A STUDY OF THE CHEMICAL PROPERTIES OF 3-ARYL-2-METHYLQUINAZOL-4-ONE DERIVATIVES WITH THE OBJECT OF FINDING METHODS FOR THEIR ANALYSIS

I. The Reaction of 2-Methyl-3(o-tolyl)quinazol-4-one with Some Aromatic Aldehydes

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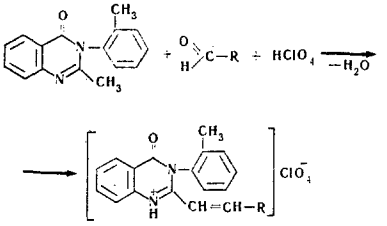
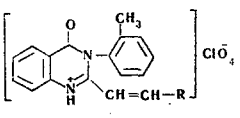
In order to find methods for the analysis of 3-aryl-2-methylquinazol-4-ones, we have studied the condensation of 2-methyl-3-(o-tolyl)-quinazol-4-one with aromatic aldehydes. It has been shown that the condensation of these substances takes place readily in glacial acetic acid and that the styryl synthesized separates out directly in the form of a crystalline quinazolonium perchlorate, the depth of coloration of which depends on the chemical nature of the aldehyde residue.

3-Aryl-2-methylquinazol-4-ones possess a many-faceted pharmacological action [1–4]. Some of them are widely used in medicine [5]. There are no specific methods for the analysis of these compounds. In order to find such methods, we have studied the reaction of 2-methyl-3-(o-tolyl)quinazol-4-one (Orthonal) [6] with aromatic aldehydes. Methods for the synthesis of styryls of 3-alkyl-2-methylquinazol-4-ones by their condensation with p-dimethylaminobenzaldehyde have been described in the literature with the aim of obtaining biologically-active quinazolones. The reaction takes place in two stages: the quinazolone is first heated for several hours with an alkyl iodide in a sealed tube, and then the resulting quinazolone alkyl iodide derivative is condensed with the aldehyde in acetic anhydride [7]. Attempts to use this method of synthesis for obtaining styryls of 2-methyl-3-(o-tolyl)quinazol-4-one with the simultaneous formation of alkyl halide derivatives did not give us satisfactory results. The condensation products were isolated in the form of a resinous non-crystallizing mass. In accordance with the object of the investigations, we have studied the possibility of a simple and generally available method for the synthesis of crystalline and intensely colored styryls of 3-aryl-2-methylquinazol-4-one.

In the synthesis of styryls of 2-methyl-3-(o-tolyl)-quinazol-4-one, we used glacial acetic acid as the condensing agent and perchloric acid instead of an alkyl halide. In the latter case, the high nucleophilic activity of the perchlorate ion, favoring the polarization of the styryl obtained (see table) was taken into consideration.



The UV spectra of the compounds studied had, in addition to two maxima characterizing the electronic structure of the quinazolone moiety of the molecule (228–232 and 264–266 nm), a maximum at 304–306 nm which is characteristic for a conjugated ethylenic bond [8]. The IR spectra of the substances obtained had a strong band at 1140–1060 cm^{-1} (ClO_4^- [9]), bands at 1650–1617 and 1570–1585 cm^{-1} (intracyclic double C=C bond [10]), a band at about 1590 cm^{-1} intracyclic C=C bond conjugated with an aromatic ring [10]), and two bands in the 3250–3000 and 1740–1710 cm^{-1} ($\overset{+}{N}H$



R	Mp, °C (decomp.)	Color	Empirical formula	N, % Calculated	N, % Found (Kjeldahl)	Yield, %
C_6H_5	219—223	Colorless	$C_{23}H_{18}N_2O \cdot HClO_4$	6.38	6.37	80.6
p-$CH_3OC_6H_4$	229—232	Yellow	$C_{24}H_{20}N_2O_2 \cdot HClO_4$	5.97	5.91	69.7
3.5-$(HO)_2C_6H_3$	252—254	Yellow	$C_{23}H_{18}N_2O_3 \cdot HClO_4$	5.95	5.87	67.2
3-CH_3O-4-HOC_6H_3	247—249	Bright yellow	$C_{24}H_{20}N_2O_3 \cdot HClO_4$	5.77	5.79	63
C_6H_5-CH=CH	249—252	Brown-yellow	$C_{25}H_{20}N_2O \cdot HClO_4$	6.02	6.08	62.4
p-$NO_2C_6H_4$	197—205	Yellow	$C_{23}H_{17}N_3O_3 \cdot HClO_4$	8.69	8.59	71.5
α-C_4H_3O	182—184	Green-yellow	$C_{21}H_{16}N_2O_2 \cdot HClO_4$	6.53	6.42	66.7
p-$(CH_3)_2NC_6H_4$	246—248	Red	$C_{25}H_{23}N_3O \cdot HClO_4$	8.71	8.76	95.85
p-$(C_2H_5)_2NC_6H_4$	241—243	Red	$C_{27}H_{27}N_3O \cdot HClO_4$	8.23	8.23	78

[10]). The product of condensation with vanillin had a band at 3300 cm^{-1} characteristic for a free hydroxyl, and the product of condensation with p-nitrobenzaldehyde had two bands at 1525 and 1345 cm^{-1} which are characteristic for the stretching vibrations of nitro group in aromatic compounds [9,10].

EXPERIMENTAL

The UV spectra were recorded on an SF-4 spectrophotometer in ethanolic solutions and the IR spectra on a UR-10 spectrophotometer (mulls in paraffin oil).

General method for performing the reaction. An equimolecular amount of aromatic aldehyde was added to 5 ml of a 0.4M solution of 2-methyl-3-(o-tolyl)quinazol-4-one in glacial acetic acid, and the mixture was boiled under reflux for 15 min. After cooling, 2-4 ml of 30% perchloric acid solution was added to the colored reaction mixture. The solution acquired a more intense coloration and immediately deposited the crystalline reaction product (see table). The compounds obtained are readily soluble in methanol and ethanol, sparingly soluble in chloroform, and insoluble in water, ether, and benzene.

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