If the experimental values of $(2H_\alpha)$ are plotted against the corresponding values of log a_w, the points fall nearly on a straight line with the fit of the line well within experimental error. Least-squares analysis yields for the line

$$(2H_\alpha) = 35.3_7 - 8.17_8 \log a_w \qquad (3)$$

The general equation for a straight line with coordinates $(2H_\alpha)$ and log a_w is

$$(2H_\alpha) = (2H_\alpha)^0 + S \log a_w \qquad (4)$$

where $(2H_\alpha)^0$ is the value of $(2H_\alpha)$ at log a_w = O, and S is the slope of the line. For any system, by definition

$$\mu_w - \mu_w{}^0 = 2.303\,RT \log a_w \qquad (5)$$

Combining Eqs. 4 and 5, we obtain Eq. 1; by substituting the values of $(2H_\alpha)^0$ and S from Eq. 3 into Eq. 1, we obtain Eq. 2.

The apparent optic axial angle $(2H_\alpha)$ depends on both $(2V_\alpha)$, the true optic axial angle of the crystal, and the refractive index of the medium in which the crystal is immersed. Thus, it is surprising that $(2H_\alpha)$, a property of the total system, should be related in such a simple manner to the chemical potential of water. Furthermore, for a system at equilibrium μ_w is everywhere the same, so that $(2H_\alpha)$ also is a measure of μ_w in the crystal.

We have also investigated a stellerite containing a small percentage of sodium ions. For this crystal the same straight-line relationship between $(2H_\alpha)$ and log a_w holds, although values of the equation constants are different.

It seems likely that Eq. 1 can be used to measure a_w in aqueous solutions either to establish thermodynamic properties or to monitor systems. Similar relationships may exist between the optic axial angle and the activity of a component in solid solutions for other systems.

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References and Notes

1. The optic axial angle measured in solution of known a_w is designated $(2H_\alpha)$ in contradistinction to the true optic axial angle $(2V_\alpha)$ and the apparent optic axial angle in air $(2E_\alpha)$.
2. Analysis was made by Sarah Neil, U.S. Geological Survey.
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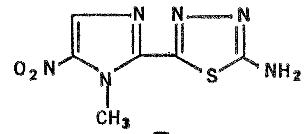
2-Amino-5-(1-methyl-5-nitro-2-imidazolyl)-1,3,4-thiadiazole: A New Antimicrobial Agent

Abstract. *The title compound has been prepared and shown to be highly active against a wide variety of gram-positive and gram-negative bacteria in mice and chicks, as well as against a number of parasitic infections in rodents.*

We have prepared a compound which we believe to be one of the most active synthetic, broad spectrum, antibacterial-antiparasitic agents known: 2-amino-5-(1-methyl-5-nitro-2-imidazolyl)-1,3,4-thiadiazole (I).



I

As a consequence of a program of synthesis (*1*) of novel nitroheterocyclic aldehydes and their elaboration into structures suggested by the antibacterial nitrofurans, structure I was prepared in 81 percent yield by the ferric ammonium sulfate oxidative cyclization of 1-methyl-5-nitroimidazole-2-carboxaldehyde thiosemicarbazone (*2*) in hot water. Recrystallized from dimethylformamide, the sample had a melting point of 270°–271°C; microanalysis for C, H, N, and S was satisfactory; and the nuclear magnetic resonance spectrum (dimethylsulfoxide-d_6) showed bands at τ 1.73 (singlet, ring H), τ 2.13 (broad singlet, NH_2), and τ 5.59 (singlet, CH_3).

In the chick, compound I was approximately equivalent to furazolidone orally against both *Salmonella gallinarum* and *Escherichia coli* and was highly effective against *Pasteurella multocida*. In the mouse, it was at least as effective as furazolidone orally against *Salmonella choleraesuis* and highly efficacious versus *Pasteurella multocida*. The median effective oral dose was less than 1 mg/kg against *Neisseria meningitidis* and between 10 and 90 mg/kg for *Klebsiella pneumoniae, Salmonella typhosa, Escherichia coli, Aerobacter aerogenes*, and *Shigella flexneri* infections in the mouse. It was highly effective against *Streptococcus pyogenes* and a number of strains of *Staphylococcus aureus*. In rodents, the agent was active against the following parasitic infections: *Trichomonas vaginalis, Entamoeba histolytica, Trypanosoma equiperdum, Trypanosoma cruzi*, and *Leishmania donovani*. Compound I was also active against *Eimeria tenella* in the chick at 125 parts per million in the diet.

Test results on a large number of analogs of compound I indicate that several types of structural changes can be made, including the substitution of an aminooxadiazole for the aminothiadiazole ring, with the retention of a substantial degree of biological activity.

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References and Notes

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Size-Detecting Mechanisms in Human Vision

Abstract. *Inspecting a pattern of alternating dark and light bars makes it difficult to see a similar pattern presented afterward. This phenomenon can be used to isolate mechanisms responsive to bars of a given width. Our results suggest that the human visual system contains several different classes of size detectors, each maximally sensitive to visual targets with sizes in a particular range.*

The ability to appreciate the size of an object is a basic visual perceptual function, and much research has been concerned with the indirect or higher-order processes contributing to this ability (*1*). We tried to determine whether, in addition to use of these indirect cues, the human visual system can directly encode the area of retinal images produced by objects of different sizes.

The observation of a pattern of alternating dark and light bars reduces the visibility of a similar pattern presented thereafter (*2*). This phenomenon may be exploited to isolate mechanisms responding to patterns whose bars are of a particular size. One measure of the size of a bar in a pattern of alternating light and dark bars is the number of such alternating pairs (or cycles) occupying a given area. This quantity is termed spatial frequency, with values expressed in number of cycles per degree (cycle/deg) of visual angle. In