

cal with the flavouring extract, as above defined. The difference is one of *flavour* due to the presence of specific resins (and probably small amounts of undetermined matters) peculiar to the bean, and as essential to the production of a true vanilla flavour as the vanillin itself.

In order to ascertain what amounts of vanillin may be present in the genuine extract, Winton and Silvermann (2) prepared five extracts, according to the formula given in the U. S. Pharmacopœia, and obtained as follows:—

Grade of Bean.	Specific Gravity.	Vanillin.	Alcohol (wgt)	Total Residue.	Cane Sugar.	Non-sugar Solids
Mexican (whole).....	1·0159	0·125	37·96	22·60	19·90	2·70
" (cut).....	1·0146	0·065	39·92	23·10	19·20	3·90
South American (whole).....	1·0109	0·215	38·58	22·00	19·00	3·00
Bourbon (whole).....	1·0166	0·138	38·32	23·13	20·40	2·73
Tahiti (whole).....	1·0104	0·108	38·84	21·75	20·00	1·75

From this it appears that the vanillin in genuine extracts may vary from about 0·065 to 0·215. It seems fair to conclude that where the vanillin much exceeds 0·200 per cent in an extract artificial or synthetic vanillin has been used.

*Coumarin* is a substance which somewhat resembles vanillin in its flavour, but is quite distinct chemically. It is found in the Tonka bean, and is also prepared synthetically. On account of its cheapness it is much used to adulterate vanilla extract, and it will be seen that in the collection now reported it is present in 61 out of 77 samples examined. In one case it entirely replaces vanillin. The flavour of Coumarin is not identical with that of vanillin. Leach (3) says of it:—'The odour of Coumarin is more pungent and penetrating than that of vanillin, and in mixtures is apt to predominate over the milder and more delicate odour of vanillin.'

There can be no doubt that extracts containing coumarin should be required to announce the fact, either by explicit statement, or by being sold as compounds.

The use of alcohol is necessary in preparing the genuine extract of vanilla, not so much to dissolve the vanillin which is rendered more soluble by the presence of sugar, as in order to get the characteristic resins into solution. Hence, an extract cannot meet the requirements of a true vanilla bean extract, unless it contains from 30 to 40 per cent. of alcohol.

In the absence of any legal standard for Flavouring Extract of Vanilla, it is impossible for me to express an opinion upon the samples now reported. In a general way it may be said (1) that those containing notably more than 0·200 per cent. of vanillin are prepared from synthetic vanillin. There are some 31 samples of the present collection which fall in this class. (2) That those which contain less than 30 per cent of alcohol, are either not made from the bean, or are necessarily lacking in those odoriferous resins which are characteristic of the vanilla bean. Some 36 samples fall into this class. (3) Those samples which contain more than traces of Coumarin, are not, in the truest sense, extracts of vanilla, and should be sold as compounds. Some 58 samples must be thus classified.

The report now submitted, together with that published in Bulletin 89, will enable the public to judge of the character of Commercial Vanilla Extracts, and will also furnish material for the defining of this article, under section 26 of the Adulteration Act.

I beg to recommend the publication of this report as Bulletin No. 201.

I have the honour to be, sir,

Your obedient servant,

A. MCGILL,

Chief Analyst.

(2) Report Conn. Agr. Station—1901, 150.

(3) Foods, &c.,—p. 734.