soy sauce and Fen wine and the control of toasting are very important to the flavour forming and taste. The purpose of the research is to demonstrate the mechanism of flavour forming in processing by detecting flavour components of sausage and by comparing them with those of the raw materials.

MATERIALS AND METHODS

Sausage

Chinese Guangdong sausage (Golden National Award in 1990)

Extraction of flavour components

The research uses the method of Simultaneous Distil Extraction (SDE), some meat is sampled and ground, then 1500ml of distilled water is added, all these are distilled in the SDE equipment for six hours. 80ml ether is used as a extractor, water bathing at 50°C. The extracted solution is dehydrated by adding 4g anhydrous sodium sulfate, keeping 10 hours, concentrated to 500l by snyder column. The concentrated extracted solution is transparent and with a strong fragrance.

GC-MS analysis

Analysis is conducted at Daozhen GC-7AGC-R3A/FID, JEOL DX303/DA5000 (Japan)GC-MS system. Separation was performed with a fused silica capillary column. Carrier gas was helium and the oven programmed from 50 to 200°C at a rate of 4°C one/minute. The mass spectra was measured by electron impact at 70eV. Standard library: NBS/Wiley.

RESULTS AND DISCUSSION

A list of the molecules identified in the Guangdong sausage with their chromatographed quantities are listed in Table 1. Ion graphy is listed in Figure 1. 78 kinds of flavour components are detected, 24 esters, 13 aldehydes, 7 ketones, 4 acidities, 17 alcohols, 3 ethers and epoxides, 6 alkanes and 4 N or S-compounds.

Some of the components have been reported in the earlier research of meat flavour,especially N or S-compounds, ester and ketones are important to meat flavour forming. Some components detected in sausage flavour are also detected in added spices. It proves that spices contribute to sausage flavour-forming.

In the manufacture of sausage, Fen wine (ethanol content more than 60% (v/v)) and soy sauce are added.It takes a long time (more than 48 hours) to toast sausage in its processing, In the compounds detection, esters are the most, such as ethyl acetate ethyl lactate ethyl phenylethylate ethyl octanate can be found in the sausage. Those compounds can also be found in Fen wine, and ethyl acetate is the main component. Ethyl acetate can be found in the flavour of soy sauce and meat, ethyl octanate and ethyl phenylacetate can be also found in soy sauce flavour. Thus, of the esters in the flavour of Guangdong sausage, some are from Fen wine directly, while the others are from the esterification of alcohols and acids.

Alcohols in cooked pork and sauce are rare, for only ethanol phenylethanol, butanol and 3-hydroxy-2-butanone can be detected. But in Fen wine, there are 2, 3- butandiol, propanetriol, methanol, propanol, butanol, isobutanol and pentanol etc., except ethanol. Thus, the alcohols in sausage flavour components is mainly from wine. In aldehyde components, hexanal and phenylethanal can be detected in the flavour components of Fen wine and soy sauce.

In sausage processing, a lot of sugar is added. It will react with Amino acids. When it is cooked, some liquors and s-compounds are decomposed, as a result, various flavour compounds are produced. The sensory characteristics of most esters is similar to that of hard nut, but hexanol, 2-nonenal, 3-hydroxy-2-butanone have the odour of butter and oil. Until now, we don't have a very clear understanding of the characteristics of the flavour component, and its contribution to the odor of sausage and how that acts.

But through flavour compound analysis and the additives component detection, we can draw the conclusion that esterification and the Maillard reaction when cooked are the main way to produce flavour compounds.

CONCLUSION

78 kinds of flavour compounds were detected in Guangdong sausage; esters were the most prevalent (24 kinds).

Some of the flavour compounds, such as ethyl acetate, ethyl lactate, ethyl phenylethylate, hexanal and alcohols are mostly from Fen wine, others from the flavour components of soy sauce and esterification.

After heating, the Maillard reaction, the decomposition of liquors and s-compounds produced flavour compounds that have a similar odor to that of hard nut and toasted food.

REFERENCES

WANG JIE. 1988. The Research Method of the Food Flavour Analysis. *Food Sci.* 9:1-5.

SHEN GUOHUI. 1988. Isolation and Identification of Volatile Compounds From Cooked Jin-hua Ham. *Food and Fermentation Industry.* 3:12-19.

BERDAGUE, J.L. 1991. Volatile components of dry cured ham. *Proc. 37th ICMST.* pp.1135-1138.

LILLARD, D.A., and AYRES, J.C. 1969. Flavour compounds in country cured hams. *Food Technol.* 23:251-254.

Table 1. Flavour Components of Guangdong Sausage.

compound	relative concentration
propylmethyl ether	2.01
ethanol	100
3-thio-5-azole-1,2,4-triazine	0.53
2-epoxybutene	
2-methyl-propanal	0.38
3,4-dihydropyran	0.10
neohexane	
2-heptone	0.21
isbutanol	0.23
ethyl hexate	13.92
pentaoctanal	0.37
3-carboxy-2-butanone	0.14
2-heptenal	1.11
tri[2,2,1]hept-1-ol	
ethyl lactate	0.92
nonanal	0.99
2-hydroxy-4,6-dimethylpyrimidine	
3-hydroxy-1-octene	0.36
3-ethyl-1,4-hexadiene	0.16
phenylethanal	
(E)-2-nonenal	0.29
3,5-octadiene-2-one	0.32
ethyl dmethyl hexanethiateecanoate	13.22
furanyl methanol	0.33
(2,2)-2,4-nonadiene-al	0.11
decadiene-al	3.87
ethyl laurate	2.68
pentanoic acid	0.12
phenylethanol	
ethyl tetradecanoate	7.96
ethyl didecanate	
2-undecanone	
methyl palmate	
3-methyl epohexanol	0.34
1,14-tetradecanedeol	0.31
2-methyl-methyloctadecanate	
ethyl obeate	8.88
11,14-dodecadienic acid methyl ester	
tetradecanix acid	
ethyl acetate	0.99
2-butanol	0.68
hexanol	4.26
3-methoxypentane	
ethyl pentanate	0.19
(Z) ethylpropanal	
heptanal	0.43
butanol	0.66
2-pentyl furan	0.70

3-methyl-1-butanol	2.91
octanal	0.51
hydroxypropanal	
isooctanol	
4-methyl-2-ethyl-1pentanol	
hexanol	0.33
4,4-dimethyl- 2-pentene	
ethyl octanate	2.53
E-non-2-enal	2.42
heptanol	0.24
ethyl nonanate	
(Z)-2-nonenol	51.19
6-methyl-1-heptanol	0.09
methyl hexanethiate	0.60
9- decenyl methy ester	1.07
2-undecenal	2.07
ethyl phenylacetate	2.05
|Â- asntal camphor	0.06
ethyl- 2-phenylpropanate	
2-dodecanone	0.49
palmal	5.53
nonanoc acid	
ethyl palmate	20.42
ethyl- 9-hexadecanate	3.17
methyl- 2, 6-dimethyl heptanate	
2,2,4,6,6-pentamethylheptane	
ethyl stearate	0.85
ethyl linoleate	3.87
methyl-11,14,17-icosanate	
palmic acid	1.31