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# Solubility of Lobenzarit Disodium Salt

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The solubility of lobenzarit disodium salt (disodium 4-chloro-2,2′-iminodibenzoate) in water in the temperature range from 5 to 80 °C was determined. The time of dissolution of this salt in water was also studied.

## Introduction

Lobenzarit disodium salt, $C_{14}H_8ClNNa_2O_4$ (disodium 4-chloro-2,2′-iminodibenzoate) is used in rheumatoid arthritis with an immunomodulating mechanism of action (*1*, *2*). A few physicochemical properties of lobenzarit disodium salt have been reported (*3*), and in the case of solubility in water only one value at 20 °C is available (*3*). In this work the solubility in water for lobenzarit disodium salt in the temperature range 5−80 °C and the time to achieve equilibrium are measured.

## Experimental Section

Distilled water at pH 7.0 was used. The lobenzarit disodium salt was prepared following the procedure described by Pellón and co-workers (*4*, *5*). Lobenzarit disodium was verified from ultraviolet and infrared spectroscopy (*3*), and the purity (minimum 99.5 mass % of pure substance) was determined by nonaqueous titration and HPLC (*3*).

A mechanically stirred jacketed glass vessel (200 $cm^3$) equipped with a thermometer and reflux condenser and closed by an interchangeable glass plug was used for the solubility studies.

The temperature of the vessel was controlled by circulating thermostated water in the jacket, and it was constant and accurate to ±0.1 °C. The content of the vessel was stirred at 400 rpm. The mass of solid (about 8 g) was chosen to be in small excess relative to the highest estimated solubility in the chosen amount of water (100 g).

The salt concentration in aqueous solution is determined by an ultraviolet spectrometry method (ultraviolet−visible single beam spectrometer Unicam 8630 was used).

To evaluate the behavior of the salt dissolution process, two sets of experiments, at 5 and 80 °C, were carried out. At each temperature, samples of supernatant (1 $cm^3$) were withdrawn from the stirred vessel after elapsed times of 0.5, 1, 2, 3, 6, 12, and 24 h.

After equilibrium between saturated aqueous solution and the solid lobenzarit disodium salt in excess in the system (time approximately 24 h), the solubility at 5, 15, 25, 40, 60, and 80 °C was measured. Each value is an average of three repeat measurements with a relative error of less than 4%.

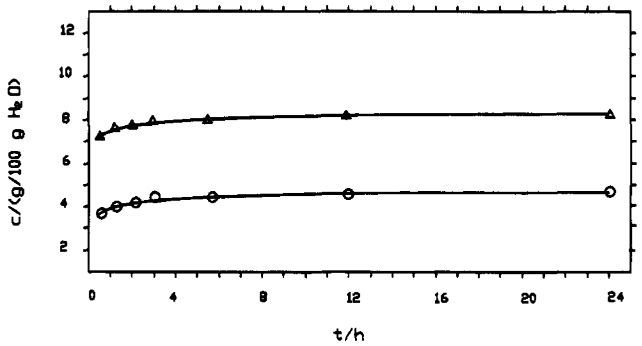

**Figure 1.** Variation of the concentration of lobenzarit disodium salt in water with time: ○, 5 °C; △, 80 °C.

**Table 1. Solubility ($C_s$) of Lobenzarit Disodium Salt in Water**

| $t$/°C | 5 | 15 | 25 | 40 | 60 | 80 |
|---|---|---|---|---|---|---|
| $C_s$/(g/100 g of water) | 3.65 | 3.81 | 4.41 | 5.05 | 5.51 | 7.26 |

## Results and Discussion

Figure 1 illustrates how the concentration of lobenzarit disodium salt in water changed during the dissolution process prior to reaching the equilibrium at 5 and 80 °C. The salt concentration at constant temperature gradually increases, and after approximately 12 h saturation is achieved; however, we established a time of 24 h to allow the equilibrium in the system before sampling for solubility studies.

The solubility for the system lobenzarit disodium salt + water increased with an increase in temperature. The experimental solubility results are reported in Table 1.

The solubility of lobenzarit disodium salt in water was correlated according to the equation

$$1/C_s = 0.280388 - 0.001786t \qquad (1)$$

where $C_s$ is the solubility of lobenzarit disodium (g/100 g of water) and $t$ is the temperature (°C). The correlation coefficient and the standard error of estimation of $1/C_s$ were 0.986 56 and $9.3987 \times 10^{-3}$, respectively.

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**Registry Numbers Supplied by Author.** $C_{14}H_8ClNNa_2O_4$, 64808-48-6.

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