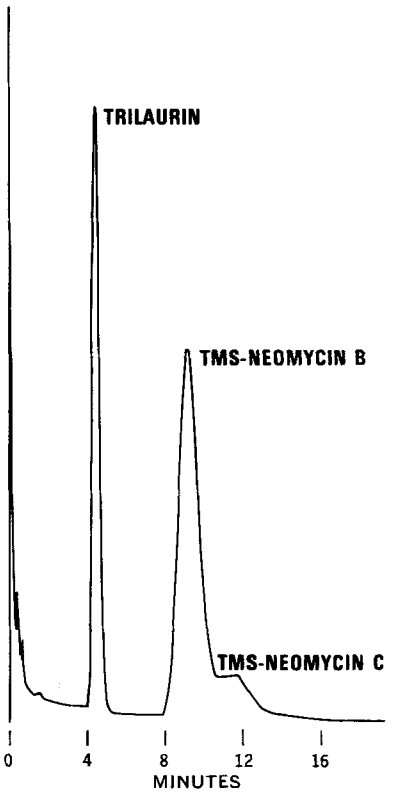

Figure 1—*Typical chromatogram of neomycin extracted from a topical ointment.*

the range of 3.0–4.6 mg. when a silylation mixture of 50 μl. of *N*-trimethylsilyldiethylamine in 1 ml. of TRI-SIL Z was used. The amount of *N*-trimethylsilyldiethylamine was found to be quite critical in obtaining a sharp symmetrical peak of trimethylsilyl-neomycin. If the amount of *N*-trimethylsilyldiethylamine was increased to 60 μl., a trailing shoulder on the neomycin peak was produced. Mass spectrometric data on the major trimethylsilyl-neomycin peak indicated all 13 sites on the neomycin molecule were silylated (3). It is possible that the trailing shoulder was due to silylation of an additional hydrogen of one or more nitrogen groups. Increasing the concentration of *N*-trimethylsilyldiethylamine or silylating reagent did not produce a single peak with the retention time of the shoulder. The amount of *N*-trimethylsilyldiethylamine must be determined experimentally if samples outside the range of 3.0–4.6 mg. neomycin base are to be analyzed.

A 3-day stability study at room temperature was conducted with trimethylsilyl-neomycin contained in sealed vials. The silylated samples were stable for 1 day at room temperature, with an estimated degradation of 3% after 8 hr. Degradation was characterized by the broadening of the trimethylsilyl-neomycin peak. Samples may be kept for longer periods with a minimum of degradation if they are refrigerated at 5° or placed at a freezer temperature of −18°. After 7 days at 5°, the trimethylsilyl-neomycin degraded 10%. After 7 days at −18°, 5% degradation was detected. The silylated samples must always be protected from moisture. Differences in the rate of degradation of neomycins B and C were not detectable.

The most reliable results were obtained with a 61-cm. (2-ft.) column packed with 3% OV-1 on Gas Chrom Q, 100-120 mesh. A 122-cm. (4-ft.) column of 3% OV-1 gave better separation of neomycins B and C, but the increased column temperature needed to chromatograph neomycin reduced column life, with a higher frequency of repair of the gas chromatograph. Increasing column adsorption was noted with 2% OV-1 or less. Column life using the 61-cm. (2-ft.), 3% OV-1 column is around 3 months.

REFERENCES

(1) "Code of Federal Regulations, Title 21, F.D.A.," U. S. Government Printing Office, Washington, D. C., 1967, pp. 67, 71.

(2) K. Tsuji, J. H. Robertson, R. Baas, and D. J. McInnis, *Appl. Microbiol.*, **18**, 396(1969).

(3) K. Tsuji and J. H. Robertson, *Anal. Chem.*, **41**, 1332(1969).

ACKNOWLEDGMENTS AND ADDRESSES

Received January 18, 1971, from the *Control Research and Development Department, The Upjohn Co., Kalamazoo, MI 49001*

Accepted for publication March 18, 1971.

The authors thank A. R. Lewis for the statistical evaluation of the data.

Cathode Ray Polarography of Riboflavin, Thiamine Hydrochloride, and Niacinamide Content of Pharmaceutical Preparations

M. E. SCHERTEL and A. J. SHEPPARD*

Abstract □ A polarographic method for the determination of riboflavin, thiamine hydrochloride, and niacinamide in multivitamin preparations was evaluated. Distinct polarographic waves of the three vitamins from single extracts were obtained after adjusting the pH to 5.7–6.0. Polarographic results were compared with official chemical analyses. Results indicate that the polarographic method has potential for rapidly screening the vitamin content of multivitamin preparations.

Keyphrases □ Riboflavin, thiamine HCl, niacinamide in dosage forms—determination □ Multivitamin products—riboflavin, thiamine HCl, niacinamide determination □ Polarography, cathode ray fast sweep—analysis

Several investigators described the basic design, application, and advantages of single-sweep cathode ray polarography (1, 2). Several polarographic methods for vitamins require solutions between pH 7 and 10 because of the interference from hydrogen and its catalytic wave in acid solution, especially with thiamine and niacinamide (3–7). In preliminary studies, using conventional polarography, waves of several vitamins in

a dilute KCl extracting solution, pH 5.7–6.0, were resolved and measured from a single extract in the presence of foreign substances extracted along with the vitamins from commercial preparations in the authors' laboratory. This latter method used 0.05 *M* KCl as both extracting solution and base electrolyte for polarography of thiamine hydrochloride ($B_1 \cdot HCl$), riboflavin (B_2), and niacinamide in a single determination. Stability tests with standard solutions indicated that these vitamins were all stable in the boiling 0.05 *M* KCl used in this latter method. The pH range of 5.7–6.0 is more advantageous than the higher pH range previously used because B_1 and B_2 are more stable in acid solution. Also, this procedure forms a basis for possible determinations of three of the B vitamins in a single extract.

This study deals with the application of the single-sweep cathode ray polarograph combined with a 0.05 *M* KCl extraction–electrolyte system for the analysis of $B_1 \cdot HCl$, B_2, and niacinamide in pharmaceuticals. Data are presented regarding the general performance and operating characteristics of the instrument under the conditions imposed during this investigation.

EXPERIMENTAL

Apparatus—A twin-cell Davis differential cathode ray polarograph[1] was used. The instrument was equipped with a dropping mercury electrode, a mercury pool, and an oscilloscope camera[2].

Reagents—USP reference standards of thiamine hydrochloride, riboflavin, and niacinamide were used. All other reagents (analytical grade) were used without further purification. The samples were standard Triasyn B and hexavitamin NF pharmaceutical products and one miscellaneous formulation, all available on the open market. The NF samples were from different manufacturing lots representing three different manufacturing sources.

Standard Solutions—*Polarography*—Thiamine and niacinamide standard solutions were prepared by dissolving 50 mg. of thiamine hydrochloride or niacinamide in 40 ml. of 0.05 *M* KCl; the pH was adjusted to 5.7–6.0 with 0.2 *M* KOH, and the solution was diluted to 50 ml. with 0.05 *M* KCl. Each milliliter of the final standard solution contained 1000 mcg. of vitamin.

The riboflavin standard solution was prepared by dissolving 50 mg. of riboflavin in 100 ml. of 0.1 *M* HCl by heating in an autoclave at 121° for 20 min. The pH of the digest was adjusted to 5.7–6.0 with 2 *M* KOH and diluted to 200 ml. with 0.05 *M* KCl. Each milliliter of the final standard solution contained 250 mcg., which is about the practical limit of solubility for riboflavin.

Chemical Assays—The standards for the chemical assays were prepared according to official methods as follows: thiamine, USP (8); riboflavin, AOAC[3] (9); and niacinamide, AOAC (10).

Sample Preparation—Tablets, capsules, and liquid samples were dissolved in 100 ml. of boiling 0.05 *M* KCl. Once the sample dissolved (usually within 20 min.), the pH was adjusted to a final pH of 5.7–6.0 with 0.2 *M* KOH. If solids were a problem, they were removed by passing the solution through double-washed, medium filter paper[4] before adjusting the pH. Generally, the filtration step was not necessary. The final dilution with 0.05 *M* KCl was made so that the assay solution contained the minimum concentration to give a usable wave based on the label claim for the lowest ingredient of interest, which was thiamine in all of the products used in this study; *i.e.*, 30–45 mcg. of riboflavin, 20 mcg. of thiamine, or 20 mcg. of niacinamide per ml.

Polarography—Five milliliters of sample solution (pH 5.7–6.0) was added to each of three cells. When measuring thiamine or niacinamide, 0.05–0.2 ml. of standard solution was added to Cells 2 and 3, respectively. In the riboflavin analysis, 0.50 and 1.0 ml. of the standard solution were added to Cells 2 and 3, respectively. The three cells were deaerated with water-pumped high purity nitrogen for 8 min. The dropping mercury electrode was lowered into the cell solution, deaerated 1 additional minute, and polarographed. The sweep was from −0.0 to −0.5 v. *versus* the mercury pool reference electrode for riboflavin, with a peak potential of −0.30 ± 0.05 v. The next sweep was from −1.0 to −1.5 v. *versus* the mercury pool reference electrode for thiamine, with a peak potential of −1.25 ± 0.5 v. The final sweep was from −1.5 to −2.0 v. *versus* the mercury pool reference electrode for niacinamide, with a peak potential of −1.65 ± 0.5 v. The temperature was maintained at 25 ± 1°. Sensitivity settings and slope compensation were adjusted for proper wave height and shape, respectively.

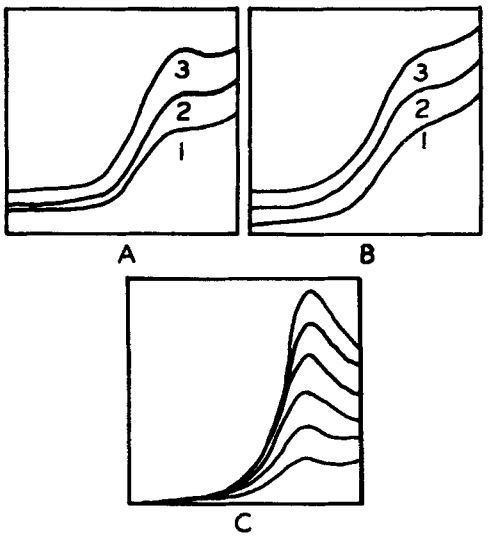

Figure 1—*Polarograms of niacinamide from a multivitamin sample extract (A1 and B1); extract plus 10 mcg. of niacinamide/ml. (A2 and B2); and extract plus 20 mcg. of niacinamide/ml. (A3 and B3). The sample was diluted with 0.05 M KCl to about 20 mcg. of niacinamide/ml. (estimation based on declared value). C shows six exposures of 10-mcg./ml. increments of niacinamide standard ranging from 10 to 60 mcg./ml. on one film. Slope setting is 60 for A and 0 for B and C.*

Three waves, representing the sample (Cell 1), sample + standard (Cell 2), and sample + standard (Cell 3; standard concentration twice that in Cell 2), were photographed[5] by triple exposure on one film at a setting of 0.2 sec. and between lens opening f5.6 and f8 with 3000 speed, 10-sec. developing time. As many as six exposures were satisfactorily developed on a single print (Fig. 1C); in this case, the brilliance of the cathode ray trace was adjusted at about midpoint on the scale to prevent overexposure of the film, and the screen lighting switch was set on visual.

The wave heights were then measured from the photographs or directly from the oscilloscope screen as the differences between the top and bottom of the wave on the vertical scale. Sample concentrations were then calculated from the direct proportion between the wave height of the sample alone and the wave height contribution by the internal standard, allowing for a slight volume correction as a result of the standard addition.

RESULTS AND DISCUSSION

A single cell was used with the Davis differential cathode ray polarograph. The standard addition method was used throughout the procedure described in this study. It is suitable when the preparation of a calibration curve would be too time consuming. It is especially useful for biological fluids that cannot be obtained vitamin free and for commercial samples of unknown composition, such as those analyzed in these experiments. Standard and sample can be analyzed in about the same medium. Except where designated otherwise, 0.05 *M* KCl (pH 5.7–6.0) was used as the supporting electrolyte.

Figure 1 shows typical niacinamide waves at slopes 60 (A) and 0 (B), obtained from an extract of a Triasyn B capsule. The wave

[1] Type A 1660, The Bendix Corp., Cincinnati, OH 45241
[2] Fairchild Polaroid model F-286.
[3] Association of Official Agricultural Chemists.
[4] Schleicher & Schüll No. 589, White Ribbon.
[5] Polaroid Land Pictures Roll (film).

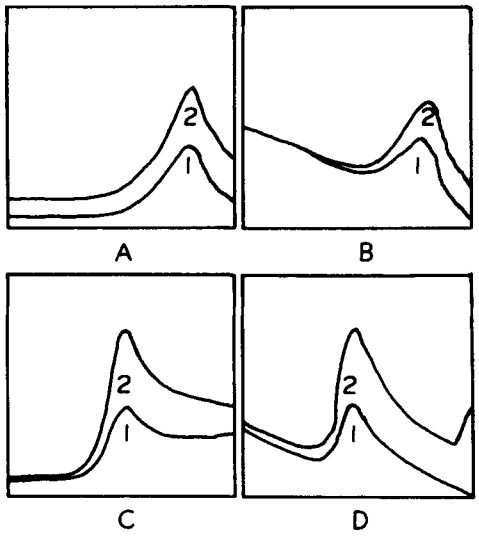

Figure 2—*Polarograms of 25 and 50 mcg. of riboflavin standard/ml. in 0.05 M KCl at slope 0 (A1 and A2, respectively); 25 and 50 mcg. of riboflavin standard/ml. in 0.05 M KCl at slope 60 (B1 and B2, respectively); 10 and 20 mcg. of Cd^{+2}/ml. in 1 M HCl at slope 0 (C1 and C2, respectively); and 10 and 20 mcg. of Cd^{+2}/ml. in 1 M HCl at slope 60 (D1 and D2, respectively).*

heights can be accurately read at slope 60. No slope adjustment was required to obtain the six exposures on a single film (C), which represent six amounts of niacinamide standard from 10 to 60 mcg./ml. in 10-mcg./ml. increments.

The curves of sample plus standard (concentration *versus* wave height) did not always pass through zero in these experiments. This was true even of the standard curves of some vitamins in pure electrolyte. As shown in Fig. 2A, doubling the concentration of riboflavin standard did not precisely double the wave height. However, with the slope compensator properly adjusted, the standard curve (concentration *versus* wave height) obtained by the standard addition method could be made to pass approximately through zero (Fig. 2B). The tendency was to obtain high results when the slope compensator was at zero. Figure 3 also illustrates the wave changes effected by adjusting the slope compensator. Thiamine showed a double wave in pure electrolyte (C and D) and a single wave in impure extract (A and B).

Figure 4 shows graphically the relationship between the slope setting and the calculated value of thiamine in an unknown Triasyn B formulation by the standard addition method. According to the

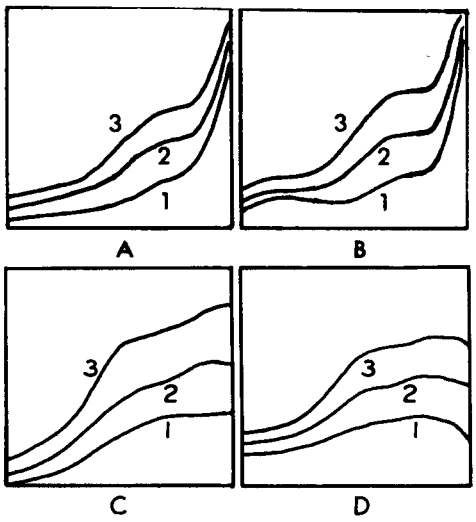

Figure 3—*Polarograms of thiamine HCl. A and B are sample extracts (Curve 1), sample extract plus 10 mcg. (Curve 2), and sample extract plus 20 mcg. (Curve 3). Concentrations are 20, 40, and 60 mcg./ml. in C and D for waves 1, 2, and 3, respectively. Slope settings are 0 for A and C, 15 for B, and 20 for D.*

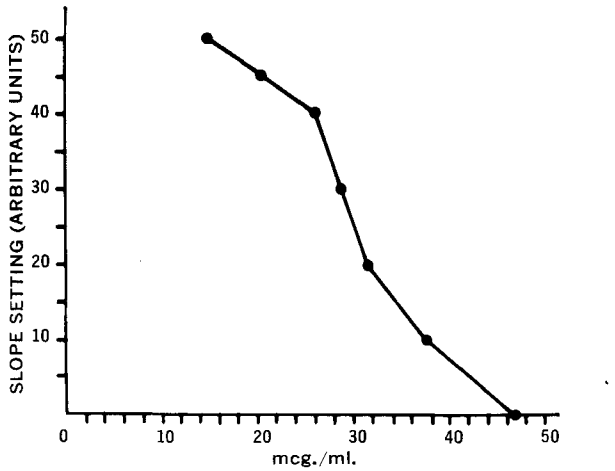

Figure 4—*Results of polarographic assays of thiamine by the standard addition method at various slope settings. The sample concentration was 25.8 mcg. of thiamine/ml. of extract of Triasyn B capsules (according to the USP fluorometric assay). The best empirical setting is found in the steep portion of the curve.*

fluorometric assay, this sample extract should contain 25.8 mcg./ml. An intermediate slope setting gave a comparable polarographic value, while slope settings higher or lower gave unrealistic results when measuring the waves as described previously. The wave heights at lower slope settings could not be read accurately due to poorly shaped waves. Any change in sensitivity and/or slope setting, type of compound assayed, concentration of the compound, and background interference altered the configuration of the graph in Fig. 4 and the shape of the polarographic waves. Wave shape and the polarographic behavior of each vitamin in pure electrolyte differed from those in the same electrolyte containing extracted sample materials.

Under certain polarographic conditions, a slope setting of 0 was satisfactory. In Fig. 2C, for example, the concentrations of 10 and 20 mcg. Cd^{+2}/ml. in 1 *N* HCl are directly proportional at slope 0, but a slight divergence from proportionality is noted at slope 60.

Figure 5 shows polarograms of thiamine hydrochloride present in two batches of the same formulation (Samples E and F). The lack of thiamine in Fig. 5A indicates that it may have decomposed during storage. Both the chemical and polarographic results indicate that this vitamin also may have partially decomposed in other samples.

Slope compensation was usually needed to produce waves with well-defined crests for accurate measurement, with the exception of riboflavin whose waves were well defined at slope 0. In most assays, well-shaped waves were produced for all three vitamins except in the presence of excessive interference. The thiamine wave was not resolved with the sugar-coated, chocolate-flavored Triasyn B tablets and the hexavitamin tablets, and niacinamide was not resolved in the same hexavitamin assay. In five other cases, waves for all three vitamins could be resolved and measured. It should be emphasized that changing the slope setting appears to change the calculated values when assaying by standard addition.

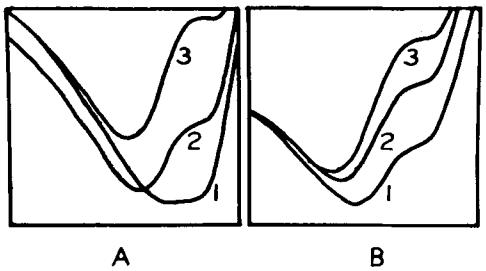

Figure 5—*A and B represent two separate batches of Triasyn B tablets. A1 shows that no thiamine is present, and B1 shows that an appreciable amount is present. Key: A2 and B2, addition of 10 mcg. of thiamine/ml.; and A3 and B3, addition of 20 mcg. of thiamine/ml. Slope setting is 40.*

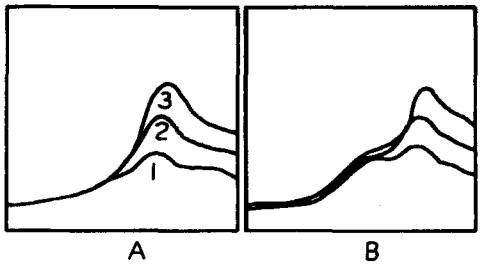

Figure 6—*Polarograms of riboflavin at slope 0. Key: A1, multiple-vitamin sample extract (about 45 mcg./ml.); A2, addition of 25 mcg. of riboflavin/ml.; and A3, addition of 50 mcg./ml. B shows that adsorption prewave height did not change significantly with two increments of standard added internally to sample extract.*

Figure 6B shows the only case in this investigation in which a double riboflavin wave occurred, the prewave being an adsorption wave (4, 7). The height of the adsorption wave remained constant with added increments. The riboflavin wave was displaced about 0.2 v. toward zero potential, possibly indicating some electrode interaction with the sample impurities. The three riboflavin waves in Fig. 6A are typical of most other riboflavin assays at slope 0. The assay results were slightly lower when the peak voltage was displaced.

Figure 7 demonstrates a timesaving step which may be of practical value. Four Triasyn B capsules were extracted and diluted to 400 ml. (See *Sample Preparation.*) In this experiment, the three waves were produced consecutively from a single 5-ml. aliquot by selecting appropriate slope settings, starting voltages, and sensitivity settings in each case and were exposed consecutively on a single frame.

Increasing or decreasing the sample concentrations served no apparent advantage. A silver chloride anode gave about the same

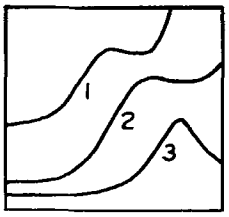

Figure 7—*Polarograms of: 1, 20 mcg. of thiamine hydrochloride/ml.; 2, 200 mcg. of niacinamide/ml.; and 3, 30 mcg. of riboflavin/ml. from one 5-ml. aliquot of an extract of Triasyn B capsules.*

results as the mercury pool anode. Some observations encountered in these experiments may be unique for this type of polarography, arising, for example, from the change in drop area of the mercury cathode during voltage sweep and current interferences.

The results of polarographic and official chemical analysis of thiamine hydrochloride, riboflavin, and niacinamide content of commercially available multivitamin preparations are summarized in Table I. The interference produced by the sugar caused polarography difficulties, precluding the determination of thiamine in Samples B and D. Additional sample clean-up techniques must be developed before samples containing sugar can be analyzed for thiamine by polarography. Another complicating factor is that the described polarographic method does not respond well to thiamine mononitrate, which was the thiamine form present in Sample D. No usable signal could be obtained on Sample D for niacinamide due to unknown interferences.

An analysis of variance was used to evaluate the data obtained by the two methods. The mean values for thiamine, riboflavin, and niacinamide were 1.27:3.48, 3.32:3.68, and 20.20:21.07, respectively, for the polarographic and chemical methods. The within-sample variations for thiamine, riboflavin, and niacinamide were 0.10:0.11, 0.10:0.40, and 0.78:0.71, respectively, for the polarographic and chemical methods. A statistically significant ($p < 0.01$) interaction occurred for riboflavin and niacinamide between formulations and methods. There was no statistical significant difference ($p < 0.05$) between the polarographic and chemical method means for ribo-

Table I—Comparison of Data Obtained Polarographically and Chemically for Seven Vitamin Formulations

Formulation	Vitamin	Found, mg./Capsule or Tablet					
		Polarographic			Chemical		
		S[a]–1	S–2	$\bar{X}$[b]	S–1	S–2	$\bar{X}$[b]
A							
Triasyn B (gelatin capsules)[c]	B_2	3.17	3.19	3.18	3.55	3.64	3.60
	B_1	1.97	1.92	1.95	2.57	2.60	2.59
	Niacin	21.2	19.5	20.4	21.0	20.0	20.5
B							
Triasyn B (sugar-coated, chocolate-flavored tablets)	B_2	4.25	4.23	4.24	4.02	4.07	4.05
	B_1[d]	—[e]	—	—	2.00[f]		
	Niacin	20.2	20.8	20.5	23.8	22.6	23.2
C							
Triasyn B (gelatin capsules)	B_2	2.98	3.17	3.08	3.41	3.66	3.54
	B_1	0.49	0.52	0.51	0.95	0.96	0.96
	Niacin	22.3	20.9	21.6	20.4	21.6	21.0
D							
Hexavitamin tablets NF (sugar-coated)	B_2	2.72	2.89	2.81	3.52	3.80	3.66
	B_1[d]	—[e]	—	—	2.10[f]		
	Niacin	—[e]	—	—	18.8	19.8	19.0
E							
Triasyn B (gelatin capsules)	B_2	3.92	3.89	3.81	3.84	3.75	3.80
	B_1	1.43	1.45	1.44	1.98	1.98	1.98
	Niacin	26.9	26.0	26.5	21.2	20.8	21.0
F							
Triasyn B (gelatin capsules)	B_2	3.33	3.14	3.24	3.45	3.45	3.45
	B_1	0	0	0	0.37	0.40	0.39
	Niacin	19.5	18.4	19.0	18.2	18.2	18.2
G							
Liquid, orange-flavored, multivitamin formula[g]	B_2	2.91	2.75	2.83	3.78	3.64	3.71
	B_1	2.28	2.60	2.44	2.84	2.73	2.79
	Niacin	20.3	20.4	20.4	21.8	23.2	22.5

[a] Subsamples. [b] Mean. [c] Triasyn B NF formulations contain 20 mg. of niacinamide, 2 mg. of B_1, and 3 mg. of B_2/capsule or tablet. [d] B_1 as mononitrate. [e] No usable signal obtained due to interferences. [f] Single analysis run to determine presence of B_1. [g] Non-NF formulation containing 3 mg. of B_1, 3 mg. of B_2, 1 mg. of B_6, 20 mg. of nicotinamide, 5 mg. of pantothenic acid, 5 mcg. of B_{12}, 1.5 mcg. of A, 50 mg. of C, and 25 mcg. of D/5 ml.

flavin and niacinamide. The high degree of interaction between formulations and methods probably accounts for the inability to detect any significant differences between the method means of riboflavin and niacinamide. However, the thiamine method means were significantly different ($p < 0.01$) from the chemical method, giving a consistently higher result. These higher results may be due to a reagent or background blank not detected by the polarographic procedure, as indicated in Sample F where no thiamine was found by the polarographic method but 0.4 mg. was found by the chemical procedure. By assuming that the 0.4 mg. was a background blank and subtracting this value from the chemical result obtained on all samples, good agreement with the polarographic data is obtained.

CONCLUSIONS

It was established that it is possible to detect and analyze most multivitamin pharmaceutical preparations for their riboflavin, thiamine hydrochloride, and niacinamide content by cathode ray fast sweep polarography. Preliminary results indicate that the cathode ray fast sweep polarographic instrumentation is adaptable and has several readily apparent advantages for the analysis of multivitamin products containing riboflavin, thiamine hydrochloride, and niacinamide. Some problems and their subsequent solution associated with the utilization of this type of analytical instrumentation are provided. The method appears to have an excellent potential for becoming a practical analytical routine with further refinements.

REFERENCES

(1) R. C. Rooney, "The Principles and Applications of Cathode-Ray Polarography," Southern Analytical Limited, Camberly, Surrey, England, 1962.

(2) "Davis Differential Cathode-Ray Polarotrace Type A1660 Equipment Handbook," The Bendix Corp., Cincinnati, OH 45241

(3) G. P. Tikhomirova, S. L. Belen'kaya, R. G. Madievskaya, and O. A. Kurochkina, *Vop. Pitan.*, **24,** 32(1965); through *Chem. Abstr.*, **62,** 12978e(1965).

(4) M. Brezina and P. Zuman, "Polarography in Medicine, Biochemistry and Pharmacy," Interscience, New York, N. Y., 1958, p. 389.

(5) R. Strohecker and H. M. Henning, "Vitamin Assay, Tested Methods," Verlag Chemie, G.m.b.H. Weinheim/Bergstr., Germany, 1965, pp. 80, 116.

(6) G. W. C. Milner, "The Principles and Applications of Polarography and Other Electronanalytical Processes," Wiley, New York, N. Y., 1958, p. 596.

(7) I. M. Kolthoff and J. J. Lingane, "Polarography," vol. 1, Interscience, New York, N. Y., 1965, p. 256.

(8) "The United States Pharmacopeia," 17th rev., Mack Publishing Co., Easton, Pa., 1965, pp. 888, 889.

(9) "Official Methods of Analysis," 10th ed., Association of Official Agricultural Chemists, Washington, D. C., 1965, sections 39.033–39.036.

(10) *Ibid.*, sections 39.037 and 39.039.

ACKNOWLEDGMENTS AND ADDRESSES

Received October 2, 1970, from the *Division of Nutrition, Food and Drug Administration, Washington, DC 20204*

Accepted for publication March 4, 1971.

The authors acknowledge the technical advice and assistance of Miss Janet A. Springer, mathematical statistician, Bureau of Foods and Pesticides, Food and Drug Administration.

*To whom all reprint requests should be addressed.

GLC Analysis of Multicomponent Suppository Formulations

A. COMETTI, G. BAGNASCO, and N. MAGGI

Abstract □ A GLC procedure for drug assay in commercial suppositories is described. Aminophenazone, *d*-propoxyphene hydrochloride, caffeine, chlorpheniramine maleate, lidocaine, phenacetin, fenalamide, and sodium benzoate were determined, in various associations, in three types of suppositories. Simultaneous determinations of up to five components were performed on the following columns: Column A, a mixed column of 2% polyethylene glycol (20,000) + 2% methyl silicone gum rubber on silanized diatomite impregnated with 5% KOH; Column B, a column of methylvinyl silicone gum rubber on silanized diatomite; and Column C, a mixed column of 0.4% isophthalic acid + 0.25% polyethylene glycol (20,000) on glass beads. The sample preparation procedure involves only a dissolution step. Precision and accuracy, calculated on simulated suppository preparations, were satisfactory.

Keyphrases □ Suppositories, commercial—GLC drug assay □ Antipyretic drug assay, suppositories—GLC □ Drug assay, multicomponent suppositories—GLC method □ GLC—analysis

It is well known that drug assay in suppositories following the classical techniques (*e.g.*, spectrophotometric and colorimetric methods) is cumbersome and often leaves much to be desired, both in accuracy and precision, due to interference of the excipients and other additives. It seemed particularly desirable to have a rapid, specific, and precise technique, such as GLC, for the assay of some suppository formulations marketed for the symptomatic treatment of the common cold and related diseases. According to the different formulations, the main antipyretic drug is either alone or, more often, associated with antihistamines and/or analgesics and other components (*e.g.*, sulfa drugs and caffeine).

Few papers have been published concerning the determination of active ingredients in suppositories by GLC (1–4). Reportedly, only single-drug (chlordantoin, 7-chlor-4-hydroxyindan, vitamin K_3, and prenylamine) determinations in single- (1, 2) and dual- (3, 4) component suppositories are performed. In the present report, data are presented regarding the GLC assay of suppositories containing: (Type I) aminophenazone in association with sodium sulfadimethoxine (not determined); (Type II) chlorpheniramine maleate, *d*-propoxyphene hydrochloride, lidocaine, and caffeine in association with paracetamol and calcium urea acetylsalicylate (not determined); and (Type III) aminophenazone, phenacetin, chlorpheniramine maleate,