TABLE I

2-SUBSTITUTED-THIAZOLIDINE-4-CARBOXYLIC ACIDS

R	M. p. °C.[a]	Yield, %	Formula	Analyses,[b] % Calculated C	H	N	Found C	H	N
1'-Ethylpentyl	163–164	97	$C_{11}H_{21}NO_2S$	57.10	9.15		56.71	8.72	
2'-Thienyl	145–146	94	$C_8H_9NO_2S_2$	44.63	4.21		44.25	4.17	
Methylene-3',4'-dioxyphenyl	167–168 dec.	99	$C_{11}H_{11}NO_4S$	52.16	4.38		52.60	4.40	
Benzyl	165–166 dec.	90	$C_{11}H_{13}NO_2S$	59.17	5.87		58.97	5.98	
4'-Methoxyphenyl	156–158 dec.	95	$C_{11}H_{13}NO_3S$	55.21	5.48		54.74	5.67	
2'-Phenylethyl	159–160 dec.	94	$C_{12}H_{15}NO_2S$	60.73	6.37		61.06	6.27	
4'-Hydroxy-3'-methoxyphenyl	164–166 dec.	95	$C_{11}H_{13}NO_4S$			5.49			5.53
4'-Hydroxyphenyl	167–169 dec.	93	$C_{10}H_{11}NO_3S$			6.22			6.54
2'-Hydroxyphenyl	164–166	99	$C_{10}H_{11}NO_3S$			6.22			6.04
1'-Ethylpropyl	173–175	43	$C_9H_{17}NO_2S$			6.89			6.70
3',4'-Diethoxyphenyl	149–151 dec.	96	$C_{14}H_{19}NO_4S$			4.71			4.65
n-Hexyl	150–152	99	$C_{10}H_{19}NO_2S$			6.45			6.28
i-Propyl	180–182	41	$C_7H_{13}NO_2S$			7.99			7.70

[a] Melting points were taken on a Fisher–Johns apparatus. [b] Carbon and hydrogen analyses by Oakwold Laboratories, Alexandria, Va.; nitrogen analyses by H. Soloway.

colorless crystals which melt, in most cases, with decomposition, have solubility properties reminiscent of α-amino acids, and show a tendency to revert to the original components on solution in polar solvents.

Experimental

The method of Schubert[2] was used in all cases, and the results obtained are listed in Table I.

2-(2'-Thienyl)-thiazolidine-4-carboxylic acid.—L(+)-Cysteine hydrochloride[6] (5 g., 0.028 mole) and 3 g. (0.035 mole) of potassium acetate were dissolved in 43 ml. of distilled water. To this solution was added 3.56 g. (0.0318 mole) of freshly distilled thiophene-2-aldehyde in 45 ml. of 95% ethanol. On shaking vigorously, precipitation occurred. After refrigeration overnight, the crystalline product was separated by filtration, washed with 20 ml. of cold ethanol, and recrystallized from the same solvent, giving a 94% yield of product melting at 145–146°.

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(6) Purchased from General Biochemicals, Inc., Chagrin Falls, Ohio.

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NEW COMPOUNDS

6-β-Hydroxyethoxy-4-(3'-diethylaminomethyl-4'-hydroxyanilino)-quinoline

2-Diethylaminomethyl-4-aminophenol dihydrochloride[1] (13.3 g.) and 6-β-hydroxyethoxy-4-chloroquinoline[2] (11.2 g.) were refluxed in isopropyl alcohol (550 cc.) for twenty-four hours. The dihydrochloride of 6-β-hydroxyethoxy-4-(3'-diethylaminomethyl-4'-hydroxyanilino)-quinoline precipitated and was filtered from the hot reaction mixture. Suspending the precipitate in fresh, hot isopropyl alcohol, then filtering, gave 20 g. of dihydrochloride. This material (20 g.) was dissolved in water (150 cc.), ether (200 cc.) was added, and the mixture was made alkaline with potassium carbonate with shaking. The free base was filtered off, triturated in a mortar with water, and crystallized from acetone (16 volumes). When dried to a melting point of 144–145° the compound contained one-half mole of water; yield, 40%. The substance was a tan powder, soluble in acetone, slightly soluble in benzene or chloroform, and very slightly soluble in ether.

Anal. Calcd. for $C_{22}H_{27}O_3N_3 \cdot 0.5H_2O$: C, 67.67; H, 7.23; N, 10.74; H_2O, 2.31. Found: C, 67.41; H, 7.25; N, 10.87; H_2O, 2.33.

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(1) Kindly presented by Parke, Davis and Company.

(2) Ramsey and Cretcher, THIS JOURNAL, 69, 1659 (1947).

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RECEIVED SEPTEMBER 26, 1947

Substituted Amides of *p*-Cyclohexylbenzoic Acid

A number of substituted amides of *p*-cyclohexylbenzoic acid were prepared by a reaction of the acid chloride with the corresponding amine in benzene solution. The standard method described by Shriner and Fuson[1] was employed. However, as the amounts of amine employed in each instance was double to triple the molar quantity specified

TABLE I

SUBSTITUTED AMIDES OF *p*-CYCLOHEXYLBENZOIC ACID

N-*p*-cyclohexylbenzoyl	M. p., °C.	Sol-vent	Yield, %	Empirical formula	N Analyses, % Found	Calcd.
Aniline	198–198.5	*b, c, d*	39	$C_{19}H_{21}NO$	5.08	5.01
p-Toluidine	205.0	*b*	52	$C_{20}H_{23}NO$	4.59	4.78
m-Toluidine	149.5–150.0	*d*	23	$C_{20}H_{23}NO$	4.55	4.78
o-Toluidine	153.0	*a*	67	$C_{20}H_{23}NO$	4.86	4.78
p-Bromoaniline	250.5	*a, b*	46	$C_{19}H_{20}NOBr$	3.76	3.91
m-Bromoaniline	164.0	*b*	39	$C_{19}H_{20}NOBr$	3.83	3.91
o-Bromoaniline	106.0–106.2	*b*	50	$C_{19}H_{20}NOBr$	3.78	3.91
3-Bromo-4-amino-toluene	123.5–124.0	*a*	80	$C_{20}H_{22}NOBr$	3.67	3.76
5-Bromo-2-amino-toluene	223.5	*b, c*	60	$C_{20}H_{22}NOBr$	3.63	3.76
3-Nitro-4-amino-toluene	134.0	*c*	86	$C_{20}H_{22}N_2O_3$	7.75	8.28

[a] Ethyl acetate. [b] Benzene. [c] 1,4-Dioxane. [d] Ethyl alcohol. [e] *n*-Propyl alcohol.

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(1) Ralph L. Shriner and Reynold C. Fuson, "The Systematic Identification of Organic Compounds," 2nd Ed., John Wiley & Sons, Inc., New York, N. Y., 1940, pp. 132–133.