APPLIED SCIENTIFIC RESEARCH CORPORATION OF THAILAND

RESEARCH PROGRAMME NO. 11

NATURAL PERFUME AND FLAVOUR MATERIALS

RESEARCH PROJECT NO. 11/9

COMPOUNDING OF PRACTICAL FLAVOUR AND FRAGRANCE PRODUCTS FROM AVAILABLE MATERIALS

REPORT NO. 2

ARTIFICIAL BEEF-FLAVOURED PREPARATIONS

BY

PIVAN VARANGOON

INDUSTRIAL CHEMISTRY GROUP

TECHNOLOGICAL RESEARCH INSTITUE

ASRCT, BANGKOK 1967

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By Pivan Varangoon*

SUMMARY

An imitation meat flavour which is capable of replacing part or all of the beef extract in a variety of food products was prepared. The meat flavour was presented in several forms: bouillon which may be used to replace beef extract in soup; gravy, a thick liquid with acceptable roast meat flavour when an amount of starch is added; gravy base, a concentrated paste of gravy, to which water may be added when desired. The flavour was also made in the forms of powder and paste which dissolve rapidly in hot water, but the powder changed to a sticky mass within one week.

INTRODUCTION

Beef flavour in many commercial foods such as soup is obtained by incorporation of beef extract. The manufacture of beef extract is expensive. A relatively small quantity of concentrated extract is obtained from a large quantity of beef tissue.

Furthermore the quality of beef extract tends to vary when manufacturers are forced to use poorer cuts of meat for the preparations, due to the more demand than supply of good meat. The price also fluctuates with variations in availability and price of meat.

The objective of this work was to prepare artificial beef-flavoured mixtures which are of uniform quality and economical to use. A patent on making such beef-type flavouring compositions has been issued in the United States+.

MATERIALS AND METHODS

Experiment I

An artificial beef-flavoured bouillon was prepared by mixing together

* Industrial Chemistry Group, Technological Research Institute, ASRCT.

+ PERRET, M.A., and McMAHON, J.R. (1966).- U.S. Patent 3,271,167.

1.3 g of Ribotide*, 4.8 g of monosodium glutamate. To this then was added 5 g of sodium chloride and 21.65 g of vegetable protein hydrolysate (HVP)+. To the mixture thus obtained was added 896 ml of water. Then it was heated to 98°C for 15 minutes.

Experiment II

An artificial beef-flavoured gravy was made by heating together the mixture of 7.3 g of fresh beef fat, 8.66 g of vegetable protein hydrolysate (HVP), 0.256 g of Ribotide, 2 g of sodium chloride, 1.92 g of monosodium glutamate, and 100 ml of water. The mixture was boiled for five minutes. The solution was filtered through filter paper to remove the residue of beef fat. The heating was carried out on water bath in such a manner that the mixture thickened due to the evaporation of moisture. The volume of the gravy was half that of the original volume.

Experiment III

An artificial beef-flavoured gravy base was prepared by mixing together 1.3 g Ribotide, 9.6 g of monosodium glutamate, 5 g of sodium chloride, 43.3 g of vegetable protein hydrolysate (HVP)and 35 g of fresh beef fat. The mixture was suspended in 181 ml of water and heated to 108°C for 10 minutes in a pressure cooker. The residue of beef fat was removed by filtering the solution through filter paper. The base was further treated by cooling in the refrigerator, skimming off the fat after it congealed, and evaporating the moisture from the residue until a very thick paste was obtained.

Experiment IV

An artificial beef-flavoured powder was made by mixing together 10 g of gravy base obtained from experiment III with 15 g of sorbitol and 10 g of magnesium carbonate as a free-flowing agent. The mixture was ground in mortar until mixed very well, and then kept in a tight container.

Experiment V

An artificial beef-flavoured paste was prepared by mixing together the same ingredients as in experiment III, but using only 10 g of fresh beef fat instead of 35 g. 46.63 g of this mixture was suspended in 150 ml of water and

* A 50-50 mixture of disodium inosinate and disodium guanylate (Takeda Chemical Industries Ltd: Osaka, Japan.)

+ Hydrolyzed vegetable protein (Hercules Powder Company: Wilmington,Delaware,U.S.A.

heated to boiling. The suspension was cooled in the refrigerator and the fat skimmed off after it congealed. The residue of beef fat was removed. To the solution was added 4.66 g of corn starch (= 10 % by weight of the original powder mixture) and the thickened solution was evaporated on the water bath until twice the weight of the mixture powder was obtained (93.6 g).

The paste was packaged in small polyethylene bags of 5 g each.

Experiment VI

An artificial beef-flavoured paste with pepper was prepared by mixing together 0.5 g of white pepper powder, 9.6 g of monosodium glutamate, 5 g of sodium chloride, 1.3 g of Ribotide, 43.3 g of vegetable protein hydrolysate (4-BE Maggi's powder*) and 10 g of fresh beef fat.

The mixture weighing 59.7 g was suspended in 150 ml of water and treated by the same procedure as that in experiment V until 120 g of paste was obtained,

The paste was packaged in small polyethylene bags of 5 g each.

RESULTS AND DISCUSSION

The results from Table 1 and 2 show that in Experiment I the solution has meat-like flavour and taste. It can be used to replace all or part of the beef extract in a soup. In order to get the most desirable flavour, the concentration may be adjusted according to taste.

The thick solution from Experiment II had a flavour substantially the same as that of the gravy derived from meat. A certain amount of starch may be needed to meet the desirable appearance of gravy.

The gravy base from Experiment III when dissolved in a suitable amount of water passed as an acceptable gravy with roast meat odour and flavour. It can be used as a soup by adding more water. This product was kept at room temperature (34°C) over three months with no change of taste and appearance.

The result from Experiment IV shows that beef-flavoured powder cannot be made by this method. The addition of sorbitol and magnesium carbonate in a considerable amount did not result in a free-flowing powder. It turned into a sticky mass after one week. Spray drying should be tried.

* Maggi's hydrolyzed plant protein. The Nestle Company Inc.: White Plains, New York, U.S.A.)

TABLE 1

TASTE AND APPEARANCE OF ARTIFICIAL BEEF-FLAVOURED PREPARATIONS

Experiment	Preparations	Results
I	Beef-flavoured bouillon	Brown colour, tasty meat flavour, soup-like solution
II	Beef-flavoured gravy	Dark brown colour, tasty, meat flavour, the solution is thicker than Experiment I.
III	Beef-flavoured gravy base	Dark brown colour, roast meat flavour, very thick paste.
IV	Beef-flavoured powder	Light brown colour, meat flavcured free-flavouring powder, but after one week it turned to a sticky mass.
V	Beef-flavoured paste	Brown colour, meat flavour, light paste.
VI	Beef-flavoured paste with pepper	Brown colour, meat flavour, light paste with slight spicy taste.

Transferred from laboratory record book No. 82 pages 17, 18, 21, 23, 37, 38.

TABLE 2

TYPICAL ANALYSES OF MEATLESS BEEF-FLAVOURED PREPARATIONS

Experiment No.	% Moisture	% Total solid	% Fat		% Nitrogen		% Protein	
			Wet basis	Dry basis	Wet basis	Dry basis	Wet basis	Dry basis
3	14.55	85.45	0.05	0.06	3.84	4.49	23.97	28.05
5	51.92	48.08	Trace		1.94	4.03	12.09	25.15
6	52.23	77.77	0.04	0.08	2.21	4.63	13.79	28.87

Transferred from laboratory record book No. 82 pages 21, 37, 38.

In Experiments V and VI the products were made in a paste form which rapidly dissolved even in cold water. Five grammes of the paste dissolved in 100 ml of boiling water, was compared to Bovril* 5 g dissolved in 100 ml of water. The product provided a flavour and taste superior to that obtained with commercial beef extract (Bovril).

The addition of pepper powder in Experiment VI gave a better taste to the product. Hydrolyzed protein vegetable used in this experiment was Maggi's 4-BE powder. It was found to be better in flavour.

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* Bovril -"The full flavour and goodness of beef" (Bovril Ltd: London.)