



Figure 1. Set-up for gel strength measurement.

the gel is  $L_3$  and the length of string with weight  $w$  is  $L_4$ . Now,

$$\begin{aligned} L_3 - L_1 &= x \\ L_2 - L_4 &= y. \end{aligned}$$

Velocity ratio =  $x/y$ , i.e. velocity ratio is equal to unity as the increase in length  $x$  is equal to the decrease in length  $y$ .

Efficiency in this instrument is unity since

$$\begin{aligned} \text{Efficiency} &= \frac{\text{Mechanical advantage}}{\text{Velocity ratio}} \\ &= 1/1 = 1. \end{aligned}$$

The gel strength of agar sample at 1.5% concentration in glass-distilled water was determined by a

Nikan Sui type instrument made by Kiya Seisakusho Ltd, Japan, at the Central Salt and Marine Chemicals Research Institute, Bhavnagar, and was found to be identical with that measured using the instrument devised by us.

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#### PHOTOCHROMIC ACTIVITY OF 4-HYDROXY-BENZYLIDENESALICYLOYLHYDRAZINE

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VARIOUS types of organic compounds have been investigated for photochromic activity. Generally this phenomenon occurs owing to the structural isomerism with the effect of radiation<sup>1-2</sup>. Cohen *et al.*<sup>3-5</sup> considered that the presence of the *ortho* hydroxy group is an essential condition for coloration in *N*-salicylideneanilines and interpreted photochromism as an intrinsic property of the individual anil molecule. Benzenesulphonylhydrazines are photochromic in rigid matrices at low temperature<sup>6</sup>. Arylidene hydrazides, which are structurally similar to benzenesulphonylhydrazines; are potentially photochromic. An attempt was therefore, made to prepare arylidene hydrazides and investigate their photochromic activity. These hydrazine derivatives were prepared by condensation of the appropriate acid hydrazide (prepared by refluxing hydrazine

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hydrate with ester) with the corresponding aldehyde in ethanol heated over a water bath for 3 h<sup>7</sup>. Crystals obtained on cooling were further purified by recrystallization from petroleum ether-acetone. Purity was checked by TLC, elemental analysis, and IR and PMR studies.

4-Hydroxybenzylidenesalicyloylhydrazine (m.p. 231°C) showed the colour change in crystalline form from white to yellow on exposure to sunlight for 5 min and reversal to the original colour thermally in the dark or on keeping in the dark at 25°C for a week. The cycle could be repeated several times without any fatigue in the molecule. The compound did not show any colour change when exposed to UV light (365 nm). When either of the OH groups was replaced or substituted by the -OCH<sub>3</sub> group, the photochromic property of the compound was lost.

Photochromism among *N*-salicylideneanilines has been attributed to the existence of intramolecular hydrogen bonding between the phenolic proton and the imine nitrogen leading to intramolecular hydrogen transfer followed by *cis-trans* isomerization yielding photochromic coloured species on excitation<sup>5</sup>. Compounds with an *ortho* group other than OH have also shown photochromic behaviour<sup>8,9</sup>, and the photochromism involves an intramolecular proton shift from a suitable *ortho* group to the nitrogen of the >C=N leading to quinoid-type structure.

In the present case 2-hydroxybenzylidenesalicyloylhydrazine did not show observable colour change on irradiation (UV, sunlight) in the solid state whereas 4-hydroxybenzylidenesalicyloylhydrazine is photochromic in the solid state (sunlight). The observation, indicates that *ortho* groups that are able to shift their proton intramolecularly to the azomethine nitrogen are not essential for photochromism in this series of compounds. Further investigations of the mechanism of photochromism in this series of compounds are under progress.

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### EXTRACTION AND SPECTROPHOTOMETRIC DETERMINATION OF IRON IN STEELS AND HAEMATITE ORE USING THIOCYANATE AND CHLORPROMAZINE

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MANY methods have been reported for the spectrophotometric determination of iron in steel, ores, rocks and minerals<sup>1</sup>. However, these methods are not well suited for simple and selective determination of iron because of complicated procedures or chemical interferences. The thiocyanate method is applicable in routine analysis, but it has serious shortcomings such as the formation of more than one product with iron(III), [Fe(SCN)<sub>n</sub>]<sup>+3-n</sup>, n=1...6, depending on the concentration of thiocyanate. In the work described here chlorpromazine (CPZ) was chosen as a reagent to establish a new, simple, rapid and selective extraction and spectrophotometric determination of microamounts of iron in haematite and steels.

A Beckman Model DB, UV-VIS spectrophotometer with 1 cm matched silica cells was used for absorbance measurements. Stock solution of iron(III) was prepared by dissolving iron(III) ammonium sulphate (AnalaR, BDH) in double-distilled water with a few drops of sulphuric acid. This stock solution was standardized gravimetrically<sup>2</sup> and used after appropriate dilutions as and when required. 0.05 M CPZ solution in chloroform, and ammonium thiocyanate, 25% w/v in water, were also prepared.

Various aliquots of iron solution containing