TABLE I

*Dicoumarols with mp and IR data*

| Name of the substituent | m.p. C° | % yield | Carbonyl frequency in IR ($cm^{-1}$) |
|---|---|---|---|
| Simple | 208[2] | 80 | 1660 |
| 6-methyl | 228[3] | 80 | 1665 |
| 7-methyl | 235 | 80 | 1660 |
| 8-methyl | 262 | 80 | 1660 |
| 6-chloro | 220[4] | 80 | 1665 |
| 6-chloro-7-methyl | 263[5] (lit m.p. 214–6) | 75 | 1665 |
| 6, 8-dichloro | 255 | 75 | 1670 |

This method does not seem to have been reported earlier for the synthesis of dicoumarols. The reaction conditions are fairly simple and yields are quite good in all cases. This condensation may prove useful for the synthesis of dicoumarols from sensitive aldehydes.

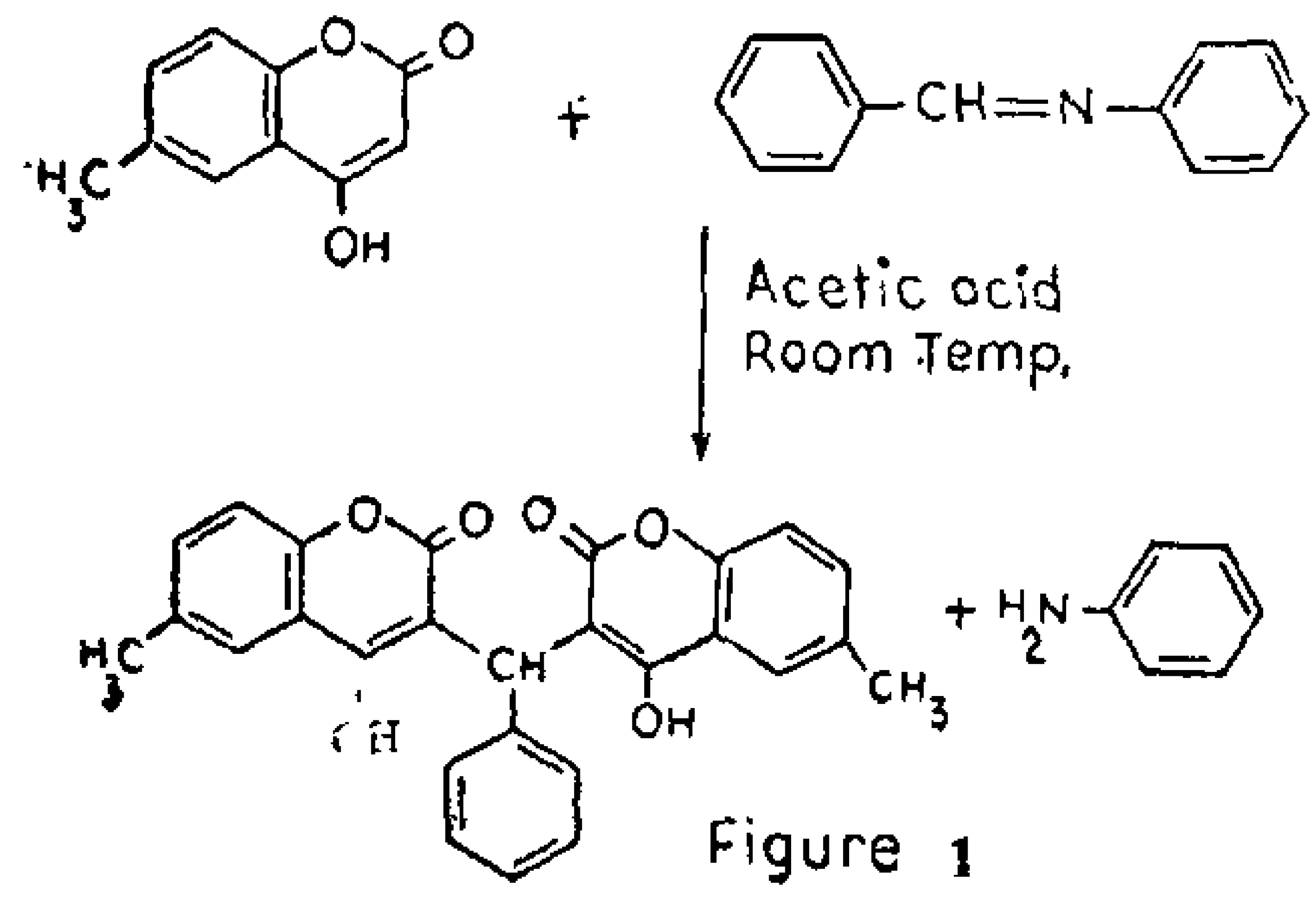


Figure 1

*Experimental*

*General Procedure.*—4-hydroxy coumarin (0·02 mole) and Schiff's base (from benzaldehyde and aniline) (0·01 mole) were mixed in acetic acid (20 ml). The clear dark brown solution obtained was shaken well for about 15 minutes at room temperature. A colourless substance was precipitated immediately. This was filtered, dried and recrystallised from methanol as colourless crystals.

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## INTERFACIAL TENSION AND PARTICLE SIZE OF NONAQUEOUS EMULSIONS

IN continuation of earlier work on oil-in-oil emulsions[1–3], the present communication describes the effect of temperature on the interfacial tension of oil-oil interface in presence of an emulsifier and an effort has been made to correlate the interfacial tension with the mean particle size and the stability of the resulting emulsions.

Monochlorobenzene and ethylene glycol were employed as the two nonaqueous phases and the surfactants used were (*a*) polyoxyethylene sorbitan monostearate (Tween 60; KL), (*b*) polyoxyethylene sorbitan monooleate (Tween 80; KL), and (*c*) polyoxyethylene sorbitan monolaurate (Tween 20; KL). The oil-in-oil emulsions were prepared with 1 : 1 phase ratio by volume and 0·1% concentration of nonionic surfactant (*w/v* % of emulsion). The mixtures were emulsified with the help of Braun emulsator.

The interfacial tension of monochlorobenzene-ethylene glycol interface with the surfactant was determined by the drop volume method[4]. Three or more runs were made for each measurement. The interfacial tension ($O_1\gamma O_2$) at the oil ($O_1$)-oil ($O_2$) interface in presence of surfactant was calculated from the expression.

$$ {}_{O_1}\gamma_{O_2} = \frac{v(\rho_1-\rho_2)g}{2\pi r\phi(r/v^{1/3})} = \left[\frac{v(\rho_1-\rho_2)g}{r}\right]F \qquad (1)$$

where $v$ is the drop volume, $r$ is the radius of the capillary tip, $\rho_1$ and $\rho_2$ are the densities of the respective phases and F, the correction function, depending on $v/r^3$, is derived from the drop-volume correction table.

Particle size analyses of nonaqueous emulsions were carried out by photomicrographic method[5]. Immediately after the preparation of an emulsion, the mean globule diameter (Dm) was determined. Further determinations were made at different temperatures in the range of 15°–60° C. Dm was calculated from the relationship[6]

$$ \mathrm{Dm} = \left\{\frac{n_1 D_1^3 + n_2 D_2^3 + \ldots + n_x D_x^3}{n_1 + n_2 + \ldots + n_x}\right\}^{1/3} = \left\{\frac{\Sigma n D^3}{\Sigma n}\right\}^{1/3} \qquad (2)$$

where $n_1$, $n_2$, ... $n_x$ are the number of globules with diameters $D_1$, $D_2$, ... $D_x$, respectively.

Figure 1 shows the influence of temperature on the interfacial tension of monochlorobenzene-ethylene glycol interface in the presence of three different non-ionic surfactants. In all cases, there is an increase in the interfacial tension of oil-surfactant-oil interface with an increase in temperature. Under similar conditions, when a surfactant was added to monochlorobenzene phase, the values of interfacial tension have been found to be slightly lower than when the surfactant was dissolved in ethylene glycol phase.

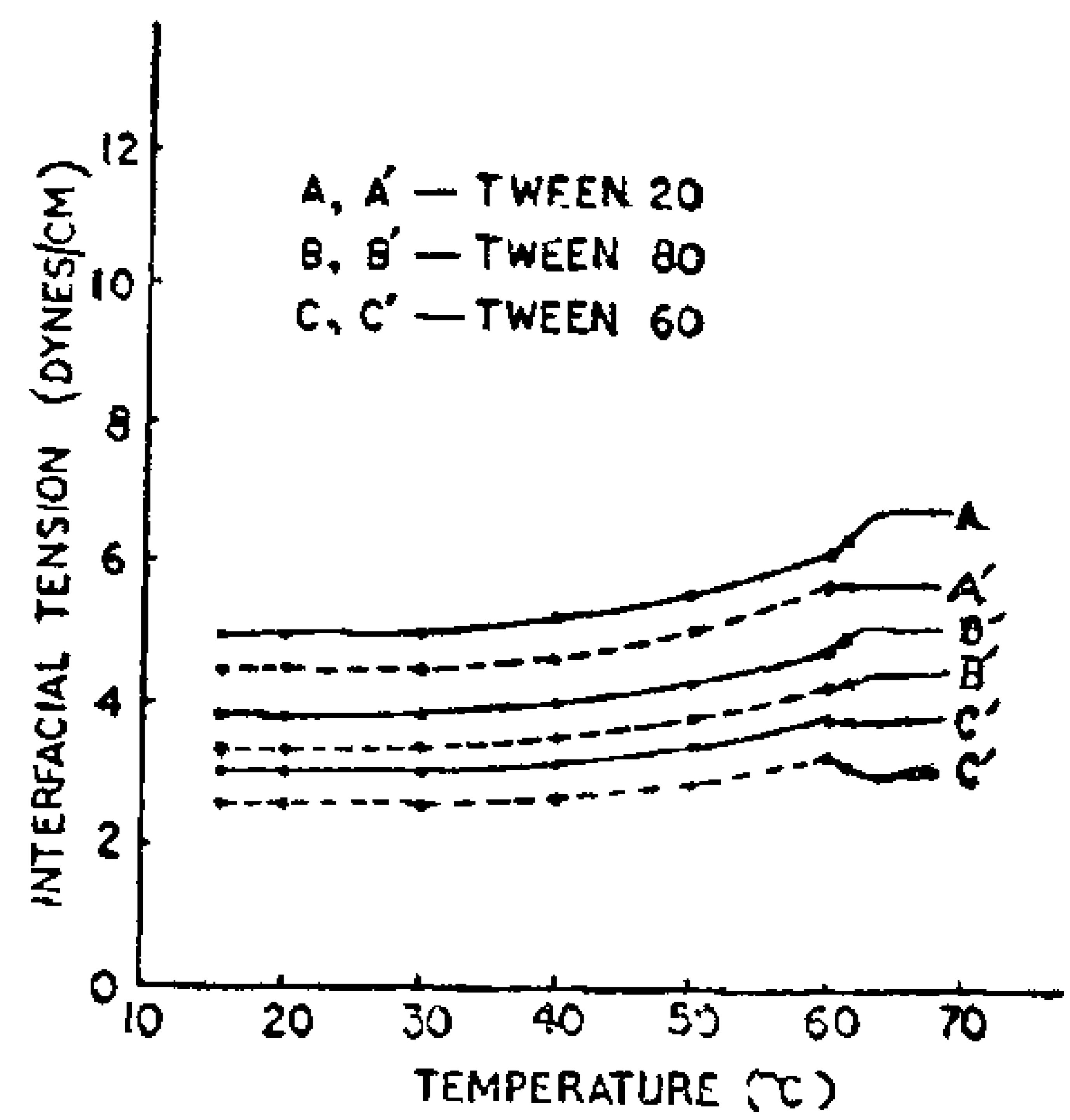


FIG. 1. Effect of temperature on the interfacial tension of monochlorobenzene-ethylene glycol interface in the presence of surfactant:—— surfactant dissolved in ethylene glycol, .... surfactant dissolved n monochlorobenzene.

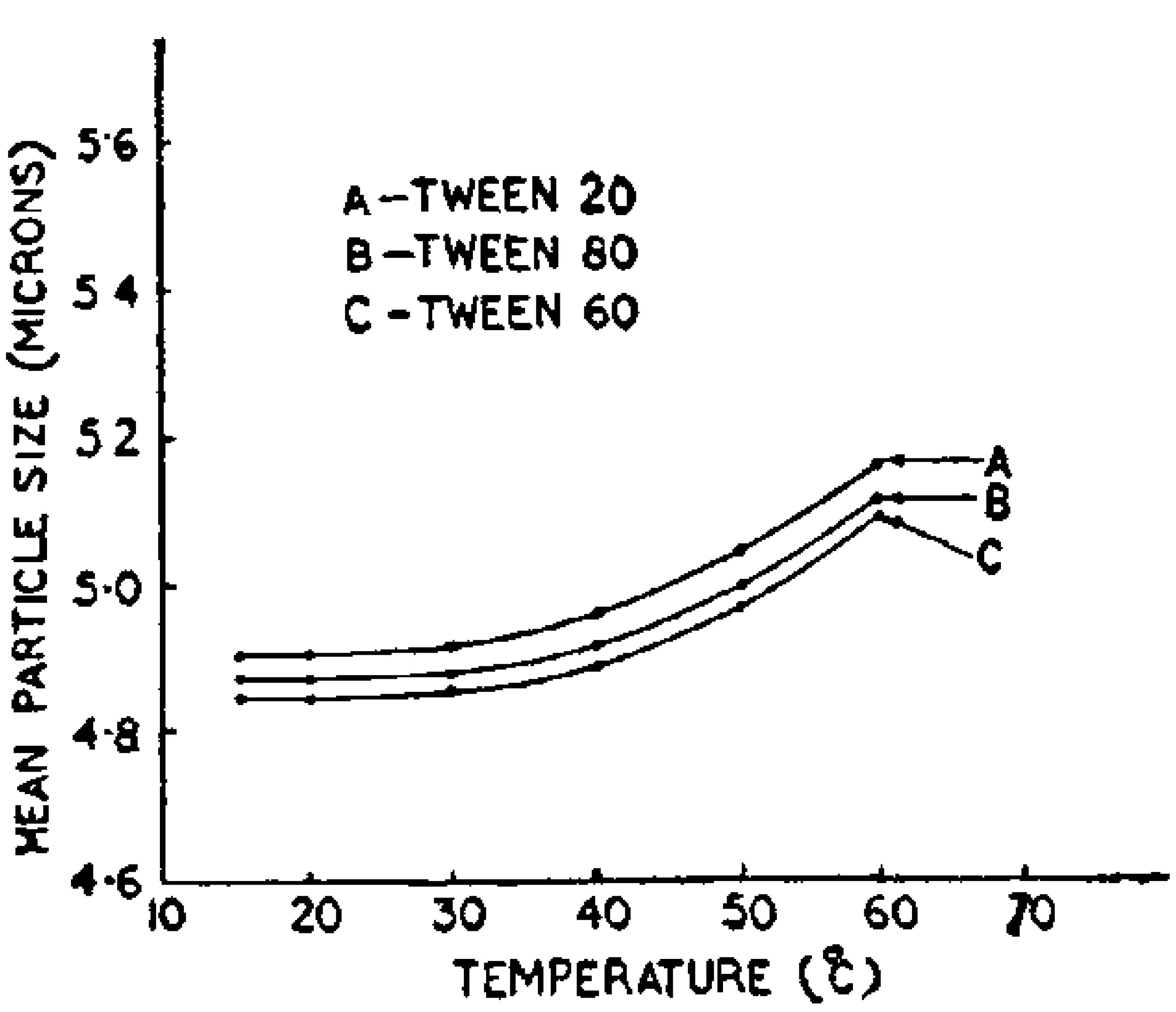


FIG. 2. Effect of temperature on the mean particle size of oil-in-oil emulsions stabilized with surfactants.

The effect of temperature on the mean particle size of oil-in-oil emulsions stabilized with three different nonionic surfactants is shown in Fig. 2. There is an increase in the mean particle size of emulsions with an increase in temperature of emulsions. As compared to higher temperatures, particle size of emulsions increases much more slowly at lower temperatures, during the course of increasing the temperature of emulsions, because the rate of coalescence of emulsion droplets appears to be slow and the viscosity of the medium is higher at lower temperatures.

It is apparent from these studies that the interfacial tension increases with increasing temperature and so do the particle size. It is well known that the stability of emulsions is related to the particle size of emulsion droplets *i.e.*, the smaller the particle size, more stable are the emulsions. Thus it may be concluded from the interfacial tension data that the stability of oil-in-oil emulsions decreases with an increase in temperature of emulsions from 15°–60° C and as compared to higher temperatures, the stability of the emulsions decreases much more slowly at lower temperatures, because the stability of the emulsions is more at lower temperatures.

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*May* 26, 1977.

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## MOTHER-CHILD INCOMPATIBILITY IN THE ABO SYSTEM

SELECTION is known to exist because of maternal-feta antigenic incompatibilities with regards to the ABO system and the expected distortions in genetic ratios have already been demonstrated.[1-4]

In order to investigate the selective mechanism operating on ABO bloodgroups an investigation was carried out on some village populations of coastal Andhra Pradesh. Samples from 1021 couples, with wives ranging in age from 20 to 40 years were collected and a total of 4144 children could thus be tested with ABO bloodgroups. The results are presented in Table 1.

There appears to be no striking difference in the proportion of childless couples between the two groups ($\chi_1^2 = 0 \cdot 01$). The mean number of living children between the two matings presents a significant value ($t = 5 \cdot 510$; $P < 0 \cdot 001$). As to segregation ratio of the bloodgroups of children, comparisons between