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Dielectric Constants of Glycerides.

During recent years considerable amount of work is being carried out on the polymorphism shown by mono-, di- and tri-glycerides[1] by a thermal analysis of the melting and solidification of these glycerides. It has been shown that these glycerides exist usually in three different forms in the solid state. We have measured so far the dielectric constants of monomyristin and benzophenone at radio frequencies. The dielectric constant-temperature curves show distinct breaks giving the transition temperatures of these forms. Thus for monomyristin, Malkin and Shurbagy[2] give 56°, 67–5°, 70–5° as melting points of the different forms. In addition they get an arrest at 24°. Our measurements, likewise, confirm these and in addition, if the chilled melt of monomyristin is gradually heated to 39·5°, the dielectric constant suddenly falls from 7·77 to 3·85. This observation has been verified by carrying out the experiments at two different frequencies. Some of these forms show considerable absorption and like the dielectric constant, the temperature-absorption curves also show similar maxima and minima when the transitions take place.

In all our experiments we get a sudden break at 27° instead of 24° as mentioned by Malkin and Shurbagy (*loc. cit.*). They mention that this arrest varies within two or three degrees in different experiments. In some of our experiments this transition at 27° could not be observed accurately, but the change in dielectric absorption was quite distinct. The work is being extended to other glycerides and "liquid crystals". Our results with benzophenone are of a similar nature and confirm earlier work.

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[1] Malkin and co-workers, *J. Chem. Soc.*, 1934, 666.
[2] *J. Chem. Soc.*, 1936, 163.

Colouring Matter of Indian Tulip (*Thespasia populnea*) Flowers: Populnin and Populnetin.

Wardle[1] examined the capsules and petals of *Thespasia populnea* and found that they contained a small quantity of a yellow colouring matter soluble in water and capable of producing by the aid of suitable processes artistic though somewhat faint shades of brownish yellow and light brown on Tasar, mulberry silk and wool. He remarked that this would be a valuable dye-stuff but for the fact that the amount present was very small. A. G. Perkin[2] investigated the flowers of the allied species of *Thespasia lampas* and isolated from them quercetin and some protocatechuic acid. No work seems to have been done on the chemistry of the yellow colouring matter present in the flowers of the populnea.

A chemical examination of a small quantity of the dried petals collected in October 1933 in Coimbatore showed that they contained only a small amount of yellow colouring matter. From this was isolated as the main portion a yellow non-glycosidic pigment melting at 270–75° (I), a small amount of a yellow glycoside melting at 228–30° with decomposition (II) and a very small quantity of a third substance (III) which could be obtained pure only as its acetyl derivative melting at 182–85°. Examination of a larger quantity of the petals obtained from Trichinopoly in the summer of 1936 contained the glycoside (II) only. Compounds (I) and (II) are closely related as shown below. (III) could not be studied since the amount was too small.

The glycoside (II) which is now given the name 'populnin' has the formula $C_{20}H_{18}O_{11}$. It undergoes hydrolysis readily to yield a molecule of glucose and a crystalline aglucone (I) called 'populnetin' having the formula ($C_{14}H_8O_6$). The aglucone forms a colourless tetra-acetyl derivative melting at 127–29°.

The following characteristics of populnin as well as of populnetin are noteworthy. They are unaffected by neutral lead acetate solutions whereas with basic lead acetate they form orange red precipitates. They give pale green colour with ferric chloride. With aqueous alkali the glucoside forms a deep yellow solution whereas the aglucone gives a red solution and both slowly fade to a pale brownish yellow. Their solutions in concentrated sulphuric acid possess a remarkable green fluorescence which disappears on the addition of water.

The constitution of populnetin is under investigation. It does not seem to be a flavone or flavonol. All its reactions indicate that it belongs to the group of hydroxy anthraquinone pigments. It is, therefore, suggested that it is a tetrahydroxyanthraquinone.

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[1] *Watt's Dictionary of Economic Products of India.*

[2] A. G. Perkin, *J.C.S.*, 1909, 1859.

The Coupling Phase of the Linkage Relationship between "Leaf-Sheath-Glume" and "Dry Anther-Grain" Colours in Sorghum.

In a previous paper[1] the repulsion phase of a linkage between the factor for leaf-sheath and glume colour (Qq) and the factor for brown colour in dry anther and grain (Bb) has been recorded. The two parents figuring in that experience had the following characters. Parent (1) Reddish purple leaf-sheath and glume and no brown colour in the dry anther and no brown wash on the grain. Parent (2) Blackish purple leaf-sheath and glume and brown colour in the dry anther and brown wash on the grain. The first generation plant had reddish purple sheath and glume and brown colour in the dry anther and brown wash on the grain. In the F_2, instead of the dihybrid 9 : 3 : 3 : 1 ratio, there always occurred a 2 : 1 : 1 : 0 ratio of the double dominant and parental groups, the double recessive group being absent. The double dominants always segregated and the linkage was absolute.

In all the wild sorghums so far examined, the leaf-sheath and glume are blackish purple and the grain is brown in colour. An examination of the large collection of sorghums gathered from all over the world at the Millets Breeding Station, Coimbatore, leads to the general conclusion that broadly speaking the black-glumed groups of sorghum are mostly African in origin and the red-glumed ones predominantly Indian and Asiatic. The characteristics of the existing types of sorghum in India amply prove that there was an introduction of the African races into India and that in consequence there was free hybridisation and subsequent selection of valuable individuals. It is a matter of common knowledge that given the choice, the cattle relish fodder of sorghum plants with a reddish purple leaf-sheath in preference to those with a blackish purple leaf-sheath. The blackish purple leaf-sheath brings in its train the brown wash on the grain and this wash is an advantage to grains liable to be caught up in rains at the maturing stages. It is a matter of common experience that grains with a brown wash do not turn mouldy and discoloured so quickly as grains without the wash. The wash is therefore an asset in