

Fat.	Methods.		
	I	II	III
Cottonseed oil	201	203.8	202.8
Corn oil	192	193.2	193.4
Rosin oil	76.9	77.4	75.1
Tallow	196.5	196.9	196.5

Each figure represents the average of two determinations.

The number given under method I is the saponification number obtained when the oil was saponified with alcoholic potash only.

The number given under method II is the saponification number obtained when the oil was saponified with alcoholic potash and benzene.

The number given under method III is the saponification number of the oil obtained when it was mixed with an equal quantity or more of mineral oil, and the saponification number determined by means of alcoholic potash and benzene.

In mixing the oils they were weighed into the Erlenmeyer flask, warmed on the steam bath and shaken to mix as thoroughly as possible. The amount of alkali used up by the mineral oil was separately determined and allowance made for it.

The oils were saponified for one-half hour in each case.

THE FULLER'S EARTH TEST FOR CARAMEL IN VINEGAR.

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The fuller's earth test for caramel appears in a number of publications covering methods for food analysis, and has been used quite generally for the detection of added caramel in cider vinegar. In some cases the method has been published with no statement of the precautions necessary to its manipulation, nor the severe limitations to which it is subject. In order to investigate these points and if possible prescribe conditions under which it could be applied with certainty, the work described in this article was undertaken.

Fifty samples of pure cider vinegar were obtained from farmers in Pennsylvania through the agents of Dr. B. H. Warren. Of these eleven were selected, differing as much as possible in physical appearance. Five vinegars made by the author in 1905 were also included in the experiment.

Samples of fuller's earth were procured from several houses and from a number of food chemists, the purpose for which the samples were desired being stated. The method was applied as follows:

Fifty cubic centimeters of vinegar and 25 g. of fuller's earth were measured out into a 250 cc. beaker, stirred thoroughly and allowed to stand one-half hour. The mixture was then filtered through a dry folded filter, and the color of the filtrate compared with that of the untreated vinegar, filtered in the same way. Color comparisons were made in a Duboscq colorimeter. In the table below the results are expressed as

per cent. of the total color removed by fuller's earth. The last five vinegars in the table were made by the writer.

Serial Number of Vinegar	PER CENT COLOR REMOVED BY FULLER'S EARTH									
	15663	15664	17038	17039	17040	17042	17043	17045	17080	
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	
17046	29.6	38.0	24.0	44.8	28.0	31.2	18.4	50.0	..	
17047	41.9	46.8	48.0	60.2	42.0	42.0	43.2	50.0	..	
17048	34.0	20.0	30.0	44.0	22.2	25.0	25.0	4.2	..	
17049	..	31.6	00.0	20.0	00.0	20.0	00.0	00.0	00.0	
17050	20.0	36.7	00.0	4.0	00.0	23.3	00.0	..	48.3	
17055	00.0	00.0	7.7	52.0	20.0	36.8	33.3	40.5	..	
17056	70.8	68.0	67.9	70.0	66.0	60.7	66.6	66.6	71.4	
17057	..	28.0	27.2	32.0	12.0	20.0	00.0	30.0	45.5	
17058	..	40.0	25.0	25.0	24.0	36.0	4.0	20.0	71.9	
17059	..	44.0	20.0	30.0	4.0	10.0	25.0	23.1	..	
17060	56.2	63.1	65.0	66.6	63.1	53.3	63.1	67.6	..	
17512	..	..	..	57.9	42.9	00.0	35.9	63.4	..
17513	..	..	..	43.4	24.7	16.7	21.8	66.6	..
17514	..	..	..	41.2	13.0	00.0	00.0	50.0	..
17515	..	..	..	37.5	00.0	..	11.0	..	..
17516	..	..	..	41.2	37.5	38.9	32.5	57.6	..

DISCUSSION OF RESULTS.

The color removed from pure cider vinegar by fuller's earth varies according to the figures in the table, from none to seventy-two per cent. No one sample of fuller's earth can be selected from the above as giving uniform results. For instance, Nos. 15663 and 15664 remove no color from vinegar No. 17055, thereby indicating it as pure, while from vinegar No. 17056, just as pure as the first indicated, 71 per cent. and 68 per cent. respectively of color are removed. Vinegar No. 17050 would be indicated as pure by treatment with earths Nos. 17038, 17040 and 17043, while its case would be made doubtful by earth No. 15663 and condemned by 15664. Again, earths Nos. 17038, 17040 and 17043, which give uniform results on vinegar No. 17050 and comparable results on several others, are at wide variance on vinegar No. 17057. Earth No. 17080 is one received from a chemist who uses this test and declares it reliable if 25 to 30 per cent. be allowed for the color which fuller's earth will remove from pure vinegar. As shown in the table it removes from one sample of pure cider vinegar no color at all, while taking out as much as 72 per cent. of color from another sample. There seems to be no uniformity in the data and it is impossible to select any one of the fuller's earths tried which could be relied upon to give truthful results. In the writer's estimation the method is unreliable and should only be used as a preliminary test. If no color or only a small percentage of color is removed, the analyst is reasonably safe in pronouncing the sample pure. On the other hand, if all the color disappears, he is equally secure in declaring caramel present. But for the large number of vinegars which lose from 25 to 75 per cent. of their color when treated with fuller's earth, the data obtained by this test are not

final, and it is necessary to subject the vinegar to further treatment before a conclusion regarding the presence of caramel can be reached.

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[CONTRIBUTION FROM THE CHEMICAL LABORATORY OF HARVARD COLLEGE.]

HYDRAZONES OF AROMATIC HYDROXYKETONES. ALKALI-INSOLUBLE PHENOLS.

PRELIMINARY PAPER.

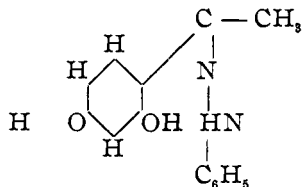
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The study of the action of phenylhydrazine upon aceto- and benzophenones carrying an hydroxyl group in the ortho position to the side chain seemed to us a reaction of some interest, since the possibility suggested itself that, under some conditions, in addition to the attack on the ketone group the hydroxyl of the ring might be made to react with the imide hydrogen thus forming a five-membered ring, calling to mind the action of phenylhydrazine on acetacetic ester.

Although thus far we have been unable to obtain such a secondary condensation, the hydroxyl group in the ortho position is affected in its properties by the formation of the hydrazones, since though these products supposedly contain a free hydroxyl group they are insoluble in alkalis. Other examples of substances containing the hydroxyl group which are insoluble or difficultly soluble in alkalis are not entirely wanting. M. Rogow¹ has prepared some phenols which are insoluble in alkalis; he obtained for instance, a compound by the action of naphthylamine on vanillin which shows this property. In his paper he cites similar cases discovered by other observers, among them the case of chief interest to us is the observation by O. Anselmino² that the phenylhydrazone of homosalicylaldehyde is insoluble in aqueous alkalis.

The hydrazones which we have chiefly studied are those of dihydroxy-aceto- and benzophenones, such as resacetophenone, dibenzoresorcinol and dibenzohydroquinone. The hydrazone³ of resacetophenone⁴ made by the action of phenylhydrazine on resacetophenone, is, as would naturally be expected soluble in alkalis, while paeonol, the monomethyl ether of resacetophenone, in which the only free hydroxyl group is ortho to the keto side chain,



¹ J. pr. Chem. 2, 72, 315.

² Ber. 35, 4099.

³ Ann. chim. pharm. 7, 276. Bl. 36, 154.

⁴ J. pr. Chem. 2, 23, 147, 537.