Brief information about the project

Title	AP22688235 «Synthons of new biologically active imidazolyl derivatives».
Relevance	The project is aimed at obtaining new imidazole derivatives, since the imidazole ring is a valuable fragment of many important molecules carrying the potential of biological activity. The research consists in carrying out the diester cyclization reaction according to Dickman, nucleophilic addition of the acetylenide anion to the carbonyl group by the Favorsky reaction, condensation of the primary amine with various benzaldehydes and dialkylphosphites, and alkylation with diverse bromides. During the implementation of the project, it is planned to obtain inclusion complexes with natural medical polymers (cyclodextrins, arabinogalactan and/or pectins) due to their non-toxicity and for long-term storage of synthesized substances.
Goal	The aim of the project is to obtain new synthons based on 3-(1*H*-imidazole-1-yl)propane-1-amine for biologically active piperidinols, α-aminophosphonates and thioesters
Tasks	*Tasks for the synthesis of substances with an imidazole fragment:* - cyclization of the diester followed by the production of piperidinols by nucleophilic addition by the Favorsky reaction; - isolation of α-aminophosphonates during condensation of 3-(1*H*-imidazole-1-yl)propane-1-amine with various benzaldehydes and dialkailphosphites; - implementation of alkylation of (3-(1*H*-imidazole-1-yl)sodium carbamodithioate with m-methoxyphenyl-, phenacyl- and propargyl bromides under conditions of catalytic initiation. Selection of catalysts and optimal conditions (time, temperature, solvent/dry medium); - preparation of inclusion complexes with medical polymers (cyclodextrins, arabinogalactan and pectin). *Tasks for determining the chemical composition and structure* to determine the chemical composition and structure, methods of elemental analysis, IR and NMR spectroscopy, including methods of spectrometric analysis of X-ray diffraction, will be used. *The tasks of bioscreening* for growth-stimulating and other *in vitro* activity will be carried out on seeds, wheat seedlings and/or strains of microorganisms, respectively.
Expected and Achieved Results	Based on the results of scientific research, it is planned to submit at least 2 (two) articles in journals from the first three quartiles by impact factor in the Web of Science database or having a CiteScore percentile in the Scopus database of at least 50, submission of 1 (one) article in a peer-reviewed domestic journal recommended by KQAFES and submission of 3 (three) patent applications for a utility model of the Republic of Kazakhstan. New imidazole-containing derivatives will be synthesized using fine organic synthesis methods. To study the physicochemical properties and chemical structure, a

	number of physicochemical methods will be used (elemental analysis, NMR spectroscopy, IR spectroscopy and/or X-ray, etc.). Biological testing of growth-stimulating and other *in vitro* activity will be performed.
Names and Surnames of Research Group Members with Their Identifiers (Scopus Author ID, Researcher ID, ORCID, if available) and Links to Corresponding Profiles	Kaldybayeva A.B.- supervisor, Scopus Author ID: 57222042972, https://orcid.org/0000-0003-2805-3633, https://www.webofscience.com/wos/author/record/AAN-7838-2021 Yu V.K. – advicer, Scopus Author ID: 8841069300, https://orcid.org/0000-0001-6508-707X,
Publications list with links to them	1. Kaldybayeva A.B., Yu V.K., Durap F., Aydemir M., Tassibekov K.S. Metal complexes of bispidine derivatives: Achievements and prospects for the future // Molecules. – 2025. – 30, 1138. https://doi.org/10.3390/molecules30051138 (Chemistry (miscellaneous) Q1, IF: 4.2). (WoS Q2, Scopus, percentile 83%)
Patent information	-