



SLOVAK ACADEMY OF SCIENCES



THE NATIONAL ACADEMY OF SCIENCES OF UKRAINE

**SLOVAK ACADEMY OF SCIENCES (SAS) -
NATIONAL ACADEMY OF SCIENCES OF UKRAINE (NASU)**

APPLICATION

FOR UKRAINIAN- SLOVAK JOINT RESEARCH PROJECT
FOR THE PERIOD 2020-2022

Project title:
Geophysical events and their bioindication using microorganisms
Geofyzikálne príhody a ich bioindikácia pomocou mikroorganizmov

Slovak side:

Ukrainian side:

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<p><u>List of executor of the project:</u> RNDr. Magdalena Vaczyova, PhD Mgr.Valach Fridrich, PhD Prof. Podhorsky Dushan, DrSc. Mgr. Anna Buchholcerova, junior scientist</p>	<p><u>List of executor of the project:</u> D.Sc., Senior researcher, Gromozova O.M. Ph.D. Hretskyi I.O., young specialist Luchko R.A., undergraduate Ph.D. Skorokhod I.O., young specialist D.Sci., Prof. Kurdysh I.K.</p>

Start date: 2020	Term: 2020-2022
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ANNOTATION:

Short description and purpose of the project:

Using the results and hypotheses obtained in the joint research during 2017-2019, the project team has decided to continue research activities within the frame of this project, that includes the following steps:

- monitoring fluctuations of geophysical phenomena such as low-frequency geomagnetic field fluctuations (Slovakia, Hurbanovo Geomagnetic Observatory), high time resolution measurements of atmospheric pressure, temperature, humidity (in the regions of Ukraine and Slovakia) to perform the amplitude-frequency analysis of the obtained data
- development and modification of systems for automatized investigation of bioindicator parameters and aspect of modelling of geophysical parameters
- determination of processes of interaction of fluctuations of geophysical factors with changes of bioluminescence of bacteria, metachromasia of volutinous granules of yeast and antioxidant properties of plants, those being as bioindicators
- development of algorithms and programs for the study of correlations between fluctuations of geophysical phenomena characteristics considered and bioindicators
- comparative analysis of the obtained data to determine the mechanisms of influence of chosen geophysical factors on biologically important processes.

Objective of the project: Determination of the interrelation between the geophysical phenomena fluctuations and their bioresponse - bioluminescence of bacteria, metachromasia of volutinous granules of yeast and antioxidant properties of plants – called in this study as bioindicators.

Scientific field: Earth sciences, biophysics, medical sciences

Expected results:

Keeping in mind partial results obtained earlier, project participants do evaluate the benefit of mutual cooperation feeling the need to continue in investigation of this interdisciplinary topic:

- collection of an actual database of fluctuations in geophysical characteristics in Slovakia and Ukraine to widen a database in the frequency range less than 1 Hz;
- modification of methodological approaches to registration and processing of fluctuations of bioindicator parameters due to geophysical events analyzed;
- optimization of processing algorithms for bioindicator data and software development for determination of amplitude-frequency characteristics of geophysical parameters and their analysis
- analysis of the peculiarities of the relationship between changes in the bioluminescence of bacteria, metachromasia of volutinous granules of yeast and antioxidant properties of plants, on one side, and low-frequency fluctuations in **both** the geomagnetic field and **meteorological** parameters considered, **on other side**, in order to determine the biophysical mechanisms of influence of these **environmental** factors.

The expected results appear to be of essential societal value and are the basis for a further tight cooperation.

Participation of young researchers is planned in the project: three project participants from Ukraine and one from Slovakia are scientists of the age below 35 years.

Plan of the scientific exchanges (for each year of the project duration):

A) Slovak institution

(mobility from SAS to NASU)

Number of planned trips (Total):

.....6.....

Thereof: For the year one: 2
For the year two: 2
For the year three: 2

Duration of planned stay (Total):

.....30 days.....

Thereof: For the year one: 10
For the year two: 10
For the year three: 10

B) Ukrainian institution

(mobility from NASU to SAS)

Number of planned trips (Total):

.....6.....

Thereof: For the year one: 2
For the year two: 2
For the year three: 2

Duration of planned stay (Total):

.....30 days.....

Thereof: For the year one: 10
For the year two: 10
For the year three: 10

SIGNATURES AND SEALS

Slovak side:	Ukrainian side:
<p>Project leader:</p> <p align="center"></p> <p align="center">RNDr. Pavol Nejedlik, CSc.</p>	<p>Project leader:</p> <p align="center"></p> <p align="center">Dr Sci, Prof., Yu. P. Gorgo</p>
<p>Director:</p> <p align="center"> </p> <p align="center">RNDr. Jan Madaras, PhD</p>	<p>Acting director:</p> <p align="center"> </p> <p align="center">Serhiy Voychuk, PhD</p>
<p>Date:</p>	<p>Date:</p>