

pseudo β -turn conformation with positive ϕ_2 and ϕ_3 values, centred around 60–90°, but without the formation of the 4 \rightarrow 1 hydrogen bond. It is also possible to reconcile the observation by Karle *et al.*¹¹ about the bioactive conformation being extended, since both ϕ_2 and ϕ_3 are positive for two of the four conformers in the crystal structure of leu-enkephalin studied by them. In other words, biological activity presumably requires that spatial orientation of the second peptide bond (between gly² and gly³) be such as to make ϕ_2 and ϕ_3 positive. Such an orientation must be clearly a dominant, sequence-dependent feature induced by the presence of the aromatic residues flanking the gly²–gly³ pair, as revealed by the present study as well as by the earlier crystallographic studies on several small peptides such as tyr–gly–gly¹⁴, trp–gly–gly¹⁵, phe–gly–gly², gly–gly–phe·HCl¹, tyr–gly–gly–phe⁵, and t-Boc–gly–gly–phe–OEt¹⁶. The specific bioactive conformation thus appears to be dictated by, along with other structural and conformational features, the need for involving either the amino or carbonyl function associated with the second peptide bond in its interaction with the receptor. Replacement of the gly²–gly³ peptide bond with an olefinic bond may throw some light on this matter.

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The kinematic viscosities of ethylene glycol and castor oil

Manoj Kumar and P. N. Shankar

Computational and Theoretical Fluid Dynamics Division, National Aerospace Laboratories, Bangalore 560 017, India

Kinematic viscosities of ethylene glycol and castor oil have been measured in the temperature range 10–50°C using Ubbelohde viscometers. Empirical correlations give reasonably accurate representation of the data. These data should be useful to those who would like to use these liquids as calibrating fluids for high viscosity measurements

A problem faced while measuring relative viscosity is that suitable calibrating fluids are not available in India. For low viscosity fluids, distilled water and some of the organic solvents can be used. But for fluids of high viscosity, data on suitable calibrating liquids are not easily available. We experienced this difficulty during our recent measurements on glycerol–water mixtures as the viscosity of glycerol is a few orders of magnitude greater than that of water. This note documents our data on ethylene glycol and castor oil that we feel would be useful for intermediate and high range of viscosities of Newtonian fluids.

The kinematic viscosity measurements reported here were made using a series of Ubbelohde, suspended level viscometers^{1,2}. This method has an advantage that it is the kinematic viscosity, the quantity of interest to hydrodynamicists, rather than the dynamic viscosity that is measured. In principle the measurement, based on Poiseuille flow through a capillary, is very simple; in practice, great care has to be taken to obtain reliable data. Details of our set-up and procedures were documented earlier³ and are not repeated here. However, we should emphasize that a thermostat was employed to carefully control the temperature (variations during measurements were less than $\pm 0.01^\circ\text{C}$) and drainage times were in excess of 200 seconds to make kinetic energy corrections superfluous. The ethylene glycol used in these measurements was stated by the manufacturer to have a boiling point range of 194–199°C; both ethylene glycol and castor oil used were manufactured by Loba Chemie Pvt. Ltd.

Table 1 lists the measured values for kinematic viscosities of ethylene glycol and castor oil as functions of temperature. Note that while measurements were made nominally at temperatures ranging from 10°C to 50°C in steps of 5°C, the actual temperature at the capillaries during measurements are recorded in the table. The measurements range over 2½ orders of magnitude in kinematic viscosity. The uncertainty in the ethylene glycol data was measured to be less than $\pm 1\%$ while for the castor oil data the corresponding figure was $\pm 4\%$. We believe these are conservative estimates.

Table I. The measured kinematic viscosities ν_{eg} and ν_{co} of ethylene glycol and castor oil respectively as functions of the temperature. The numbers in parentheses indicate the deviation of the actual temperature from the nominal one

Nominal temperature (°C)	ν_{eg} Centistokes	ν_{co} Centistokes
10	29.73	2560 (+ 0.1)
15	23.38	1640
20	18.69 (- 0.1)	1080 (- 0.2)
25	15.13	707 (+ 0.1)
30	12.45	500 (+ 0.2)
35	10.28 (+ 0.2)	360 (- 0.1)
40	8.70 (- 0.1)	257 (+ 0.1)
45	7.33	192
50	6.31 (- 0.1)	145 (- 0.1)

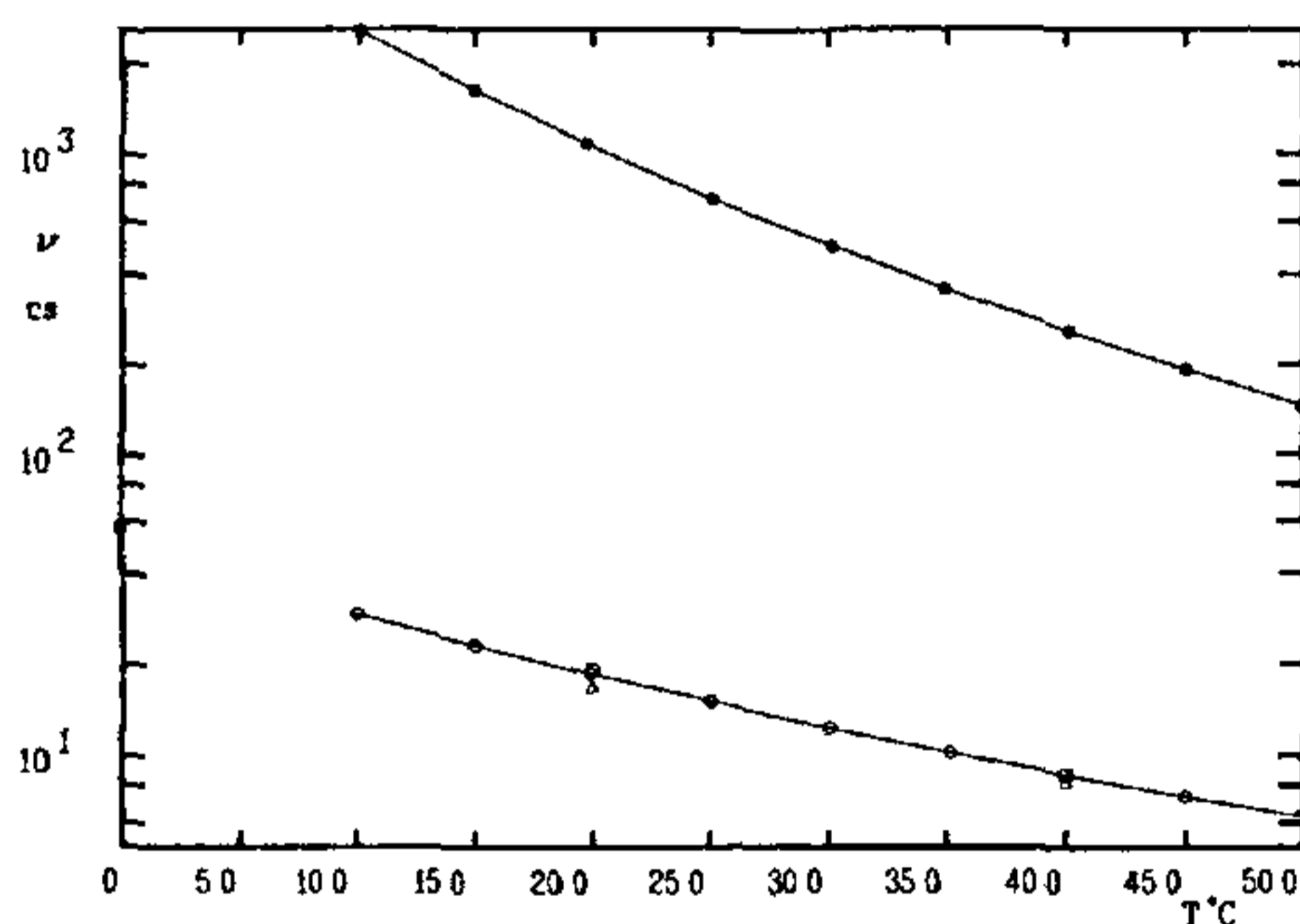


Figure 1. The kinematic viscosities of ethylene glycol (lower curve) and castor oil (upper curve) as functions of temperature Δ *Handbook of Chemistry & Physics*, \square Eckert & Gross, \circ present data

Our data when compared with some limited data available in the literature (Figure 1) indicate that our results for ethylene glycol agree fairly well, where available, with those in the *Handbook of Chemistry and Physics*⁴ and very well with the data in Eckert and Gross⁵. We have not come across any reliable data on castor oil to make a comparison. For modelling purposes it is more convenient to have the data in the form of approximate analytic representations. We suggest the following correlation to represent the data

$$\ln \nu = a + bT + cT^2 + \dots \quad (1)$$

By a least squares fit we find that for ν in centistokes and T in °C, a , b and c take the values 3.89258,

- 0.05285 and 0.00024 in the case of ethylene glycol; for castor oil the corresponding values are 8.81178, - 0.10136 and 0.00049 respectively. With these values the percentage errors in the representation vary from - 0.67 to 0.49 for ethylene glycol and from - 3.6 to 0.87 for castor oil. Considering the ranges involved these deviations are reasonable.

In conclusion, we believe that Table I and correlations (1) should be useful to anyone making relative viscosity measurements for fluids of moderate and high viscosity.

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Census of mycoflora associated with the Shilajit rocks

Raj Kumar

Horticultural Experiments and Training Centre, Chaubattia, Rankhet, Almora 263 651, India

The formation of Shilajit is a complex organic phenomenon. However, micro-organisms play an important role in the proliferation of Shilajit. This note reports an attempt made to study the details of the mycoflora associated with Shilajit and its associated rocks.

A survey of the Jaurasi area in Almora District, Kumaon Hills in Uttar Pradesh was carried out and the Shilajit samples in the form of exudation on small pieces of rocks were collected separately in sterilized polythene bags using sterilized sculper.

Potato dextrose agar medium was used to isolate micro-organisms adhering to the rocks and exudation of Shilajit both by the pressed technique and dilution plate method. The culture plates were kept at 28°C under incubation for seven days. The colonies of organisms in petri dishes were transferred in culture tubes containing the same medium (PDA) after making them in pure form for their respective growth and identification. The spectrum of fungal inhabitants showed the presence of