Color reactions of 4-alkylresorcinols and some naturally occurring phenolics with Ehrlich reagent

Ehrlich reagent, consisting of an acidic solution of *p*-dimethylaminobenzaldehyde (PDAB), is generally used for the detection of indole and pyrrole derivatives[1–3]. However, MORTON[2] in 1946 reported that certain phenols produce colors comparable to indoles under conditions of Ehrlich test. Thereafter studies on a number of phenolic compounds indicate that several resorcinols and phloroglucinols give the color tests with the reagent[4–7]. Recently ACHESON AND TURNER[8] have reported that a resorcinol requires a free 4 or 6 position, and it must not possess an uncompensated carbonyl (deactivating) group, if it is to give color with the reagent.

In our work we have confirmed the finding that the presence of a carbonyl group in resorcinols inhibits the reaction. However, study of several 4-alkyl-substituted compounds has shown some interesting results. Although 4-ethyl- and 4-*n*-propylresorcinols show color formation, spot tests on paper on 4-*n*-hexyl-, 4-*n*-dodecyl-, 4-*n*-hexadecyl-, and 4-*n*-octadecylresorcinols indicate that with an increase in alkyl chain there is an inhibition of color reaction. Comparative color tests on 4-*n*-hexyl-, 4-cyclohexyl-, and 4-benzylresorcinols have shown that the third compound gives a more intense coloration than either of the other two. On the other hand 4-*n*-hexylresorcinol yields even a weaker reaction than the corresponding cyclohexyl derivative.

Examination of several naturally occurring phenolic compounds that contain a resorcinol or phloroglucinol moiety in their molecule has been made. Spot tests on

TABLE I

COLOR REACTION OF PHENOLIC COMPOUNDS WITH EHRLICH REAGENT

No.	*Compound*	*Color observed*	*Amount of test compound* (μg)*	*Distinguishing compound(s) No.*
1	Sesamol	Blue**	1	—
2	Cannabidiol	Bluish green**	1	3, 4
3	Cannabinol	Pale pink-brown	5	2
4	Tetrahydrocannabinol***	Pale bluish brown	5	2
5	D-Catechin	Violet**	1	6–9
6	Hesperetin	Orange-yellow	5	5
7	Quercetin	Yellow	5	5
8	Quercitrin	Yellow	5	5
9	Rutin	Yellow	10	5
10	Usnic acid	Pale pink	100	—
11	Aspidin	Pale yellow	100	15
12	Albaspidin	Pale yellow	100	15
13	Desaspidin	Pale yellow	100	15
14	Flavaspidic acid	Pale yellow	100	15
15	Butyrylfilicinic acid	Orange-red**	1	11–14
16	Phloridzin	Light pink-yellow	5	17
17	Phloretin	Pink**	1	16

* Spot tests on five different quantities 1, 5, 10, 50, and 100 μg of each compound were performed and lowest amount of the compound that gave color reaction is recorded.

** These compounds show color even at room temperature after applying the reagent on the spot.

*** Synthetic tetrahydrocannabinol (m.p. 62–63°C) provided by Drs. SIEPER AND KORTE was used. In the compound the alicyclic double bond is conjugated with the olivetol ring.

paper were performed with five different quantities of each of these compounds. 2 λ of 0.5% PDAB in ethyl alcohol containing 1% hydrochloric acid was applied on the 3 mm diameter of each compound and the paper kept in an oven at 100° for 1 min. The compounds examined and the results of these tests are recorded in Table I.

The results recorded in Table I indicate the usefulness of Ehrlich reagent for detecting small amounts, at least 1 μg, of compounds numbers 1, 2, 5, 15, and 17. The usefulness of the reagent for distinguishing these plant phenolics from those listed that are closely related is also significantly revealed.

More details of these preliminary studies on the compounds reported here and other phenols tested will be published.

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A technique for the recovery of compounds from thin-layer chromatograph strips for infrared analysis

An examination of technical grade rotenone by thin layer chromatography (TLC) revealed at least three spots. Since R_F values alone cannot be considered conclusive proof for the identity of a compound, a supplementary procedure was necessary to determine which of the three spots was rotenone. A simple technique was devised to collect the components from the developed TLC strip and to confirm their identity by infrared spectrophotometry. This procedure, which should be applicable to other compounds resolved by TLC, is reported below.

The amount of compound necessary for analysis may be within the range of 10–50 μg. To aid in locating non-fluorescent spots, small amounts (0.5% each) of