

REACTIONS OF FURAN DERIVATIVES WITH ALIPHATIC CARBONYL COMPOUNDS IN ACID MEDIUM

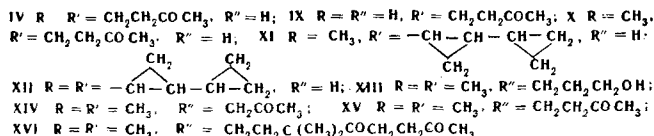
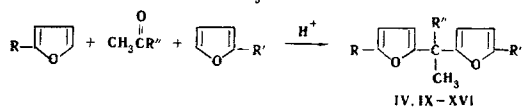
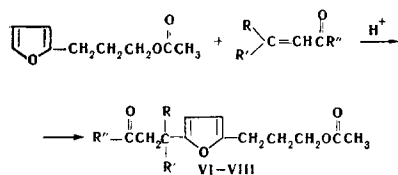
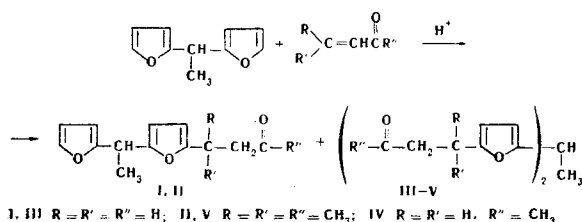
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Sixteen new derivatives of the furan and of the 1,1-difurylmethane series were synthesized by the reactions of furan, 2-methylfuran, 2-(3'-acetoxypropyl)furan, 2-(3'-butyl)furan, 1-cyclopropyl-2- α -furylcyclopropane, and 1,1-difurylthane with saturated and α, β -unsaturated aliphatic carbonyl compounds in acid medium.

In connection with the relatively high biological activity of some [1] furan derivatives, it seemed interesting to synthesize a series of new furanoid compounds. In the synthesis of these compounds, we utilized the nucleophilic addition reaction of furanoid compounds to the double bond of α, β -unsaturated carbonyl compounds [2], as well as the condensation reaction of furanoid compounds with saturated aliphatic carbonyl compounds [3].



According to data of the All-Union Phytopathological Institute, compounds I-IV, VI, VII, IX, and XIV possess a high herbicidal activity on peas and Cruciferae plantings at a dose of 10 kg/ha.

EXPERIMENTAL

1-(5-Methylfuryl-2)-1-[5-(3'-oxobutyl)furyl-2]ethane (X). To 22.5 g (0.163 mole) of 2-(3'-oxobutyl)furan, 0.1 g of hydroquinone, and 0.15 ml of 50% H₂SO₄ was added a mixture of 17 g (0.207 mole) of 2-methylfuran with 11 g (0.227 mole) of acetaldehyde under stirring and in the course of 2 hr. The reaction mixture was neutralized and then extracted with ether. After distilling off the ether, 8 g of X was obtained. The remaining compounds were prepared according to [2, 3]. The table summarizes the properties of the compounds synthesized.

REFERENCES

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Properties of the Compounds Obtained

Compound	Name	Bp, °C (pressure, mm)	d ₄ ²⁰	n _D ²⁰	Empirical formula	Found, %		Calculated, %		Yield %
						C	H	C	H	
I	1-(Furyl-2)-1-[5-(3'-oxopropyl)furyl-2]ethane	109—110 (3)	1.1110	1.5114	C ₁₃ H ₁₄ O ₃	71.37 71.61	6.41 6.48	71.53	6.46	30
II	1-(Furyl-2)-1-[5-(1',1'-dimethyl-3'-oxobutyl)furyl-2]ethane	110—111 (2)	1.0474	1.4970	C ₁₆ H ₂₀ O ₃	73.36 73.31	7.63 7.67	73.81	7.74	27
III	1,1-Bis[5-(3'-oxopropyl)furyl-2]ethane	mp. 38—39	—	—	C ₁₆ H ₁₈ O ₄	69.90 69.82	6.65 6.65	70.05	6.61	28
IV	1,1-Bis[5-(3'-oxobutyl)furyl-2]ethane	205—206 (5.5)	1.0801	1.5052	C ₁₈ H ₂₂ O ₄	71.70 71.85	7.30 7.26	71.49	7.33	54
V	1,1-Bis[5-(1',1'-dimethyl-3'-oxobutyl)furyl-2]ethane	173—174 (2)	1.0437	1.4980	C ₂₂ H ₃₀ O ₄	73.73 73.84	8.36 8.30	73.70	8.44	18
VI	2-(3'-Oxopropyl)-5-(3'-acetoxypropyl)furan	121 (2)	1.0954	1.4792	C ₁₂ H ₁₆ O ₄	64.29 64.19	7.10 6.98	64.26	7.19	36
VII	2-(1'-Methyl-3'-oxopropyl)-5-(3'-acetoxypropyl)furan	115—116 (2)	1.0747	1.4780	C ₁₃ H ₁₈ O ₄	65.75 65.75	7.44 7.50	65.52	7.61	36
VIII	2-(1',1'-Dimethyl-3'-oxobutyl)-5-(3'-acetoxypropyl)furan	122 (2)	1.0395	1.4744	C ₁₅ H ₂₂ O ₄	67.53 67.58	8.39 8.42	67.64	8.33	31
IX	1-(Furyl-2)-1-[5-(3'-oxobutyl)furyl-2]ethane	113 (3)	1.0875	1.5070	C ₁₄ H ₁₆ O ₃	72.29 72.39	7.19 7.16	72.39	6.94	18
X	1-(5-Methylfuryl-2)-1-[5-(3'-oxobutyl)furyl-2]ethane	118.5—119 (3)	1.0717	1.5063	C ₁₅ H ₁₈ O ₃	72.74 72.71	7.37 7.17	73.14	7.37	20
XI	1-(5-Methylfuryl-2)-1-[5-(dicyclopropyl-2')furyl-2]ethane	126—127 (3)	1.0414	1.5180	C ₁₇ H ₂₀ O ₂	79.52 79.69	7.96 8.01	79.65	7.87	16
XII	1,1-Bis[5-(dicyclopropyl-2')furyl-2]ethane	185—186 (4)	1.0452	1.5282	C ₂₂ H ₂₆ O ₂	81.56 81.58	8.19 8.23	81.91	8.13	59
XIII	2,2-Bis(5-methylfuryl-2)pentan-5-ol	126 (3)	1.0497	1.5032	C ₁₅ H ₂₀ O ₃	72.33 72.59	8.20 8.19	72.55	8.12	58
XIV	2,2-Bis(5-methylfuryl-2)pentan-4-one	105 (3)	1.0725	1.5080	C ₁₅ H ₁₈ O ₃	73.59 73.67	7.20 7.24	73.14	7.37	25
XV	2,2-Bis(5-methylfuryl-2)hexan-5-one	118—119 (3)	1.0641	1.5088	C ₁₆ H ₂₀ O ₃	73.99 74.01	7.86 7.98	73.81	7.74	15
XIV	2,2-Bis(5-methylfuryl-2)-5,5-dimethyldecandi-6,9-one	169 (3.5)	1.0698	1.5078	C ₂₁ H ₂₈ O ₄	73.26 73.29	8.05 8.11	73.23	8.19	32