SHORT COMMUNICATION

A Modified Acetic Anhydride–Sulphuric Acid Color Test for Oils

ABSTRACT

This article describes a color reaction involving modified acetic anhydride-sulphuric acid test giving characteristic colors and their sequence in different oils and fats.

INTRODUCTION

A color reaction involving modified acetic anhydride-sulphuric acid reagent, applicable to a number of oils, has been developed. The apparatus required are: a dropper, 5 ml capacity graduated in 0.1 ml; cylinders, 5 ml capacity graduated in ml; dropping tubes, 0.30 mm interior diameter; and test tubes, 16 mm x 125 mm. The chemicals required are: sulphuric acid, analytical reagent grade; chloroform, analytical reagent grade; and acetic anhydride, analytical reagent grade.

EXPERIMENTAL PROCEDURES

The test is performed at ambient temperature as follows: dissolve 0.2 ml oil or fat (or 5 drops with the dropping tube) in 2 ml chloroform and add 5 ml acetic anhydride. Shake well and add one or two drops of sulphuric acid. Observe the succession of color sequence for ca. 30 sec.

The test can be performed in the absence of chloroform, other conditions being the same, as follows: dissolve oil or fat in acetic anhydride by gentle heat. Cool to room temperature and add sulphuric acid. The appearance before addition of sulphuric acid will be colorless to incipient yellow. The color changes observed are given in Table I.

EXPERIMENTAL RESULTS

As seen in Table I, the color reaction is distinct and characteristic of the oils. The present method differs from earlier tests, e.g. Liebermann-Storch test (1), Fitelson's test (2), and modified Liebermann-Burchard reaction (3). Liebermann-Storch test was developed chiefly for the detection of rosin and rosin oils. Fitelson's test and the modified Libermann-Burchard reaction were meant for detection of tea seed oil in olive and other oils. The present test also differs from the earlier ones in the methodology, quantities of reagents, and scope.

Oils from plant materials belonging to *Graminae* (cereals), *Compositeae* (Sunflower, safflower, and nigerseed) and *Curcurbitaceae* (watermelon and muskmelon) give green colors at the end of the test period. But there are distinct and characteristic differences in the sequence of colors in the oils from seeds belonging to these three botonical families. Oil from *Pongamia glabra* seed gives a bright red color. The present test for tung seed oil is comparable to antimony trichloride test (4) but is simpler and faster.

The following oils and fats did not respond to the test: peanut, cottonseed, sesame, soybean, silkworm, tea seed, orange seed, rubber seed, palm, palm kernel, tobacco seed, salseed, rapeseed and mustard, ajwan, *neem*, coffee seed, castor, kapok, fish, mutton tallow, soapnut, cashew kernel, butter oil, *maroti*, cacaobutter, linseed, neat's foot oil, arecanut, mowrah, *Sesbania grandiflora* and *Schleichera trijuga*.

The test provides a quantitative basis to detect the

TABLE I

Colors of Various Oils by Acetic Anhydride-Sulphuric Acid Reagent

Serial no.	Oil	Color sequence
1	Rice bran	Brown-green-bright green
2	Oils extracted from other cereals: wheat germ, wheat bran, maize germ, rice germ, Italian millet bran, sorghum, African millet, pearl millet	Grey-bright green
3	Sunflower	Blue-sepia - intense blue-bluish green-bright green
4	Safflower	Red-dark red-dark brown-dark green
5	Nigerseed	Light blue - bluish green-deep green
6	Watermelon seed	Light yellow-light blue-bluish green-bright green
7	Muskmelon seed	Brown-dark brown-olive green
8	*Pinnai* (*Calophyllum inophyllum*)	Red-bright red-dark red
9	Poppyseed	Grey-blue-bluish green-bright green
10	Rosin	Violet
11	Lanolin	Green-brown-dark brown
12	Pongam	Red-bright red
13	Guava seed	Red-deep red
14	Tung	Pink-violet-chocolate brown
15	Argemoneseed	Brown-red-dark red

presence of oils in mixtures with other costlier oils like peanut oil which is usually the target in Indian market for admixture with cheaper edible and nonedible oils. The threshold limits at which the oils in Table I could be detected in binary mixtures of those in peanut oil are: Graminae (cereals) oils 5%, Compositae (sunflower, safflower, and nigerseed) oils 5-10% (varying), Cucurbitaceae (watermelon seed and muskmelon seed) oils 10%, pongam oil 1% or less, and tung 5%.

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