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Microscopical appearance of some oil-in-water emulsions

SIR,—Barry (1968) has demonstrated the presence of crystalline material in polyhedral particles occurring in emulsions. We find the preparative technique to influence the microscopical appearance of some similar emulsions. Solutions of cetostearyl alcohol (7 g) in liquid paraffin (50 g), and cetomacrogol 1000 or cetrimide (0·5 g) in water (42·5 g) were mixed at 60°. Separate batches of the crude emulsion were (*a*) stirred by hand, (*b*) passed through an automatic pipetting syringe or (*c*) passed through a Q.P. hand homogenizer four times. Samples of each product were examined under a phase contrast microscope and where necessary they were diluted with distilled water.

The relatively gentle shear action of stirring produced emulsions in which we, too, observed globules containing crystalline material.

The syringe technique resulted in a greater degree of globule shearing. Crystals were not visible within the globules but what appeared to be filamentous structures could be seen, either enveloping the globules or dispersed in the aqueous phase (Fig. 1A). These structures were present in the freshly prepared emulsion and did not disappear on ageing or show up under polarized light. They melted when the samples were heated to about 60° on a Leitz hot stage. On cooling, acicular crystals could be seen inside some globules, and filaments were again evident, this time radially orientated at the oil–water interface (Fig. 1B). The orientation effect might have been due to the coverslip but it seems likely that, in general, the interfacial film may act as a template for filament production.

The greatly reduced globule size of the highly sheared homogenized emulsions limited the detail visible by optical microscopy. Aggregates of globules, as noted by Axon (1957) and Riegelman (1962) were apparent in diluted samples. Fig. 1C shows an undiluted emulsion which has been heated to about 60°.

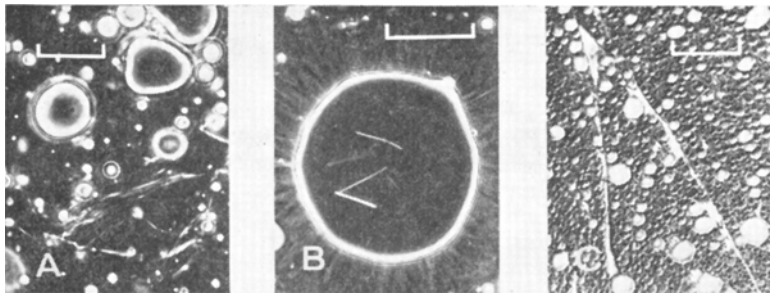

FIG. 1. Photomicrographs of: (A) Emulsion prepared by syringe technique—diluted before examination. One division = 10 μ. (B) As (A) but heated and cooled. One division = 20 μ. (C) Undiluted homogenized emulsion after heating and cooling. One division = 30 μ.

Some coalescence of the globules has occurred and long filaments developed which solidified on cooling.

These experiments were repeated with emulsions containing less than 1·0% w/w cetostearyl alcohol. In no case were we able to demonstrate the presence of filamentous structures.

These observations provide some evidence of migration of cetostearyl alcohol and indicate that its ultimate location is dependent on the previous history of the emulsion. In the aqueous phase the fatty alcohol is probably combined with the surfactant in a liquid crystalline state as described by Barry & Shotton (1967) for a similar system. The filamentous structures shown here are not necessarily of precisely the same form as those of the gel to which we earlier attributed the rheological properties of our emulsions (Talman, Davies & Rowan, 1967; 1968), although they are likely to be of the same constitution. The presence of such a gel is indicated by the aggregates of globules which appear to be immobilized within a matrix and are difficult to disperse. The fine structure of the gel has so far evaded detection, undoubtedly due to the limits of resolution of the optical microscope.

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Supersensitivity to tyramine not due to monoamine oxidase inhibition

SIR,—Our observation that chlorobethanidine [1-(*o*-chlorobenzyl)-2,3-dimethylguanidine; BW 392C60], a bretylium-like agent greatly enhanced the responses of the rat isolated vas deferens to tyramine, prompted us to investigate the mechanism involved. Chlorobethanidine differs from bretylium in showing an inhibitory action on monoamine oxidase (Gessa, Cuenca & Costa, 1963). Since most monoamine oxidase inhibitors have been shown to potentiate tyramine responses in a number of preparations (Furchgott, Weinstein & others, 1955; Balzer & Holtz, 1956; Corne & Graham, 1957; Goldberg & Sjoerdsma, 1959; Spano, 1966; Laporte, Jané & Valdecasas, 1968) and it has been postulated that this potentiation is related to monoamine oxidase inhibition (Goldberg & Sjoerdsma, 1959), it could be assumed that the potentiation observed by us could be explained on the basis of its enzyme inhibition. However, taking into account the fact that the doses of chlorobethanidine which determined tyramine enhancement in our experimental conditions were devoid of monoamine oxidase inhibitory activity in the rat heart (Gessa, Cuenca & Costa, 1963), the possibility was entertained that these doses did not inhibit the monoamine oxidase activity of the rat vas deferens. To demonstrate our working hypothesis, the influence of chlorobethanidine on the responses of the rat isolated vas deferens to tyramine or rat vas deferens monoamine oxidase activity, or both, was investigated.

Rats were injected intraperitoneally with different doses of the drug and killed 6 hr later and both vasa were removed. Cumulative dose response curves for