SECTION C, PHYSICAL SCIENCES

Synthesis of New Schiff Bases as Antitumor Agents

ERNEST M. HODNETT and CHARLES E. CAPSHEW[1],

Oklahoma State University, Stillwater

Schiff bases prepared from salicylaldehyde have shown some activity against sarcoma 180, Lewis lung carcinoma, and L1210 leukemia of mice (Hodnett and Willie, 1966). It seemed appropriate to synthesize other aromatic azomethines in order to determine the effect of varying substituents on their biological properties. The compounds which have been prepared for the first time are listed in Table I with identifying characteristics.

The compounds were prepared in high yields by the reaction of an aromatic aldehyde with the appropriate arylamine under conditions described in the experimental section. The identity of each new compound was verified by elemental analysis and by ultraviolet and infrared absorption spectroscopy.

The wavelengths of maximum absorption in the ultraviolet of these compounds shown in Table I correspond closely to those found for other Schiff bases of salicylaldehyde and aromatic amines (Krasovitskii, Bolotin and Nurmukhametov, 1964). The C=N bond is a characteristic of all Schiff bases; the stretching frequencies of the C=N bond of these compounds are listed in Table I. The C=N stretching frequencies of other aromatic Schiff bases have been shown to be in the range 1613 — 1631 cm^{-1} near the normal aromatic band (Clougherty, Sousa, and Wyman, 1957).

Experimental Section

Preparation of Schiff bases—The appropriate aldehyde and amine were mixed in equimolar amounts in 95% ethyl alcohol denatured with methyl alcohol. The resulting dark-colored solution was refluxed for 0.5 to 1.5 hr, cooled, and filtered. The resulting crystals were recrystallized from alcohol to give the desired Schiff base in the yields shown in Table I. In some cases it was necessary to use absolute ethyl alcohol for the reaction in order to improve the yield.

Acknowledgement—We are grateful to Mrs. Laura Bruns and to Joseph Tai for the nitrogen assays and the absorption spectra.

[1]National Science Foundation Undergraduate Research Participant, Summer, 1967.

TABLE I. NEW SCHIFF BASES

$R^1CH{=}NC_6H_3R^2R^3$

R^1	R^2	R^3	Formula	Melt. Point,* °C.	Yield, %	Ultra-violet Absorp.,** mμ	Stretching Frequency† C=N, cm^{-1}	Nitrogen Calcd., %	Nitrogen Found, %
C_6H_5	2-OH	4-NO_2	$C_{13}H_{10}N_2O_3$	139-142	78	258	1615	11.56	11.46
2-HOC_6H_4	2-OH	4-NO_2	$C_{13}H_{10}N_2O_4$	218-219	97	308	1627	10.85	11.12
2-HOC_6H_4	2-OH	5-NO_2	$C_{13}H_{10}N_2O_4$	239-239.5	80	261	1628	10.85	10.85
4-$CH_3OC_6H_4$	2-OH	H	$C_{14}H_{13}NO_2$	131-132	57	283	1622	6.17	6.19
4-$CH_3OC_6H_4$	2-OH	4-NO_2	$C_{14}H_{12}N_2O_4$	162-163	80	263	1600	10.29	10.35
4-$CH_3OC_6H_4$	2-OH	NO_2	$C_{14}H_{12}N_2O_4$	161-162	91	263	1626	10.29	10.36
4-$CH_3OC_6H_4$	2-OH	5-Cl	$C_{14}H_{12}NO_2Cl$	87-88	94	283	1621	5.35	5.58
4-$(CH_3)_2NC_6H_4$	2-OH	H	$C_{15}H_{16}N_2O$	195-196	90	238	1625	11.67	11.61
2-C_5H_4N	4-OH	H	$C_{12}H_{10}N_2O$	193-186	82	285	1630	14.13	13.87
2-C_5H_4N	2-OH	5-NO_2	$C_{12}H_9N_3O_3$	195-196	74	258	1622	17.28	17.23

*Melting points were determined on a Fisher-Jones melting point apparatus and are uncorrected.

**All compounds were in CCl_4 solution; a Beckman Model DK spectrophotometer was used.

†All compounds were in KBr pellets; a Beckmann Model 11 spectrophotometer was used.

LITERATURE CITED

Clougherty, L. E., J. A. Sousa, and G. M. Wyman. 1957. C=N stretching frequency in infrared spectra of aromatic azomethines. J. Org. Chem. 22:462.

Hodnett, E. M., and W. Willie. 1966. Schiff bases of salicylaldehyde and their cobalt(II) derivatives as antitumor agents. Proc. Okla. Acad. Sci. 46:107-111.

Krasovitskii, B. M., B. M. Bolotin, and R. N. Nurmukhametov. 1964. Investigations in the series of azomethine bases. I. Structure and absorption spectra of salicylalanilines. J. Gen. Chem. U. S. S. R. 34:3837-3842. Translated from Zh. Obsh. Khim. 34:3786-3791.