NOTES ON QUEBRACHITOL AND THE LIPIN FROM HEVEA LATEX.

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Recent investigations on the non-rubber constituents of latex have centred round two substances in particular, namely quebrachitol & Heavea lipin. Quebrachitol (1) is a white crystalline body. It is extremely soluble in water and possibly because of its sweet taste it has often been mis-described as a sugar. Actually it has a cyclic structure and its chemical designation is l-methyl inositol. Hevea lipin (2) is a fatty complex similar to egg lecithin in that it contains organic phosphorus and nitrogen in combination with fatty acids and glycerol.

In considering possible commercial applications for these latex constituents it was decided to ascertain their value if any in spraying.

Apparent possibilities were the use of the lipin as an emulsifier in the preparation of insecticidal and ovicidal stock (3) emulsions and also its employment as an aid in the preparation of miscible oils (3) : quebrachitol was investigated as an emulsifier, an aid to miscible oil formation, an aid to solution of oils, and as a "wetter" and "spreader" for causing wetting of, and spreading over, the plant, pest and fungoid surfaces, by a spray fluid (4).

Emulsions for spraying are obtained by two methods. First, the manufacturer may sell a non-creaming stock or concentrated emulsion for dilution to the spraying concentration in the field, the emulsion preferably being one which will not interact with the salts causing hardness of natural waters, risks of inversion to the undesirable water-in-oil type thus being avoided (5); secondly, the oil and emulsifier may be sold as a solution known as a miscible oil got by the addition of some third substance to the system, the spraying emulsion being prepared in the field by mere stirring into the water.

It has been demonstrated that ovo-lecithin tends with certain oils to the formation of dual types of emulsion (6) i.e., that oil-in-water (OW) and water-in-oil (WO) types of emulsions can be prepared from an aqueous lecithin dispersion and the oil by simply altering the phase volume ratio employed), but also that an emulsifier used in the preparation of spraying emulsions should yeild with the oil, perfect, stable, OW types only (5,7). Any emulsifier,

yielding dual types, therefore, should in general be as rigorously avoided in spraying as one giving the WO type only.

Hevea lipin has been found to give results similar to those with ovo-lecithin. Thus on vigorously shaking together in a closed cylinder the fluid phases 1% aqueous Hevea lipin dispersion and toluene, or chloroform, or carbon tetrachloride, in the ratios 5/15 and 15/5 by volume (ratios which generally allow of the formation of the two types if at all possible (7)), it was demonstrated that dual types were formed, OW with excess aqueous phase and WO when the ratio was in favour of the oil. One important observation which has been found to apply also to certain samples of ovo and soya bean lecithins, was that both types were found to be simultaneously present by drop tests on fresh and aged emulsions and creams (6, 8) with the phase volume ratio in favour of the oil: the aqueous phase disappeared entirely here, the excess continuous phase (9) being oil; the OW type was present in smaller amount as judged by simple tests, and the direction of creaming followed the rules laid down for the WO type (10).

The lipin is, therefore, useless to the manufacturer in the preparation of stock spraying emulsions. At the water-rich ratio, however, the OW types were quite stable and perfect, and hence the lipin could be used providing the grower would make his own emulsion at the place of spraying; such a procedure, however, would be rather rare.

Hevea lipin was now tested as a possible aid in the formation of miscible oils. A solution of 100 gm. of fish oil soft soap containing 34.85%moisture was made in 50 cc of fusel oil by shaking. It was found possible to incorporate with 5 cc of this, 10.55 cc of a special blend of spindle oil before slight turbidity occurred, solutions containing less than this amount of special blend forming perfect, stable, OW types of the special blend on stirring into water. On previous incorporation of Heavea lipin in the fusel oil soft soap solution so that the latter was now 4% as regards lipin, 5 cc of the resulting solution needed 8.55 cc only of special blend to cause turbidity, the presence of the lipin reduced the miscible oil-forming power.

A similar experiment with 5 cc of fusel oil-soap solution 4% as regards quebrachitol (dissolution being effected by long shaking) demonstrated that 8.60 cc of special blend produced turbidity. Here again the added substance lessens the miscible oil-forming tendency of the fusel oil, and hence is useless in this regard.

A 2% aqueous quebrachitol solution was found useless as an emulsifying medium in the preparation of stock emulsions of oils (e.g., toluene, oleic acid & crude soya oil). Neither did this solution dissolve oils (e.g., soya oil & oleic acid).

Quebrachitol has also no value as a wetter and spreader as determined by the tension liquid / air of a solution (4). Thus the drop number at 16°C. of the 2% aqueous solution was 41.8, distilled water having a drop number of 41.7 in the same stalagmometer at the same temperature. It is obvious that quebrachitol does not lower the surface tension of water.

SUMMARY.

Dual types of emulsions are possible with certain oils when the lipin is the emulsifier, and it is noted that with this substance the two types of emulsion can apparently both be present in the same system at one and the same time, the first case of this phenomenon to be recorded up to the present.

Hevea lipin and quebrachitol (1-methyl inositol), two possible by-products from Hevea latex, are demonstrated to be valueless in the spraying industry.

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