SYNTHESIS AND STUDY OF PROPERTIES OF SALICYLIC ACID PRODUCTS

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Abstract. The article examines the conditions of the synthesis of various products of salicylic acid, which are bioregulators, synthesized by the body itself and performing protective functions. Initial attempts have been made to study new properties of the products obtained, as a manifestation of biological activity with side effects. The kinetics has been studied and the kinetic parameters of the alkylolation reaction of salicylic acid salt with allyl bromide have been determined. Received phosphoric esters of salicylic acid, amides based on various amidating substances.

Introduction. The invention aims to obtain vinyl esters and their derivatives, which are very important for medicine, industry and agriculture. In the synthesis of polymers, block monomers can be synthesized as well as insecticides and herbicides. Also, by introducing a variety of functional groups due to the double bonds of the vinyl ester, substances with different properties can be synthesized.

As you know, the chemistry of non-steroidal anti-inflammatory drugs (NSAIDs) is one of the fastest-growing areas of chemistry due to the practical importance of these compounds. NSAIDs are a wide and diverse group of drugs that are widely used in clinical practice due to their clinical structure. Most of the NSAIDs (including salicylic acid, a derivative of o-hydroxybenzoic acid called SA) are "warm" anti-inflammatory drugs [1-5].

Their side effects are similar: harmful effects on the mucous membrane of the gastrointestinal tract, impaired renal function, and others. Derivatives of SA (salicylates) have been used in clinical practice since the end of the nineteenth century and are still widely used today. SA derivatives, such as acetylsalicylic acid (ASA, aspirin), sodium salicylate, salicylamide (CAM), methyl salicylate, are used in medicine as pain relievers (pain relievers), antipyretic (antipyretic) and antiplatelet (anti thrombotic). According to the latest data, SA derivatives can be considered as bioregulators synthesized by the body itself and performing protective functions. And this allows us to reconsider the role of SC in the pathophysiology of humans and animals.

To date, several scientists have created their own schools for the synthesis of vinyl esters and their derivatives. One of them is the scientific school of F.V. Kalabina. They used acetylene as a vinyl agent in their vinyl ester technology. Their constituents - arylvinyl ethers - are widely used in the synthesis of polymers, in the synthesis of diene and polylene, as well as in the synthesis of biologically active substances [6-11].

“Systems that have a Hammett acidity function (H_) above 18.5, i.e. systems
with such basicity that it is impossible to create in hydroxyl-containing solvents (water and alcohols) due to the limitations imposed by the acidity of the medium itself. Of the wide variety of super basic systems for systematic use in the chemistry of acetylene, the KOH / DMSO suspension turned out to be convenient as the simplest, most accessible, and universal. The upper limit of its basicity is set by the acidity of DMSO (pKα = 35.1), but usually does not exceed 32 (on the H_ scale), unless special measures are taken to remove water released during the formation of dimethylsilyl-potassium [12-18].

A big advantage of this system is its adjustable basicity: when the water content in DMSO is <25%, it goes into the superbasicity region (H_ > 20), and with a further decrease in the water concentration, its function H_ increases steeply, approaching 30-32 in the region of 99% DMSO. A big advantage of this system is its adjustable basicity: when the water content in DMSO is <25%, it goes into the superbasicity region (H_ > 20), and with a further decrease in the water concentration, its function H_ increases steeply, approaching 30-32 in the region of 99% DMSO.

In this regard, the development and improvement of new directions for the synthesis of SC derivatives, as well as the search for effective therapeutic agents based on SC that increases biological activity in combination with low toxicity and less detectable side effects, is an urgent task.

![Acidity function (H_) of the KOH / DMSO / H2O system on the DMSO content in it](image)

**Fig. 1. Dependence of the acidity function (H_) of the KOH / DMSO / H2O system on the DMSO content in it**

The works of A.E. Favorsky on the development of the fundamental chemical bases of acetylene have not lost their relevance today. It is possible to carry out the reaction of nucleophilic binding (vinylation) of acetylene as an electrophile in a strongly grounded environment and as the nucleophilic binding of acetylene with the carbonyl group C = O (ethynylation). KOH / DMSO is one of the most stable, comfortable and versatile systems among supersexual environments [19-27].

Acetylene and vinyl carbanions are intermediates in the Favorsky reaction:
- acetylene carbanions (ethynylation reaction):
  \[ \text{C} \rightleftharpoons \text{CH} \rightarrow \text{B}^{-} \]
- propargyl anions (acetylene-allene isomerization):
Experimental part and its discussion. 17 esters and 6 amides of SA have been synthesized and described. Improved methods have been developed for the esterification of SA and ASA esters and the preparation of their salts by alkylation with an alkyl halide, a potentially potent antipyretic agent, to obtain the target compounds with high efficiency and high purity.

Vinylation of aminophenols of various structures and varying degrees of substitution of the amino group with acetylene in the presence of a base, characterized in that the process is carried out at a much lower pressure - 14-26 atm. in a medium of a high-boiling solvent DMSO containing 10-30 vol.% H₂O at a temperature of 80-110 °C, and lithium, or sodium, or potassium hydroxides were used as a base 29-100 mol.% (In terms of mass, this is ~ 11 -35 wt%).

A known method of producing β-phenoxypridine from the obtained vinyl acetylene and phenol. The synthesis was carried out with the participation of a catalyst, at high pressure and temperature [28-34].

To obtain vinyl esters of salicylic acid, the following examples are given: 12,16 g (0.08 mol) of (2-dihydroxy-3-methyl benzoic acid) are added to 100 ml of 35% potassium hydroxide solution and placed in a magnetic stirrer for 12-16 minutes until a homogeneous solution is formed. The synthesized and cooled (3-5°C) solution of vinyl acetylene in o-xylene (chlorobenzene) is combined with a Drexel flask with a solution of 2-dihydroxy-3-methyl benzoic acid. When the electric heater heats the vinyl acetylene solution, the gas evolved from it passes into the 2-dihydroxy-3-methyl benzoic acid solution. The process continues for 55-60 minutes until the solution is saturated with vinyl acetylene 2-dihydroxy-3-methyl benzoic acid (up to a maximum of 1.5 hours). After completion, the resulting reaction mixture was cooled, dissolved in 150 ml of water and extracted with diethyl ether. The extraction product is dried with anhydrous calcium chloride, and the solvent is distilled off in a rotary evaporator. the β-Divinyl ester of 2-hydroxybenzoic acid was obtained in crystalline form with a productivity of 66% in an amount of 10.7712 g. The molecular weight of a β-divinyl ester of 2-hydroxybenzoic acid is 204 g / mol, the boiling point is 285.2°C, and the melting point is 71.9°C [35-41].

In contrast to the synthesis of this drug from other methods, the proposed method differs in its performance under mild conditions and does not require high pressure, temperature and catalyst. The synthesis is carried out in an alkaline environment. In the course of the study, the systematization of vinyl acetylene with vinyl acetylene was systematically studied using highly basic KOH-DMSO and KOH-DMF systems in the presence of salicylic acid (KOH) alkali.

The roles of DMSO in the KOH-DMSO system change, there is a dissociation of the ion pair based on it, the formation of a dimsyl anion based on the Yuasori-based and low-solvate state:

It should be noted that the essence of this system as a whole can be explained
by changes in the dielectric constant of the medium, hydrogen bonds, and other effects. The introduction of metal fluorides into the DMSO-KOH system will increase their basicity, simplify the process and increase the yield of vinyl ethers [42-54].

For vinyl salicylic acid, a catalytic system with a high base content CsF-MON-DMSO (M = Li, Na, K) was used. In the process, the formation of a vinyl ester of salicylic acid was determined, a schematic representation of the reaction is as follows:

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\[ \text{O-H} + \text{HC-} + \text{C} = \text{C} \equiv \text{CH}_2 \rightarrow \text{KOH-DMSO-CsF} \]
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This increases the reliability of the system and allows you to dramatically increase the yield of the resulting product.

**Conclusion:** The effect of the nature of the catalyst on the vinyl process of salicylic acid has been studied. Lithium, sodium, and potassium hydroxides were used as catalysts. In all cases, the formation of an ester of salicylic acid was found. The results obtained depending on the nature of the catalyst used are shown in Table 1.

**Table 1**

| Catalyst | Product yield,% |
|----------|-----------------|
| LiOH     | 14.6            |
| NaOH     | 22.7            |
| KOH      | 31.7            |

According to the results, it was found that the most active catalyst used was KOH, with a yield of a vinyl ester of salicylic acid of 31.8%, LiOH and NaOH of 14.5 and 22.7%, respectively.

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