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Short Communication

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About the Penetration of Associates and Micelles into the Blood of Goldfish

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In works /1,2/, the kinetics of the oxyethylation reaction of primary alcohols of the normal structure of the composition C_4-C_7 and C10 was studied. It is shown that in this reaction, not a monomeric alcohol molecule acts as a kinetically independent unit, but a linear chain alcohol associate consisting, on average, of n alcohol molecules. For alcohols C_4-C_7, the dependence of the parameter n on temperature is expressed in Arrhenius coordinates in the form of one straight line. For alcohol C_{10}, this dependence is expressed by two straight lines with an intersection point of about 87,5°C (see figure 1). Above this temperature, the parameter n ≈ 11-12 and does not depend on temperature. At t < 87, 5°C, the rapid growth of parameter n begins. At t = 60°C n ≈50. Such values of the parameter n are characteristic not for associates, but for micelles. At t > 87,5°C, the interaction in associates is apparently carried out due to hydrogen bonds of hydroxyl groups. At lower temperatures, the Van der Waals interaction of hydrocarbon radicals is added to this interaction and the associate turns into a micelle.

We do not have data on alcohols C_8-C_9, but there are data in the literature on the dependence of the thermal conductivity of alcohols C_6-C_{12} on temperature. In this work /3/ it is shown that for alcohols C6-C8 this dependence is expressed in the form of one straight line, and for alcohols C_9-C_{12} in the form of two intersecting lines with intersection points in the region of 80-95°C. In Figure 2. These dependencies are shown for alcohols C8 and C_{10}. If the analogy with thermal conductivity is correct, then alcohols C_6-C_8 form associates, and alcohols C_9-C_{12} form micelles. If so, it leads to interesting physiological consequences.

In the work /4/ the anesthetic effect of alcohols C_6-C_{12} on Goldfish fish was investigated. A certain concentration of a certain alcohol was created in the aquarium. Fish were launched there and the concentration of alcohol in the fish's blood was monitored. In Figure 3 the results obtained after 20 minutes at an alcohol concentration in water of 12.5 ppm are shown. It can be seen from the figure that alcohols forming micelles penetrate into the blood of fish faster than alcohols forming associates, and have a correspondingly greater anesthetic effect /4/.

Thus, in the body of the fish there is, relatively speaking, a filter makes it difficult the penetration of alcohols forming associates into the blood of the fish (hydrocarbon radicals are dissolved) and passes alcohols forming micelles into the blood (hydrocarbon radicals are interconnected).

References

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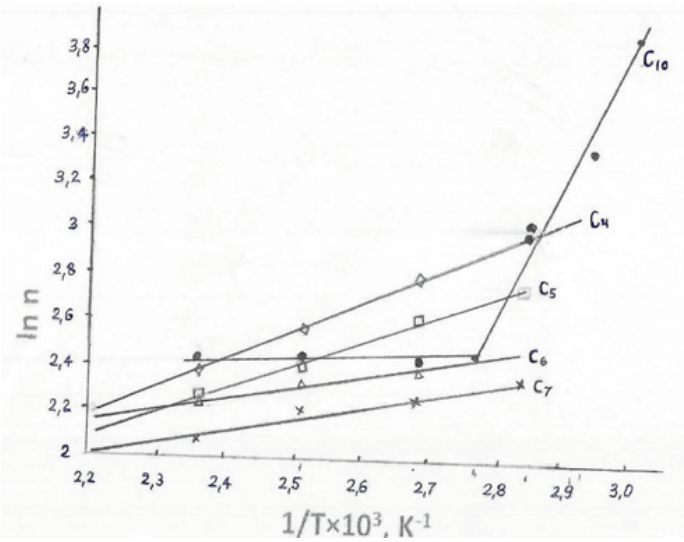

Figure 1: *Dependences of parameter n on temperature for alcohols C4-C7 /1/ and C 10 /2/ in Arrhenius coordinates.*

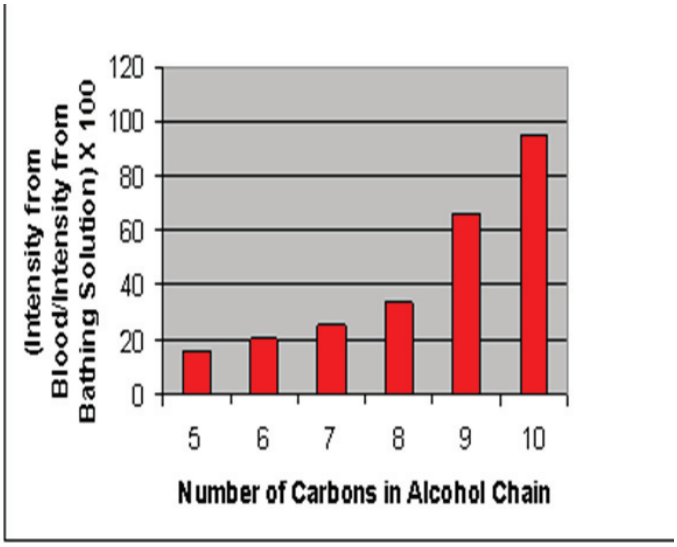

Figure 3: *Percent Alcohol Concentration in Goldfish.*

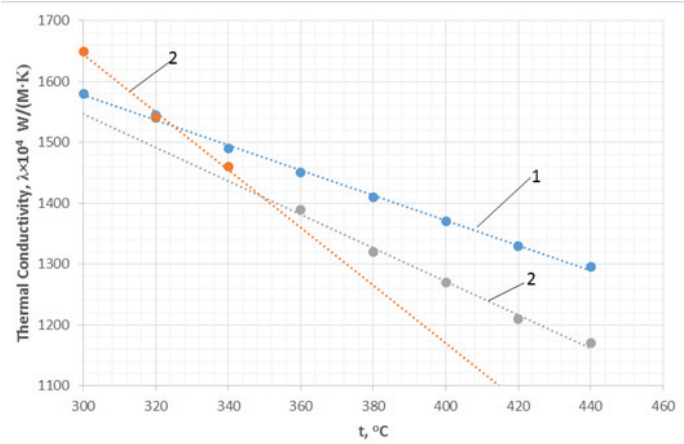

Figure 2: *The dependence of the thermal conductivity of alcohols C8 (1) and C10 (2) on the temperature / 3/.*