

MICROGRAM

BUREAU OF NARCOTICS AND DANGEROUS DRUGS / U.S. DEPARTMENT OF JUSTICE

Vol. I, No. 10 Edited by Investigative Services Branch Sept., 1968

Hawaiian Baby Wood Rose and Morning Glory Seeds

Baby Wood Rose (Argyreia) and the related Morning Glory (Ipomoea) belong to the Convolvulaceae. Species and varieties of both have shown the presence of ergoline alkaloids.

Recently, we have received several queries about the use of the seeds of these plants by the drug abuser.

The flower of the Wood Rose contains four seeds, and the abuser may use from four to twelve seeds. He scrapes off the outer coating of the seeds before chewing them, or taking them in a capsule. He may take Dramamine or some other antinauseant at the same time, to try to prevent nausea.

Morning glory seeds, usually "Heavenly Blue" or "Pearly Gates" have been abused for a number of years. Reportedly about 350 seeds, or approximately one pound, will make about 25 doses. The abuser washes the seeds to remove pesticides, grinds the seeds in a pepper mill and puts the powder in gelatin capsules. He may soak the powder in cold water for about 45 minutes, then squeeze out the liquid from the mash and drink it.

Micro-Gram, Vol. I, No. 4 contains some information, with references, on these plants and the lysergic acid amide found in them.

The following references may also be of value:

Marderosian, Ara Der, "Psychotomimetic Indoles in the Convolvulaceae," Amer. Jour. Pharm. January-February, 1967, 19-25.

Hylin, J.W., and Watson, D.P., "Ergoline Alkaloids in Tropical Wood Roses," Science, 148, 499-500 (1965)

Rice, W.B., and Genest, K., "Acute Toxicity of Extracts of Morning Glory Seeds in Mice," Nature, 207, 302-303 (July 17, 1965).

CAUTION: Use of this publication should be restricted to forensic analysts or others having a legitimate need for this material.

Clandestine Laboratories

Our Agents have raided over 80 clandestine drug producing "laboratories," in the past two years. These "laboratories" had a combined potential for producing drugs that staggers the imagination.

A recent raid by police in a Western city closed down a laboratory which used a battery of galvanized garbage cans as cooling jackets; was well stocked with laboratory equipment, including an Ainsworth balance; had scores of books and library reprints; and the chemist maintained a detailed notebook, like any good legitimate chemist would. A clue to the size of the operation is the fact that some solvents were bought in 55 gallon drums.

Tetrahydrocannabinol (THC)

We have reports that THC is allegedly being sold in various parts of the country. Our Agents have purchased capsules which were promoted as THC, however, on analysis, these have proven to be some other drug, the most recent being phencyclidine, HCl.

We know that the illicit producers are interested in THC, because several of the raided labs have contained literature on the synthesis of THC, as well as chemicals which could be used in that synthesis. Reprints of "Total Synthesis of...Tetrahydrocannabinol, a Biologically Active Constituent of Hashish (Marijuana)" J. Am. Chem. Soc., 89 17 (August 16, 1967) is being advertised for sale as the "Legal Hash Formula" in the underground press.

The Attorney General has proposed that synthesized tetrahydrocannabinols be placed under control. The initial proposal was published in the Federal Register July 9, 1968, and a reprint is attached. The final order was published August 21, 1968 (33 FR 11814). The effective date bringing THC under control will be September 22, 1968, unless objections arise to the proposal.

Changes to "Comprehensive list of DACA drugs" (Micro-Gram Vol. 1, No. 7)

ADD:

Nembu - Donna $\frac{1}{2}$ (Abbot)
Desbutal (Abbot)

DELETE

Dex Ob (Burroughs-Wellcome)
Pama (Conal)

CHANGE

Hy-Val-Flora
w/Phenobarbital (Warren-Teed)

"IDENTIFICATION OF STP"

Albert R. Sperling

Division of Pharmaceutical Sciences
Food and Drug Administration

In the analysis of STP (2,5,dimethoxy,-4 methyl amphetamine) tablets by the method of Alexander (1), the material is identified by scanning the infrared spectrum of the free base. A problem has arisen however, in obtaining reproducible spectra from the free base, due to an inability to obtain the free base in a crystalline form. Most of the material was amorphous and the small amount that was crystalline was also polymorphic, thus giving different spectra each time an analysis was performed. The hydrochloride salt on the other hand is a highly crystalline material and the optical properties are constant and dependable.

It is therefore recommended that the infrared identification be performed on the hydrochloride salt. This can be prepared by simply dissolving the free base in 2 ml of methanol, adding one drop of concentrated hydrochloric acid and evaporating to dryness. The hydrochloride salt thus formed gives constant reproducible spectra.

On very rare occasions it may be necessary to treat the salt with a mixture of chloroform (1 part), heptane (3 parts) and again evaporate to dryness.

(1) T. G. Alexander, Microgram 1 (No. 1) November, 1967

ANALYSIS AND IDENTIFICATION OF N-METHYL-3-PIPERIDYL
BENZILATE (LBJ, JB 336)

Paul DeZan and Richard Fox
New York District
U.S. Food and Drug Administration

Physical Properties:

Hydrochloride - white powder
Molecular Weight - 361
Melting Point -214 - 217°C (decomposition)
Free Base - Clear Liquid
Molecular Weight - 325

Ultraviolet Absorption Spectrum:

Maxima - 257, 251, 261, 263 mu.
Concentration - 45.6 mgs. per 100 mls of 0.1N HCl
Abs. 257 - 0.613
 $E_{1\%}^{1\text{cm}}$ - 13.4

Infrared Absorption Spectrum:

Both the hydrochloride and the free base exhibit strong bands at 1745 cm^{-1} and 1210 cm^{-1} characteristic of ester stretching frequencies.

Spot Test:

Place a small amount of sample powder in a spot plate. Add a few drops of Marquis Reagent. LBJ gives a blue color with this reagent.

Sample Preparation:

Weigh, accurately, one half dosage unit (usually equivalent to 3-8 mgs of LBJ). Transfer to a separatory funnel containing about 10 mls of 0.1N HCl. Extract with three 5 ml portions of chloroform. Discard the chloroform extracts. Add sufficient 1N NaOH to render the aqueous solution basic to litmus paper. Extract with two 10 ml and one 5 ml portions of chloroform. Evaporate the combined chloroform extracts almost to dryness on a steam bath with the aid of a current of air, leaving a clear liquid residue of the free base.

A) Determination by Ultraviolet Spectrophotometry:

Dissolve the residue in 0.1N HCl and transfer quantitatively to a 10 ml volumetric flask. Scan the solution on a recording UV spectrophotometer from 300 m μ to 240 m μ , comparing the resulting spectrum to that of a standard. Utilize the 257 m μ peak for quantitation.

B) Determination by Infrared Spectrophotometry (Alternate Procedure)

To the residue add 1.0 ml of chloroform. Immediately transfer the solution into a 1.0 mm liquid IR cell. Scan from 1900 cm⁻¹ to 1550 cm⁻¹ on a recording IR spectrophotometer and compare to a standard of similar concentration (ca 4 mgs/ml). Quantitation is based on the peak at ca. 1725 cm⁻¹ using base line technique.

(NOTE: Solution remaining from either determination can be reextracted, or reevaporated to dryness and used for identification).

C) Identification by Infrared Spectrophotometry:

To the free base add a few drops of conc. HCl. Evaporate on a steam bath to dryness. Prepare a KBr disc of the dry residue. Obtain the infrared absorption curve and compare to that of a standard curve.

D) Identification by Thin Layer Chromatography:

Adsorbent	-Silica Gel G (250u) prepared according to Stahl on 20 x 20 cm glass plates.
Mobile Solvent	-Chloroform: Acetone: conc. Ammonium Hydroxide (80 : 20 : 1)
Chromogenic Reagent	-Iodoplatinate solution -10 mls of 10% platinum chloride to which is added 250 mls of 4% potassium iodide, the mixture being diluted to 500 mls with water.

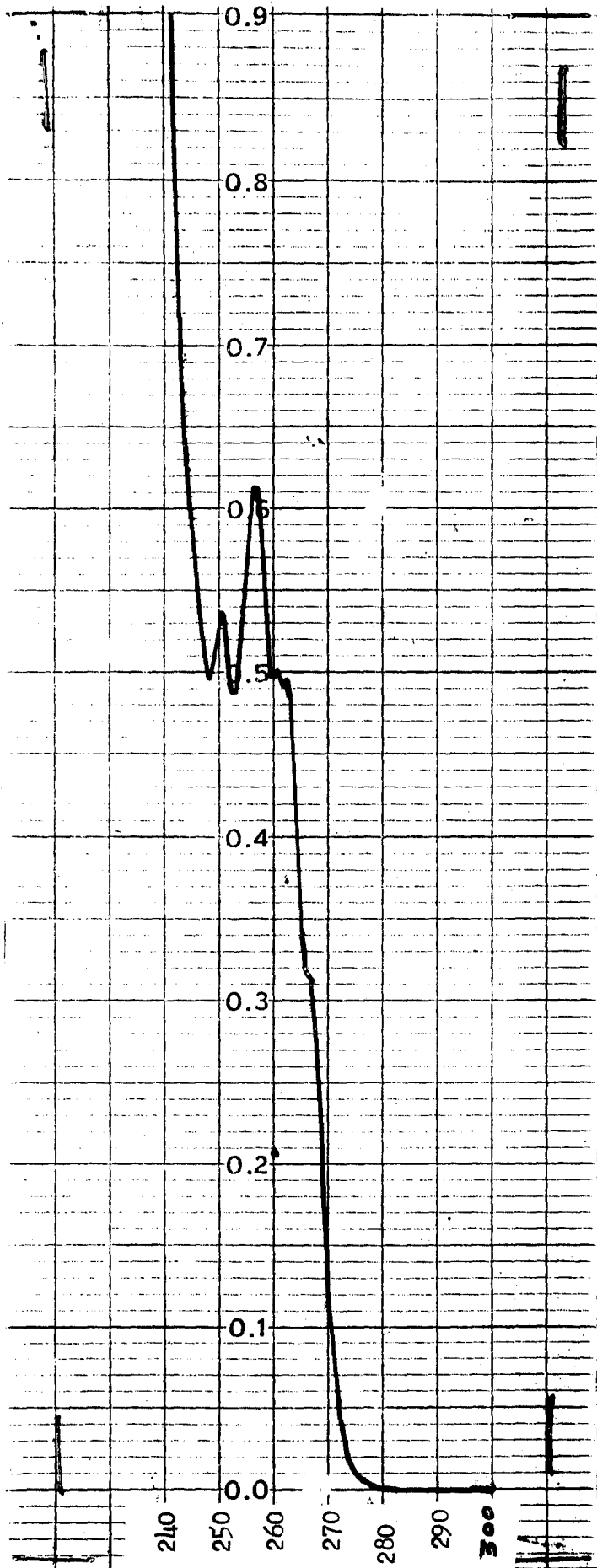
Procedure

Spot ca 5 to 10 mcgs. of the free base (dissolved in chloroform) on the plate. Develop chromatogram to 12 cm in a tank saturated with the mobile solvent. Air dry the plate and spray with the chromogenic reagent. Blue spots appear against a pink background. Two other related compounds were spotted on the same plate. Their Rf values

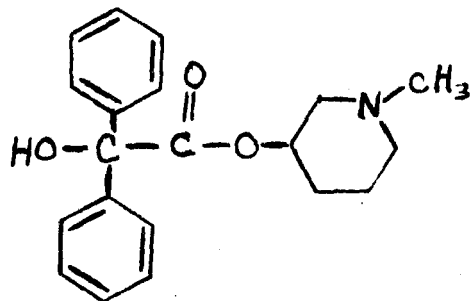
are tabulated below:

<u>Compound</u>	<u>Rf Value</u>
N-Methyl-3-Piperidyl Benzilate (JB 336, LBJ)	0.52
N-Ethyl-3-Piperidyl (cyclopentyl Mandelate) (JB 329)	0.71
N-Ethyl-3-Piperidyl Benzilate (JB 318)	0.64

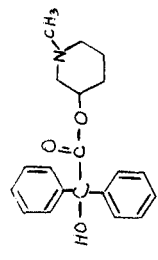
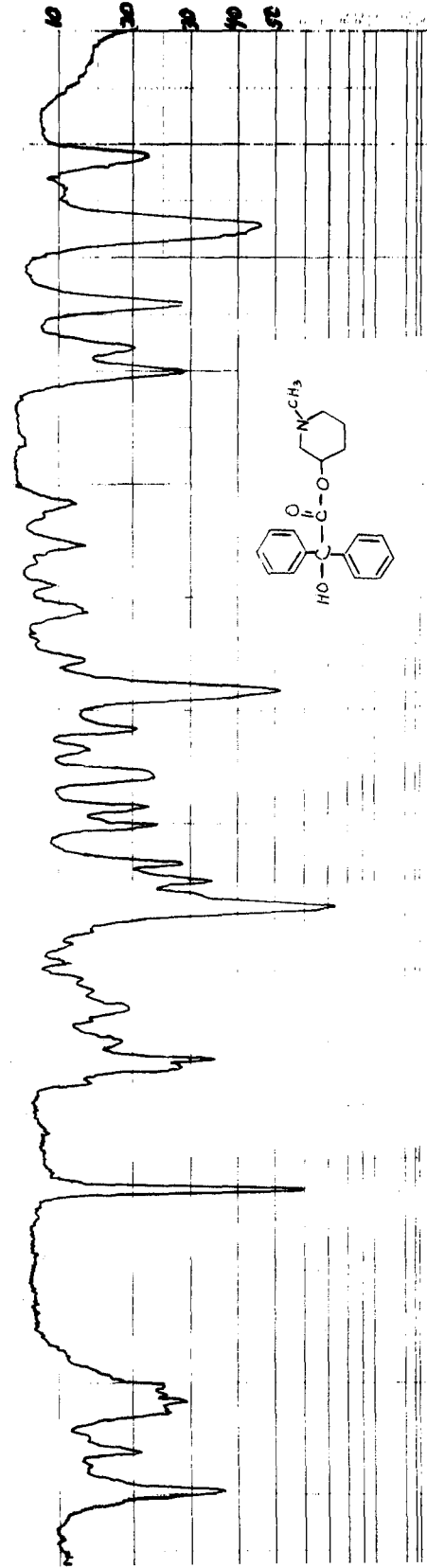
As little as 1 mcg. of LBJ can be detected by the above procedure.



SAMPLE NUMBER
STANDARD USED N-METHYL-3-PIPERIDYL
BENZILATE·HCl (LBT, JB 336)
STANDARD CONCENTRATION 4.56 mg./1.0 ml.
REFERENCE SOLVENT 0.1 N HCl
CELL PATH 1.0 cm
INSTRUMENT CARY 15
DATE 6/26/68 N.Y. DISTRICT
OPERATOR RICHARD FOX / P. DeZan



C-26-C8
(STANDARD) N-METHYL-2-PIPI
BENZYLATE-HCl (78394, L-03)



PATH: mm
SOVENT: KBr
CONCENTRATION: ~ 0.5%
PHASE: SOLID
COMMENTS: VS. AIR

ANALYST: R. Fox, R. DeZan

PREPARED BY: PHOTOMETER

RECORDING CHART NO. BK 8 (4888)

ULTRAVIOLET ABSORPTION DATA OF PHARMACEUTICALS

By Carolyn N. Andres and Susan W. Snow, Food and Drug Administration

With the advent of the Drug Abuse Control Act, many previously unknown drug substances have been encountered. A rapid procedure for detecting and identifying the drug is essential. The use of ultraviolet spectra, while not specific, is a good preliminary screening technique.

Quite often the distinctive absorbance exhibited in the ultraviolet region of the spectrum is characteristic of some substance or specific functional group. To obtain a satisfactory ultraviolet spectrum, a simple, rapid dilution procedure may be sufficient. In other instances, however, it may be necessary to isolate the active constituent by more refined methodology, such as the classical alkaloid extraction technique.

Without a central source of spectra correlation data, a time-consuming search may be necessary for the identification of any one specific compound or structural class of compounds. This compilation of ultraviolet absorption maxima is given as an aid in the elucidation and/or exclusion of pharmacological constituents.

Table 1 is arranged according to maxima wavelengths; the solvent system code is tabulated below. When more than one maximum is listed for a compound, the maxima are listed in decreasing order of intensity. When more than one compound is listed at the same wavelength(s), the compounds are listed alphabetically first and then by solvent. When known, absorptivities are also listed.

Code for solvent system given in Table 1

A - chloroform (reagent grade)	J - 0.1N sodium hydroxide
B - ethanol (absolute)	K - 0.01N sodium hydroxide
C - ethanol (95%)	L - 1N sulfuric acid
D - dilute hydrochloric acid (10%, v/v)	M - 0.5N sulfuric acid
E - 0.1N hydrochloric acid	N - 1% tartaric acid
F - 0.01N hydrochloric acid	O - 0.5% tartaric acid
G - methanol	P - 0.01M tartaric acid
H - 0.5N sodium hydroxide	Q - water
I - 0.2N sodium hydroxide	

Table 1. Ultraviolet and absorptivity data for pharmaceuticals

Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.	Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.
203, 225	E	Cyclizine	990, 440	(1)	227, 290	H	Cinchonidine	1200, ---	(4)
203, 225	E	Cyclizine HCl	990, 440	(1)	228	B	Tolbutamide	500	(2)
205, 310	Q	Ergonovine maleate	730, 180	(2)	228	M	Phenocaine	530	(4)
209, 285	E	Morphine tartrate	613, 40	(2)	228, 262	M	Berberine	630, ---	(4)
211	Q	Protoveratrine A & B maleates	148	(1)	228, 264	E	Berberine	---	(1)
219	E	Cycloserine	341	(2)	228, 264	H	Berberine	610, ---	(4)
220	E	Metharbital	---	(3)	228, 276	C	Dienestrol	1200, 160	(2)
220, 272	M	Yohimbine	1076, ---	(4)	228, 282	L	Emetine HCl	241, 104	(2)
220, 278	E	Epinephrine bitartrate	---	(3)	228, 287	C	Dichlorophen	540, 165	(2)
220, 281, 288	C	Tyrothricin	---	(3)	228, 292, 310	J	Chlorothiazide	---	(5)
221, 281, 289	C	Gramicidin	---	(3)	229, 294	C	Iophenoxic acid	520, 56	(2)
222	H	Strophanthin	200	(4)	230	Q	Amylocaine HCl	540	(1)
222	Q	Lobeline HCl	50	(2)	230	Q	Aniline	---	(1)
223, 237, 247, 343	E	Amodiaquine HCl	---	(3)	230	C	Benzodiazepinone	---	(6)
223, 252, 273, 283	C	Dihydroxyanthra- quinone	---	(3)	230	C	Benzyl benzoate	843	(2)
223, 253, 284, 346	J	Chlortetracycline HCl	---	(3)	230	H	Chlocyalizine	550	(4)
224	H	Aconitine	140	(4)	230	M	Chlocyalizine	600	(4)
224	H	Eucaïne	300	(4)	230	C	Chlorcyclizine HCl	440	(2)
224, 272	M	p-Aminobenzoic acid	1000, ---	(4)	230	C	Hydroxyzine HCl	---	(2)
224, 280	H	Yohimbine	820, ---	(4)	230	M	Hydroxyzine pamoate	240	(4)
224, 286	E	Pramoxine HCl	---	(2)	230	K	Iodopanic acid	680	(2)
225	C	Hydroxyamphetamine HBr	370	(1)	230	M	Reserpine	248	(4)
225	C	Pyrobutamine diphosphate	---	(1)	230	Q	Cocaine HCl	480	(1)
225	C	Sodium levothyroxine	616	(4)	230, 266, 272, 260	C	Meclizine HCl	---	(5)
225	Q	Caffeine sodium benzoate	585	(2)	230, 267, 274	C	Estradiol benzoate	---	(3)
225	Q	Sodium benzoate	585	(2)	230, 280	C	Hexestrol	775, 140	(2)
225, 238, 325	J	Dibucaïne HCl	---	(3)	230, 285, 330	H	Quinidine	980, ---	(4)
225, 263	H	Aminopyrine	16, ---	(4)	231	Q	Caffeine and sodium salicylate	424	(2)
225, 278	C	Benzestrol	---	(3)	231, 296	Q	Sodium salicylate	423, 224	(2)
225, 278, 284	C	L-Tyrosine	---	(3)	231, 309, 280	C	Vanillin	---	(5)
225, 279	E	Chlorocresol	525, 105	(2)	232	Q	Benzamine HCl	610	(1)
226	H	Ascorbic acid	28	(4)	232	F	Chlorpropamide	600	(2)
226	H	Thyroxine	21	(4)	232	M	Hydroxyzine HCl	320	(4)
226	M	Thyroxine	18	(4)	232, 274	M	Cocaine	520, ---	(4)
226	Q	Tridihexethyl iodide	301	(2)	232, 274	M	Eucaïne	370, ---	(4)
226, 272	M	Ethyl aminobenzoate	726, ---	(4)	232, 275	H	Alypin	---	(4)
226, 287, 315	H	Cinchonine	170, ---	(4)	232, 275	E	Hexylcaine HCl	---	(2)
226, 330	H	Coumarin	890, ---	(4)	232, 282	C	Triprolidine HCl	---	(7)
227	E	Cocaine HCl	---	(1)	233, 267	C	Thiamine HCl	380, 240	(2)
227	J	Chlorcyclizine HCl	---	(3)	233, 271, 294, 332	C	Chlorpromazine sulfone HCl	---	(8)
227, 264	M	Chlormethazone	357, 8	(4)	233, 275	E	Cocaine	---	(1)
227, 278 283	C	Tubocurarine chloride	---	(3)	234	E	Aconitine	---	(1)
					234	Q	Amydracaine HCl	450	(1)
					234, 275	M	Aconitine	200	(4)
					234, 285	Q	Anileridine HCl	---	(2)
					234, 286	H	Phenol	1100, ---	(4)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	A ₁ ^{1%} cm	Ref.	Wavelength, m μ	Sol- vent	Drug	A ₁ ^{1%} cm	Ref.
234, 334	C	Quinidine sulfate	792, 236	(2)	240	B	Cortisone acetate	390	(2)
234, 334	C	Quinine dihydrochloride	780, 134	(2)	240	B	Desoxycorticosterone acetate	440	(2)
234, 334	C	Quinine sulfate	792, 236	(2)	240	C	Desoxycorticosterone acetate	---	(3)
235, 300	M	p-Aminosalicylic acid	480, ---	(4)	240	B	Desoxycorticosterone trimethylacetate	405	(2)
235, 300	M	Salicylic acid	680, ---	(4)	240	G	Desoxycorticosterone trimethylacetate	---	(3)
235, 316	M	Cinchonidine	1200, ---	(4)	240	B	Dexamethasone	390	(2)
235, 344, 330, 257	M	Chloroquin	580, ---	(4)	240	E	Emetine	350	(2)
236, 225, 312, 283	M	Pyrimilamine maleate	---	(3)	240	B	Ethisterone	520	(2)
236, 274	H	Theobromine	230, ---	(4)	240	B	Fluocinolone acetate	360	(2)
236, 295	H	Bemidone	150, ---	(4)	240	B	Fluodrocortisone acetate	405	(2)
236, 299	M	Salicylamide	590, ---	(4)	240	B	Fluoxymesterone	495	(2)
236, 302	C	Salicylamide	570, 312	(2)	240	B	Hydrocortisone	435	(2)
236, 332, 278	C	Quinidine	920, 135, 110	(2)	240	B	Hydrocortisone acetate	390	(2)
236, 332, 278	C	Quinine	920, 135, 110	(2)	240	B	Hydrocortisone hydrogen acetate	341	(2)
237, 314	M	Pheniramine	650, ---	(4)	240	B	Hydrocortisone sodium succinate	327	(2)
237, 302	M	Methyl salicylate	660, ---	(4)	240	B	Methylprednisolone	400	(2)
237, 313	M	Thenylene	700, ---	(4)	240	B	Methyl testosterone	535	(2)
238	M	Acetanilide	800	(4)	240	B	Nandrolone phenylpropionate	430	(2)
238	G	Cortisone acetate	---	(3)	240	C	Norandrostenolone	400	(2)
238	C	Diprotizoic acid	---	(3)	240	B	Norethisterone	571	(2)
238	J	Diprotizoic acid	575	(2)	240	H	Picrotoxin	180	(4)
238	C	Iodipamide	580	(2)	240	J	Pentobarbital sodium	360	(2)
238	D	Methapyrilene HCl	620	(1)	240	B	Prednisolone	415	(2)
238	Q	Penthenate bromide	189	(2)	240	B	Prednisolone acetate	370	(2)
238	C	Sodium diatrizoate	---	(3)	240	B	Prednisolone trimethylacetate	337	(2)
238	G	Spirocholactone	470	(2)	240	B	Prednisone	430	(2)
238	C	Triamcinolone	380	(2)	240	B	Progesterone	540	(2)
238	C	Triamcinolone acetate	343	(2)	240	G	Progesterone	---	(3)
238, 260	H	Phenocaine	460, ---	(4)	240	C	Testosterone enanthate	---	(3)
238, 290	B	Piperonyl butoxide	155, 130	(2)	240	B	Testosterone phenylpropionate	395	(2)
238, 292	H	Cresol	1500, ---	(4)	240	B	Testosterone propionate	490	(2)
238, 306	C	Methyl salicylate	588, 282	(2)	240, 260, 303, 315	Q	Hydralazine HCl	580, 540, 270, 210	(2)
238, 313	M	Tripelennamine citrate	---	(3)	240, 263	B	Dexamethasone acetate	355, ---	(2)
238, 313	M	Tripelennamine HCl	---	(3)	240, 275, 298, 342	C	Chlorpromazine sulfoxide HCl	---	(8)
238, 315	M	Methapyrilene	640, ---	(4)	240, 294	J	Edrophonium chloride	550, 170	(2)
239	H	Acetanilide	710	(4)	240, 299	J	Levorphanol tartrate	198, 70	(2)
239	C	Phenylbutazone	---	(4)	240, 302	M	Physostigmine	420, ---	(4)
239	G	Prednisone	---	(3)					
239	Q	Sodium diatrizoate	520	(2)					
239, 276	C	Diethylstilbestrol	600, ---	(2)					
239, 304	Q	Methapyrilene HCl	---	(6)					
239, 314	M	Tripelennamine	561, ---	(4)					
239, 316	F	Pyrimilamine maleate	450, 205	(2)					
240	K	Amobarbital	415	(2)					

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	A _{1%} 1 cm	Ref.	Wavelength, m μ	Sol- vent	Drug	A _{1%} 1 cm	Ref.
240, 305	C	Methapyrilene HCl	637, 155	(9)	243, 350	C	Colchicine	730, 420	(2)
240, 306	Q	Methylethyl- ethylenediamine maleate	---	(6)	244	J	Metharbital	---	(2)
240, 307	M	Phenyl salicylate	2200, ---	(4)	244	E	Pyrilamine maleate	---	(1)
240, 310	M	Ergotamine	430, ---	(4)	244	Q	Sandostene	---	(6)
240, 310	H	Methapyrilene	640, ---	(4)	244, 280	C	Piperacetazine HCl	---	(8)
240, 311	C	Ergonovine maleate	---	(3)	244, 306	C	Thenyldiamine HCl	635, 152	(9)
240, 326	Q	Dequalinium chloride	890, 510	(2)	244, 314	Q	Pyrilamine maleate	420, 196	(1)
240, 327	Q	Dequalinium acetate	830, 480	(2)	244, 343, 267	M	Cinchophen	1100, ---	(4)
241	Q	Antazoline methane- sulfonate	410	(2)	245	A	Acetaminophen	---	(10)
241	G	Ethisterone	---	(3)	245	J	Barbital sodium	320	(2)
241	C	Methyltestosterone	---	(3)	245	K	Barbital sodium	320	(2)
241	G	Norethandrone	565	(2)	245	E	Benzodiazepinone	---	(6)
241	C	Testosterone propionate	---	(3)	245	C	Methaphenilene HCl	537	(1)
241, 291	E	Antazoline HCl	500, 67	(2)	245	Q	Phenacaine HCl	480	(1)
241, 291	E	Antazoline phosphate	415, 56	(2)	245	H	Phenacetin	700	(4)
241, 299	Q	Physostigmine salicylate	350, 150	(2)	245, 305	Q	Tripelennamine HCl	490, ---	(2)
241, 328	H	Salicylamide	540, ---	(4)	246	J	Butabarbital (butethal)	330	(2)
242	Q	Antazoline HCl	520	(1)	246	M	Phenacetin	750	(4)
242	C	Chloromethapyrilene citrate	409	(1)	246, 262	E	Mecamylamine HCl	---	(10)
242	F	Dimidium bromide	670	(2)	246, 262	E	Mepyrium	420, 400	(2)
242	F	Homidium bromide	720	(2)	246, 282	C	Methantheline bromide	135, 69	(2)
242	G	Hydrocortisone	---	(3)	246, 295	H	Nordefrin HCl	450, ---	(4)
242	G	Hydrocortisone acetate	---	(3)	246, 307	C	Tripelennamine HCl	547, 156	(9)
242	C	Hydrocortisone sodium succinate	---	(5)	246, 315	Q	Isothipendyl	---	(6)
242	Q	Methaphenilene HCl	489	(1)	246, 320	M	Dibucaine HCl	590, ---	(4)
242	G	Prednisolone	---	(3)	246, 355	H	Colchicine	880, ---	(4)
242	G	Prednisolone acetate	---	(3)	246, 355	M	Colchicine	900, ---	(4)
242	C	Prednisolone diethylaminoace- tate HCl	290	(2)	247	M	Imipramine HCl	240	(4)
242	C	Testosterone cyclo- pentylpropionate	---	(3)	247	Q	Prednisolone sodium phosphate	312	(2)
242	C	Thenyldiamine HCl	---	(2)	247, 296	M	Mepazine	2600, 181	(4)
242, 290	M	Antazoline	600, ---	(4)	247, 307	C	Chlorotrianisene	633, 410	(2)
242, 292	C	Antazoline HCl	515, 67	(9)	247, 309	A	Chlorotrianisene	633, 410	(2)
242, 295	J	Hexestrol	965, 175	(2)	247, 310	C	Pyrilamine maleate	464, 115	(9)
242, 310	C	Phenyl salicylate	664, 248	(2)	248	C	Ascorbic acid	---	(3)
243	M	Ascorbic acid	350	(4)	248	C	Ethosuximide	8.5	(2)
243	G	Iothalamic acid	530	(2)	248	M	Methopromazine	458	(4)
243, 277	E	Carphenazine maleate	385, ---	(2)	248, 225	C	Probenecid	330, ---	(2)
243, 278	C	Carphenazine maleate	---	(8)	248, 298	H	Antazoline	700, ---	(4)
243, 280	C	Acetophenazine dimaleate	---	(8)	248, 306, 287	C	Novobiocin	---	(3)
243, 302	E	Thiabendazole	---	(2)	248, 310	J	Tripelennamine HCl	---	(3)
243, 304	C	Chlorothen citrate	408, 89	(9)	248, 311	J	Tripelennamine citrate	---	(3)
243, 313	C	Thonzylamine HCl	739, 104	(1)	248, 312, 280	J	Pyrilamine maleate	---	(3)
					248, 313	H	Pyrilamine	640, ---	(4)
					249	C	Ethyl aminobenzoate (benzocaine)	---	(3)
					249	Q	Lobeline HCl	376	(1)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.	Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.
249	F	Promethazine HCl	910	(2)	254	M	Strychnine	390	(4)
249, 294	M	Antergan	340, ---	(4)	254	Q	Strychnine HCl	330	(2)
249, 298	Q	Diethazine HCl	---	(6)	254	L	Strychnine phosphate	270	(2)
249, 298	M	Promethazine HCl	---	(3)	254	Q	Strychnine sulfate	280	(2)
249, 300	C	8-Methoxypsoralen (methoxsalen)	1060, 563	(2)	254	M	Triflupromazine	730	(4)
250	C	Acetaminophen	---	(7)	254, 260	C	Cyclizine diHCl	---	(6)
250	M	Picrotoxin	22	(4)	254, 304	C	Mepazine HCl	---	(8)
250, 247, 256, 262	C	Trihexyphenidyl HCl	---	(3)	254, 304	C	Methdilazine HCl	---	(8)
250, 298	M	Promazine	850, ---	(4)	254, 306	C	Promazine	---	(8)
250, 299	Q	Soventol lactate	---	(6)	255	H	Gelsemine	210	(4)
250, 300	H	Morphine	246, ---	(4)	255	M	Methylparaben	1050	(4)
250, 300	M	Phenergan	878, ---	(4)	255	F	Pipamazine	800	(2)
250, 314	H	Tripeleminamine	635, ---	(4)	255	Q	Sodium iron edetate	0.23	(2)
250, 345, 318	M	Quinidine	853, ---	(4)	255, 280, 290	C	Strychnine	377, 130, 101	(1)
250, 345, 318	M	Quinine	853, ---	(4)	255, 305	M	Chlorpromazine	699, ---	(4)
250, 348	E	Quinidine	---	(1)	255, 305	M	Perphenazine	700, ---	(4)
250, 348, 316	E	Quinine phosphate	770, 142, 115	(2)	255, 305	F	Thiopropazate HCl	610, 80	(2)
251	J	Cyclobarbitol	296	(2)	255, 308	C	Promethazine HCl	---	(8)
251	F	Imipramine HCl	265	(2)	255, 308	C	Trimeprazine HCl	---	(8)
251	Q	Promazine HCl	910	(2)	256	Q	Atropine sulfate	5.4	(1)
251, 242, 261	C	Dihydrotachysterol	1010, 870	(2)	256	M	Benactyzine HCl	110	(4)
251, 257, 263, 366, 320	G	Benzathine penicillin G	---	(3)	256	I	Meperidine	---	(11)
251, 287	Q	Bacitracin	---	(3)	256	M	Sycotrol	33	(4)
251, 302	F	Trimeprazine tartrate	700, ---	(2)	256	F	Trifluoperazine HCl	630	(2)
251, 309, 285	L	Papaverine	1790, 242, 189	(2)	256, 250, 262	Q	Phenylmercuric nitrate	8.3, 7.5, 6.5	(2)
251, 316	C	Chlorquinaldol	2140, 170	(2)	256, 283, 365	J	Folic acid	547, 533 187	(2)
252	C	Benzyl alcohol	18.6	(2)	256, 288, 355	A	Anthralin	---	(3)
252	M	Gelsemine	220	(4)	256, 309	C	Prochlorperazine dihydrochloride	---	(8)
252	C	Hyoscyamine HBr	5.2	(1)	256, 310	C	Chlorpromazine HCl	---	(8)
252	E	Scopolamine	---	(1)	256, 320	C	2-Chlorophenothiazine	---	(1)
252	J	Vinbarbital	3375	(2)	257	E	dl-Alphaprodine	---	(11)
252, 302	H	Antergan	710, ---	(4)	257	I	dl-Alphaprodine	---	(11)
252, 302	C	Promethazine HCl	---	(8)	257	M	Aminopyrine	14	(4)
253	J	Phenobarbital	320	(2)	257	Q	Amphetamine sulfate	9.7	(1)
253	J	Phenobarbital sodium	304	(2)	257	M	Azacyclonol	18	(4)
253, 233, 329	K	Hydroxychloroquine sulfate	---	(3)	257	F	Chloroquine sulfate	390	(2)
253, 302	Q	Mepazine HCl	---	(6)	257	E	Mephentermine	11.5	(1)
253, 304	H	Promethazine	1100, ---	(4)	257	C	Methyl hydroxy- benzoate	1088	(2)
253, 305	M	Prochlorperazine maleate	1170, ---	(4)	257	E	Norpethidine	---	(11)
253, 320	C	Phenothiazine	---	(8)	257	I	Norpethidine	---	(11)
254	E	Perphenazine	812	(2)	257	E	Pimindone	---	(11)
254	C	Pyrazithiazine HCl	960	(1)	257	Q	Pipradol HCl	15	(2)
254	E	Strychnine	---	(1)	257	C	Propyl hydroxy- benzoate	919	(2)
254	H	Strychnine	380	(4)	257, 245, 251, 295	J	Sodium penicillin G	---	(3)
254	L	Strychnine	378	(2)	257, 250, 263, 333	C	Menadione	---	(3)
					257, 251	M	Alphaprodine HCl	7, ---	(4)
					257, 251	Q	Meperidine HCl	7.7, 6.6	(2)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	A ₁ ^{1%} cm	Ref.	Wavelength, m μ	Sol- vent	Drug	A ₁ ^{1%} cm	Ref.
257, 251 262	Q	Ephedrine sulfate	7.6, 6.1, 6.1	(2)	258	M	Diphenhydramine HCl	15	(4)
257, 251, 262	J	L-Phenylalanine	---	(3)	258	M	Hyoscyamine	9	(4)
257, 251, 263	L	Atropine methonitrate	5.2, 4.3, 3.9	(2)	258	E	d-Propoxyphene	---	(11)
257, 251, 263	H	Demerol	9, ---	(4)	258	Q	Scopolamine HBr	4.0	(1)
257, 251, 263	M	Demerol	9, ---	(4)	258, 251, 264	C	Primidone	---	(3)
257, 251, 263	H	Ephedrine	10, ---	(4)	258, 252	J	Diphenhydramine HCl	---	(3)
257, 251, 263	M	Ephedrine	10, ---	(4)	258, 252, 264	C	Homatropine methylbromide	---	(3)
257, 251, 263	Q	Ephedrine HCl	9.6, 7.4 7.3	(2)	258, 252, 264	Q	Trimetaphan camphorsulfonate	78, 76, 58	(2)
257, 251, 263	G	Glutethimide	---	(3)	258, 252, 265	C	Benactyzine HCl	12, 11, 10	(2)
257, 251, 263	H	Mepiridine	9, ---	(4)	258, 252, 265	G	Carbetapentane citrate	---	(3)
257, 251, 263	E	L-Phenylalanine	---	(3)	258, 253	Q	Systral	---	(6)
257, 251, 263, 246	C	Atropine sulfate	5.1, 4.3, 3.8, 3.6	(2)	258, 253, 263	C	Pipradrol HCl	---	(3)
257, 251, 263, 247	C	Propoxyphene HCl	---	(3)	258, 253, 264	C	Amphetamine	---	(1)
257, 252	Q	Azacyclonol HCl	---	(3)	258, 253, 264, 266	H	Atropine	11, ---	(4)
257, 252	M	Diphenhydramine HCl	15, ---	(4)	258, 253, 267	H	Amphetamine	30, ---	(4)
257, 252	E	Trihexyphenidyl HCl	---	(4)	258, 263	Q	Keithon	---	(6)
257, 252, 263	M	Amphetamine	26, ---	(4)	258, 263, 251	M	Anileridine	980, ---	(4)
257, 252, 263	M	Atropine	8, ---	(4)	258, 298	G	Syrosingopine	---	(2)
257, 252, 263	Q	Methscopolamine nitrate	4.8, ---	(2)	258, 308	C	Trifluoperazine HCl	---	(8)
257, 252, 263	H	Scopolamine	10, ---	(4)	258, 308	C	Trifluoromepazine HCl	---	(8)
257, 252, 263	M	Scopolamine	9, ---	(4)	258, 308	C	Trifluopromazine HCl	---	(8)
257, 252, 263	Q	Tricyclamol chloride	5.6, 4.5, 4.2	(2)	258, 320	H	Cinchophen	1900, ---	(4)
257, 263	C	Tolazoline HCl	12.5, 8.5	(2)	259	H	Chlormethazanone	347	(4)
257, 263	Q	Tricyclamol HCl	5.6, 4.2	(2)	259	J	Diethylstilbestrol	764	(2)
257, 301	J	Methotrexate	---	(3)	259	J	Doxylamine succinate	---	(3)
257, 310	C	Perphenazine HCl	---	(8)	259	E	Nicotine	34.3	(1)
257, 310	C	Thiopropazate HCl	---	(8)	259	M	Nicotine	343	(4)
257, 312	C	Pipamazine HCl	---	(8)	259	M	Phenindamine tartrate	---	(3)
257, 321	J	Cinchophen	1492, 340	(2)	259	Q	Phenindamine tartrate	220	(2)
257, 321	K	Cinchophen	1492, 340	(2)	259	Q	Sulfaguanidine	790	(2)
257, 330	H	Chloroquin	520, ---	(4)	259	J	Thiouracil	864	(2)
257, 365	C	Rutin	---	(3)	259, 253, 265	Q	Cetylpyridinium chloride	---	(3)
258	E	L-Acetylmethadol	---	(11)	259, 264	Q	Orphenadrine HCl	---	(6)
258	E	Atropine	---	(1)	259, 265	B	Ethotoin	11, 8	(2)
258	Q	Benztropine methane- sulfonate	11	(2)	259, 268, 276	C	Hydroxyzine HCl	---	(1)
258	B	Diiodohydroxy- quinoline	1060	(2)	259, 292, 265, 251	M	Methadone	19, ---	(4)
258	C	Diloxanide furoate	700	(2)	260	Q	Doxylamine succinate	110	(1)
258	H	Diphenhydramine HCl	15	(4)	260	M	Neostigmine	32	(4)
					260	J	Propylthiouracil	600	(2)
					260, 256, 266	G	Carbinoxamine maleate	---	(3)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, μ	Sol- vent	Drug	1% $A_{1\text{ cm}}$	Ref.	Wavelength, μ	Sol- vent	Drug	1% $A_{1\text{ cm}}$	Ref.
260, 266	L	Neostigmine bromide	16.2, 13.9	(2)	263, 239	Q	Sulfamerazine sodium	628, 503	(2)
260, 266	L	Neostigmine methylsulfate	14.7, 12.6	(2)	263, 269	H	Nicotinic acid	268, 207	(4)
260, 280, 292	H	Neostigmine	41, ---	(4)	263, 271	Q	Mepivacaine HCl	16.5, 13.4	(2)
260, 375	C	Nitrofurazone	---	(3)	263, 314	C	Thioridazine HCl	---	(8)
261	G	Brompheniramine maleate	---	(2)	264	E	Acetazolamide	---	(3)
261	Q	Carbinoxamine maleate	138	(1)	264	M	Acetazolamide	187	(4)
261	F	Cyclomethycaine sulfate	400	(2)	264	C	Brucine	307	(3)
261	Q	Dexchlorpheniramine maleate	---	(2)	264	M	Dextrochlorpheniramine	860	(4)
261	M	Doxylamine	312	(4)	264	M	Nikethamide	645	(4)
261	J	Methylthiouracil	690	(2)	264	F	Orphenadrine citrate	14	(2)
261	H	Nicotine	260	(4)	264	F	Orphenadrine HCl	20.7	(2)
261	M	Nicotinic acid	424	(4)	264, 272	E	Sulfisoxazole	---	(3)
261	M	Nicotinic acid hydrazide	396	(4)	264, 300	L	Brucine	318, 215	(2)
261	C	Phenindamine tartrate	223	(1)	264, 316	C	Thiethylperazine maleate	---	(8)
261	C	Sulfanilamide	1100	(2)	265	C	Activated 7-dehydrocholesterol	---	(3)
261, 244	Q	Sulfapyridine	680, 620	(2)	265	E	Brucine	---	(1)
261, 244	Q	Sulfapyridine sodium	625, 570	(2)	265	C	Calciferol	---	(3)
261, 291	C	Vanillic acid	---	(5)	265	M	Chlorpheniramine maleate	300	(4)
262	M	Carbinoxamine	220	(4)	265	F	Isoniazid	420	(2)
262	Q	Chlorpheniramine maleate	145	(2)	265	C	Orthocaine	550	(1)
262	H	Disulfiram	19	(4)	265	E	Pilocarpine	---	(1)
262	M	Disulfiram	11	(4)	265, 228, 337, 319	E	Chlortetracycline HCl	340, 320, 170, 150	(2)
262	H	Lidocaine	33	(4)	265, 262	Q	Propenpyridamine maleate	212, 138	(1)
262	M	Lidocaine	262	(4)	265, 272, 292	L	Phanquone	500, 500, 480	(2)
262, 240	Q	Sulfamethazine sodium	607, 556	(2)	265, 299	H	p-Aminosalicylic acid	856, ---	(4)
262, 256, 268	C	Nicotinamide (niacinamide)	---	(3)	265, 299	J	Sodium amino-salicylate	---	(2)
262, 257, 253, 269	M	Cyclizine HCl	---	(3)	265, 300	E	Aminosalicylic acid	---	(2)
262, 257, 268	M	Chlorcyclizine HCl	---	(3)	265, 300	M	Brucine	328, ---	(4)
262, 257, 268	C	Nicotinic acid	---	(3)	265, 305	H	Brucine	320, ---	(4)
262, 258, 268	J	Chlorpheniramine maleate	---	(3)	266	F	Biallylamical HCl	410	(2)
262, 267, 257, 274	C	Tolbutamide	---	(3)	266	D	Isoniazid	378	(1)
262, 312	Q	Mellaril	---	(10)	266	M	Picolinic acid hydrazide	438	(4)
262, 450, 238	E	Acriflavin	1522, 1192, 720	(2)	266-270	E	Coniine	---	(1)
263	M	Adenine	970	(4)	266, 214	M	Canescine	150, ---	(4)
263	H	p-Aminobenzoic acid	1300	(4)	267	B	Amisometradine	1120	(2)
263	H	Apomorphine	460	(4)	267	G	Amisometradine	---	(2)
263	M	Covatin	412	(4)	267	M	Deanor	760	(4)
263	H	Nikethamide	220	(4)	267	M	Isoniazid	374	(4)
263	C	Propenpyridamine	184	(1)	267	M	Marsilid	374	(4)
263	H	Thenylene	420	(4)	267	C	Sulfamethoxyypyridazine	---	(3)
					267, 245, 370	J	Oxytetracycline	---	(3)
					267, 290	G	Reserpine	278, 187	(2)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	A ₁ 1 cm	Ref.	Wavelength, m μ	Sol- vent	Drug	A ₁ 1 cm	Ref.
267, 353	E	Oxytetracycline	---	(3)	272	M	Theobromine	230	(4)
267, 355	E	Tetracycline HCl	---	(3)	272, 240	Q	Sulfamethazine	660, 600	(2)
268	M	Mescaline	39	(4)	272, 279	A	Phenoxybenzamine HCl	0.68, 0.54	(2)
268	H	Saccharin	98	(4)	273	Q	Apomorphine HCl	670	(1)
268	C	Sulfadiazine	860	(2)	273	C	Caffeine	467	(2)
268	F	Sulfisoxazole	480	(2)	273	H	Caffeine	400	(4)
268, 274	Q	Phenoxyethyl- penicillin potassium	---	(2)	273	M	Caffeine	400	(4)
					273	P	Caffeine	500	(1)
268, 274, 262	C	Estradiol dipropionate	---	(3)	273	Q	Dyphylline	361	(7)
268, 275, 263	G	Phenoxyethyl penicillin	39, 32.5, 30.5	(2)	273	E	Edrophonium chloride	---	(3)
268, 288- 295	C	Reserpine	270, 170	(2)	273	Q	Edrophonium chloride	107	(4)
269	Q	Benzpyrinium bromide	136	(1)	273	L	Phenylephrine HCl	96	(2)
269	E	Phenindione	923	(2)	273	Q	Phenylephrine HCl	---	(1)
269	C	Sulfamerazine	---	(3)	273	E	Resorcinol	---	(6)
269	C	Sulfamethazine	---	(3)	273, 220	H	4,6-Dinitroresol	727, ---	(4)
269	Q	Viomycin sulfate	310	(2)	273, 328	A	Betanaphthoxyethanol	250, 99	(2)
269, 223, 440, 355	C	Riboflavin	---	(3)	273, 329	K	Bendroflumethiazide	413, 80	(2)
270	M	Aminophylline	490	(4)	274	F	Piperocaine HCl	320	(2)
270	M	Benzonate	97	(4)	274	Q	Piperocaine HCl	80	(1)
270	M	Butacaine	33	(4)	274	Q	Piperocaine HCl	80	(1)
270	E	Caffeine	---	(1)	274	Q	Piperocaine HCl	80	(1)
270	M	Isonicotinic acid	355	(4)	274	Q	Piperocaine HCl	80	(1)
270	H	Mephensin	108	(4)	274	Q	Piperocaine HCl	80	(1)
270	M	Mephensin	92	(4)	274	Q	Piperocaine HCl	80	(1)
270	Q	Mephensin	79	(2)	274	Q	Piperocaine HCl	80	(1)
270	E	Phenol	160	(2)	274	Q	Piperocaine HCl	80	(1)
270	M	Phenol	180	(4)	274	Q	Piperocaine HCl	80	(1)
270	Q	Pyridostigmine bromide	184	(2)	274	Q	Piperocaine HCl	80	(1)
270	E	Theobromine	---	(1)	274	Q	Piperocaine HCl	80	(1)
270	E	Theophylline	530	(2)	274	Q	Piperocaine HCl	80	(1)
270	M	Theophylline	550	(4)	274	Q	Piperocaine HCl	80	(1)
270	E	Theophylline ethylenediamine	---	(1)	274	Q	Piperocaine HCl	80	(1)
270	C	Thiambutosine	700	(2)	274	Q	Piperocaine HCl	80	(1)
270	Q	Thiamine HCl	280	(1)	274	Q	Piperocaine HCl	80	(1)
270, 230	H	Quinacrine HCl	---	(4)	274	Q	Piperocaine HCl	80	(1)
271	E	Apocodeine	---	(1)	274	Q	Piperocaine HCl	80	(1)
271	B	Chloramphenicol palmitate	178	(2)	274	Q	Piperocaine HCl	80	(1)
271	B	Cyclocumarol	394	(2)	274	Q	Piperocaine HCl	80	(1)
271, 318	C	Hydrochlorothiazide	660, 120	(2)	274	Q	Piperocaine HCl	80	(1)
272	E	Apomorphine	---	(1)	274	Q	Piperocaine HCl	80	(1)
272	M	Apomorphine	780	(4)	274	Q	Piperocaine HCl	80	(1)
272	E	Apomorphine HCl	570	(2)	274	Q	Piperocaine HCl	80	(1)
272, 277	C	Mephensin	---	(3)	274	Q	Piperocaine HCl	80	(1)
272	M	Methocarbamol	97	(4)	274	Q	Piperocaine HCl	80	(1)
272	M	Phenylephrine HCl	85	(4)	274	Q	Piperocaine HCl	80	(1)
					275	H	Aminophylline	580	(4)
					275	M	Bemidone	38	(4)
					275	C	Dimethyl phthalate	75.4	(2)
					275	C	Ethyl phthalate	55.5	(2)
					275	Q	Meprylcaine HCl	---	(1)
					275	K	Procainamide HCl	600	(2)
					275	E	Procaine	---	(1)
					275	H	Theophylline	640	(4)
					275	H	Thymol	140	(4)
					275	M	Tyrosine	450	(4)
					275, 283	C	Saccharin	54, 42	(2)
					276	B	Chloramphenicol cinnamate	710	(2)
					276	Q	Chloramphenicol sodium succinate	---	(2)
					276	C	5-Chlorosalicylani- lide	---	(4)
					276	Q	Triprolidone HCl	230	(2)
					276, 309	M	Coumarin	700, ---	(4)
					277	M	Cresol	660	(4)
					277	E	Metronidazole	380	(2)
					277, 226	C	Nylidrin HCl	47, ---	(1)
					277, 257, 263	E	Sodium penicillin G	---	(3)
					277, 271, 287	E	L-Tryptophan	---	(3)
					278	M	Arterenol	140	(4)
					278	B	Butylated hydroxy- toluene	85	(2)
					278	C	Butylated hydroxy- toluene	85	(2)
					278	Q	Chloramphenicol	298	(2)
					278	M	Chlorothiazide	301	(4)
					278	Q	Dextromethorphan HBr	54	(2)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.	Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.
278	E	Diacetylmorphine	39	(2)	280	E	Methyldopa	115	(2)
278	C	Diloxanide	94	(2)	280	M	Nordefrin HCl	170	(4)
278	H	Dimenhydrinate	310	(4)	280	Q	Procainamide sulfate	600	(2)
278	M	Emetine	350	(4)	280	E	Procaine HCl	---	(1)
278	H	Ethyl aminobenzoate	1200	(4)	280	E	d-Tubocurarine chloride	---	(1)
278	H	Heroin	47	(4)	280	I	d-Tubocurarine chloride	---	(1)
278	Q	Isoproterenol HCl	112	(2)	280	Q	Tubocurarine HCl	118.5	(2)
278	E	Levomethorphan	---	(11)	280, 220	M	Quinacrine HCl	337, ---	(4)
278	E	L-3-Methoxymorphinan	---	(11)	280, 286	C	Estradiol cyclo- pentylpropionate	---	(3)
278	E	Phenazocine HBr	50	(2)	280, 287	C	Estrone	---	(3)
278	Q	Phentolamine methanesulfonate	---	(3)	280, 287	C	Estradiol	74, 66	(2)
278, 284	E	Zoxazolamine	---	(2)	280, 288	J	L-Tryptophan	---	(3)
278, 288, 305 322, 360	Q	Cyanocobalamin	---	(3)	280, 327	J	Phenindione	1328, ---	(4)
279	J	Dextromethorphan HBr	0.57	(2)	281	E	N-Allylnormorphine	---	(11)
279	Q	Emetine HCl	85	(1)	281	B	Diacetylmorphine	---	(11)
279	E	L-3-Hydroxymorphinan	---	(11)	281	E	Dihydrohydroxy- codeinone	---	(11)
279	M	Isoproterenol	110	(4)	281	I	Dihydrohydroxy- codeinone	---	(11)
279	Q	Isoproterenol	113	(1)	281	E	Dihydromorphinone	---	(11)
279	E	Levallorphan	---	(11)	281	B	Ethinyl estradiol	71	(2)
279	Q	Levallorphan tartrate	47	(2)	281	E	Methyldihydro- morphinone	---	(11)
279	D	Levarterenol bitartrate	80	(1)	281, 271, 288, 291	F	Naphazoline HCl	255, 215, 175, 170	(2)
279	I	Levomethorphan	---	(11)	281, 271, 288, 291	F	Naphazoline nitrate	265, 230, 185, 185	(2)
279	E	Levorphanol	---	(11)	281, 287	C	Ethinyl estradiol	---	(3)
279	Q	Levorphanol tartrate dihydrate	46	(2)	282	B	Dihydrocodeinone	---	(11)
279	I	L-3-Methoxymorphinan	---	(11)	282	B	Dihydromorphinone	---	(11)
279	F	Norepinephrine	80	(2)	282, 263	J	Picadex	960, 860	(2)
279	Q	Quinacrine HCl	1020	(2)	282, 290, 276	C	Dimethyltryptamine	---	(5)
279, 323	M	Digitalis	35, ---	(4)	283	F	Benzthiazide (ethanolic)	284	(2)
280	H	Butacaine	410	(4)	283	Q	Dihydrocodeinone bitartrate	36	(2)
280	M	Chloramphenicol	500	(4)	283	E	Pholcodine	40	(2)
280	Q	Chlorphenesin	67	(2)	283	Q	Pholcodine tartrate	22	(2)
280	H	Cocaine	33	(4)	283, 258	Q	Sulfathiazole sodium	549, 452	(2)
280	E	Dihydrocodeinone	---	(11)	284	H	Codeine	52	(4)
280	I	Dihydrocodeinone	---	(11)	284	Q	Codeine phosphate	39	(2)
280	H	Dihydrohydroxy- codeinone HCl	38	(4)	284	E	Dihydromorphine	---	(11)
280	M	Dihydrohydroxy- codeinone HCl	39	(4)	284	B	Dihydrohydroxy- codeinone	---	(11)
280	M	Dihydromorphinone HCl	41	(4)	284	B	Dihydrohydroxy- morphinone	---	(11)
280	D	Dimethyltubocurarine iodide	74	(1)	284	L	Thebaine	252	(2)
280	F	Epinephrine	150	(2)	284	C	d- α -tocopheryl succinate acid	38	(3)
280	F	Epinephrine acid tartrate	80	(2)	284, 258	K	Sulfathiazole	790, 260	(2)
280	M	Heroin	86	(4)	285	Q	N-Allylnormorphine HCl	44	(1)
280	Q	Isoproterenol sulfate	100	(2)	285	C	p-Aminobenzoic acid	---	(3)
280	E	Ketobemidone	---	(11)					
280	Q	Methicillin sodium	57	(2)					

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.	Wavelength, m μ	Sol- vent	Drug	1% A ₁ cm	Ref.
285	H	Anileridine	253	(4)	291	F	Pyridoxine HCl	430	(2)
285	E	Codeine	---	(11)	291, 239	J	Acetazolamide	---	(3)
285	I	Codeine	---	(11)	291, 261	E	Veratrine	---	(1)
285	L	Codeine	50	(2)	292	J	Chlorothiazide	430	(2)
285	M	Codeine	58	(4)	292	I	Dihydrohydroxy- morphinone	---	(11)
285	L	Codeine sulfate	40	(2)	292	I	Dihydromorphinone	---	(11)
285	E	Diacetylmorphine (heroin)	---	(1)	292	E	di-Methadone	---	(11)
285	H	Ergonovine	660	(4)	292	Q	Methadone HCl	---	(1)
285	B	Ethylmorphine	---	(11)	292	E	Pyridoxine HCl	422	(1)
285	E	Ethylmorphine	---	(11)	292	H	d-Tubocurarine	200	(4)
285	H	Ethylmorphine HCl	49	(4)	292, 220	C	Acetyl sulfisoxazole	---	(4)
285	M	Ethylmorphine HCl	59	(4)	292, 241	H	Acetazolamide	523, ---	(4)
285	I	Ethylmorphine	---	(11)	293	H	Methylparaben	1370	(4)
285	H	Isoproterenol	450	(4)	294	H	Chlorothiazide	444	(4)
285	B	Menadiol diacetate	240	(2)	294	B	Ethyl aminobenzoate (benzocaine)	1264	(2)
285	B	Methyldihydro- morphinone	---	(11)	294	C	Methadone HCl	---	(1)
285	E	6-Monoacetylmorphine	---	(11)	294	H	Tyrosine	800	(4)
285	E	Morphine	---	(1)	294, 340	H	Phenyl salicylate	740, ---	(4)
285	F	Morphine	50	(2)	295	C	Methypylon	---	(7)
285	M	Morphine	55	(4)	295, 252	M	Thiopropazate	486, ---	(4)
285	Q	Morphine HCl	41	(2)	295, 260	C	Diaminodiphenyl- sulfone	---	(3)
285	Q	Morphine sulfate	40	(2)	295, 268	A	Reserpine	---	(1)
285	Q	Nalorphine HCl	39	(2)	296	J	Chlorocresol	183	(2)
285	E	Norcodeine	---	(11)	296	H	Isoniazid	292	(4)
285	I	Norcodeine	---	(11)	297	I	Dihydromorphine	---	(11)
285	E	Normorphine	---	(11)	297	I	6-Monoacetylmorphine	---	(11)
286	B	Codeine	---	(11)	297	I	Morphine	---	(11)
286	H	Digitalis	40	(4)	297	I	Normorphine	---	(11)
286, 295	E	Dichlorphenamide	60, 56	(2)	297	I	Normorphine	---	(11)
287	B	N-Allylnormorphine	---	(11)	297, 243	E	Folic acid	---	(3)
287	B	6-Monoacetylmorphine	---	(11)	298	I	N-Allylnormorphine	---	(11)
287	B	Morphine	---	(11)	298, 291	C	Hexachlorophene	---	(3)
287	C	Morphine	55	(1)	298	H	L-3-Hydroxymorphinan	---	(11)
287	B	Normorphine	---	(11)	298	Q	Promethazine HCl	926	(1)
287	C	Pyrimethamine	---	(3)	299	H	Ketobemidone	---	(11)
288	C	Pyridoxine HCl	---	(3)	299	H	Levallorphan	---	(11)
288	M	Thiopental	76	(4)	299	H	Levorphanol	---	(11)
290	H	Benzonatate	284	(4)	300	M	Dimenhydrinate	245	(4)
290	H	Dihydromorphinone HCl	82	(4)	300	H	Physostigmine	460	(4)
290	Q	Methoxamine HCl	133	(2)	300	H	Salicylic acid	275	(4)
290	Q	Procaine	740	(1)	300, 245	E	Physostigmine	---	(1)
290	Q	Procaine HCl	1010	(1)	303, 255	J	Thiopental	---	(3)
290	Q	Procaine peni- cillin G	---	(1)	304, 245	H	Arterenol	360, ---	(4)
290	C	Nystatin	---	(2)	305	H	Thiopental	1100	(4)
290, 260	E	Methadone	---	(1)	306	C	Bithionol	255	(2)
290, 279	E	Meperidine	---	(1)	306	H	Ergotamine tar- trate	86	(4)
290, 294	H	Methadone	65, ---	(4)	306	Q	Sulphetrone (solapsone)	350	(2)
291	E	Carbimazole	557	(2)	306, 226	H	Tetracaine	1100, ---	(4)
291	H	Phenylephrine HCl	140	(4)	306, 241	E	Methotrexate	---	(3)

Table 1. Ultraviolet and absorptivity data for pharmaceuticals (cont'd.)

Wavelength, m μ	Sol- vent	Drug	1% A 1 cm	Ref.	Wavelength, m μ	Sol- vent	Drug	1% A 1 cm	Ref.
306, 250	E	Hydrastine	---	(1)	317	C	Ergotinine	157.5	(1)
306, 291	F	Warfarin sodium	---	(3)	317	N	Lysergic acid	---	(5)
307, 230, 281	Q	Benoxinate HCl	---	(3)	317, 315	N	Ergotinine	162.5, 138	(1)
308	J	Warfarin sodium	430	(2)	317, 332	G	Methallenestril	---	(2)
308	K	Warfarin sodium	430	(2)	319	N	Ergotamine bitar- trate	138	(1)
308	K	Warfarin potassium	410	(2)	319	J	Liothyronine sodium	65	(2)
308, 385, 253	J	Hydroxystilbamidine isethionate	---	(3)	319	A	Metabutethamine HCl	877	(1)
309, 231	J	Mercaptopurine	---	(3)	320, 344	F	Hydroxystilbamidine isethionate	---	(3)
309, 247	E	Vanillin	58.6, 10.6	(6)	322	O	Ergotamine	138	(1)
309, 288, 322	A	Bishydroxycoumarin	---	(3)	323	C	Ergotoxine ethanesulfonate	146	(1)
310	A	Lysergic acid diethylamide	---	(5)	323, 223	E	Mercaptopurine	---	(3)
310	E	Lysergic acid diethylamide	---	(5)	324, 254	Q	Pyridoxine HCl	350, 180	(2)
310	M	Methylergonovine tartrate	191	(1)	325	J	Thyroxine sodium	76	(2)
310	E	Tetracaine HCl	---	(1)	327, 273	H	Dibucaine HCl	120, ---	(4)
310, 238	C	Cinchotoxin	---	(1)	327, 281	C	Quinine	---	(1)
310, 279, 228	M	Tetracaine	960, ---	(4)	328	C	Thiacetazone	1815	(2)
310, 291	C	Noscapine	120, 100	(2)	329, 277	Q	Methylquinine sulfate	---	(1)
310, 285, 251	E	Papaverine	220, ---	(1)	330	H	Methyl salicylate	300	(4)
311	C	Tetracaine HCl	962	(1)	330, 235	Q	Eucupin dihydro- chloride	---	(1)
312	E	Noscapine HCl (narcotine)	---	(1)	330, 280	C	Quinine ethyl- carbonate	---	(1)
313, 290	Q	Narcotine	---	(2)	330, 280	Q	Quinine HCl	---	(1)
314	E	Methapyrilene HCl	274	(1)	334, 282	C	Cupreine	---	(1)
314	D	Tripeleminamine HCl	274	(1)	334, 284	C	Hydrocupreine	---	(1)
315	H	Bishydroxycoumarin	790	(4)	335, 316	M	Cinchonine	180, ---	(4)
315	P	Ergotamine tartrate	116	(1)	336, 287	Q	Ethylhydrocupreine HCl	---	(1)
315	N	Ergotoxine	138	(1)	341, 235	C	Aminitrozole (acinitrazole)	590, ---	(2)
315	Q	Metabutethamine HCl	770	(1)	343, 224	E	Amodiaquin HCl	370	(2)
315, 282, 224	C	Cinchonidine HCl	---	(1)	342, 329, 256	F	Hydroxychloroquine sulfate	470, 430, 390	(2)
315, 285, 228	Q	Cinchonidine HCl	---	(1)	343, 329, 257	F	Chloroquine phosphate	370, 320, 290	(2)
315, 285, 228	Q	Cinchonine HCl	---	(1)	345	Q	Nicarbazin	---	(2)
316	N	Ergonovine	185	(1)	346	D	Quinine	---	(1)
316	N	Ergotaminine	120	(1)	348, 270	J	Vanillin	---	(5)
316	C	Ergotamine	183	(1)	350	C	Colchicine	---	(1)
316	C	Ergotoxine	162.5	(1)	360, 225, 257	H	2,4-Dinitrophenol	792, ---	(4)
316	Q	Ergotoxine ethanesulfonate	127.5	(1)	368, 266	Q	Nitrofurantoin	753, ---	(4)
317	C	Ergotamine bitar- trate	17.5	(1)	375, 260	Q	Nitrofurazone	800, ---	(2)
					385	J	Demethylchlor- tetracycline HCl	---	(2)
					386	Q	Aminonitrothiazole	1080	(2)

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PROPOSED RULE MAKING

9833

DEPARTMENT OF JUSTICE

Bureau of Narcotics and Dangerous
Drugs

[21 CFR Part 166]

DEPRESSANT AND STIMULANT
DRUGS

Proposed Listing of Synthesized Tetra-
hydrocannabinols as Subject to
Control

The Bureau of Narcotics and Dangerous
Drugs has recommended, on the
basis of its investigations and the recom-
mendations of an advisory committee
appointed pursuant to section 511(g) (1)
of the Federal Food, Drug, and Cosmetic
Act, that the drugs set forth below be
listed as "depressant or stimulant" drugs
within the meaning of section 201(v) of
the Act because of their hallucinogenic
effect. Having considered such recom-
mendations, pursuant to the provisions
of the Act (secs. 201(v), 511, 701, 52 Stat.
1055, as amended, 79 Stat. 227 et seq.;
21 U.S.C. 321(v), 360a, 371) and under
the authority vested in the Attorney
General by Reorganization Plan No. 1 of
1968 (33 F.R. 5611), it is proposed that
§ 166.3(c) (3) be amended by alphabet-
ically inserting in the list of drugs a new
item, as follows:

§ 166.3 Listing of drugs defined in sec-
tion 201(v) of the Act.

* * * * *
(c) * * * * *
(3) * * * * *

Synthetic equivalents of the substances
contained in the plant, or in the resinous
extractives of *Cannabis* sp. and/or synthetic
substances, derivatives, and their isomers
with similar chemical structure and pharma-
cological activity such as the following:

- Δ¹ cis or trans tetrahydrocannabinol, and
their optical isomers,
- Δ⁹ cis or trans tetrahydrocannabinol, and
their optical isomers,
- Δ⁸ tetrahydrocannabinol, and its optical
isomers.

(Since nomenclature of these substances is
not internationally standardized, compounds
of these structures, regardless of numerical
designation of atomic positions are covered)

All interested persons are invited to
submit their views in writing regarding
this proposal. Comments concerning any
additional trade or other names that may
be properly listed for the subject drugs
are also invited. Views and comments
should be submitted, preferably in quin-
tuplicate, addressed to the Office of Chief
Counsel, Bureau of Narcotics and Dan-
gerous Drugs, Department of Justice,
Room 613, 633 Indiana Avenue, Wash-
ington, D.C. 20226, within 30 days fol-
lowing the date of publication of this
notice in the FEDERAL REGISTER, and may
be accompanied by a memorandum or
brief in support thereof.

Dated: July 6, 1968.

RAMSEY CLARK,
Attorney General.