1st INTERNATIONAL CONGRESS ON NATURAL SCIENCES (ICNAS-2021)

ABSTRACT AND FULL TEXT CONGRESS BOOK

Editors:
Assos. Prof. Dr. Bekir GÜRBULAK
Assos. Prof. Dr. Hakan ÖZKAN

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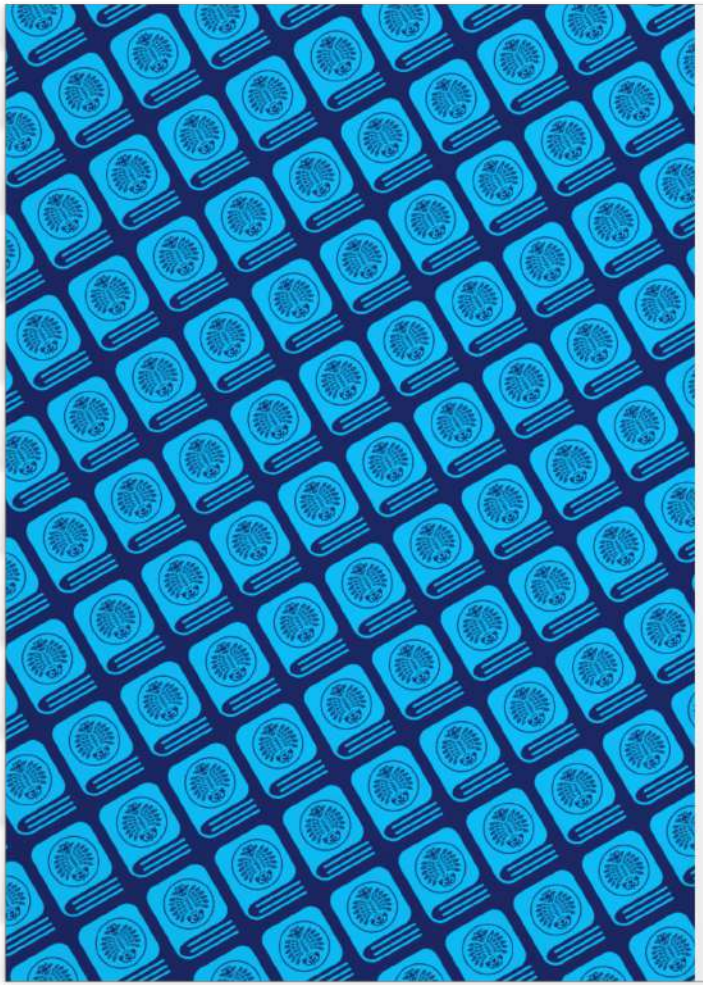

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STATISTICAL LEARNING IN BIOLOGY AND ITS APPLICATIONS IN R

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ABSTRACT

Statistical learning is a crucial tool for modern biological research. Despite that, biologists and biomedical researchers often do not have the adequate statistical literacy to run a research project effectively. The aim of this paper is to provide the biologists with a guide to the application of statistical learning in modern biology. The review covers methods from traditional statistical models to recent machine learning algorithms, applied to solve modern biological questions. Specifically, the paper explores several applications of statistical modeling and recent machine learning algorithms in genomics, proteomics, systems biology, and ecology. It also includes extensive information on packages developed to apply these methods in the R programming language.

Keywords: Statistical learning, Biological research, Biological data analysis, R programming

QUANTIFICATION OF ANTIFUNGAL POTENTIAL OF PURIFIED HYDROLYTIC ENZYMES FROM CARNIVOROUS PLANTS

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ABSTRACT

Fungal pathogens cause significant losses in a crop production every year. Plants have developed specialized defensive mechanisms, including production of the proteins with antifungal activity, including hydrolytic enzymes, chitinases and glucanases. Molecular biology and genetic engineering methods allows the introduction of these proteins with the antifungal effect into crops with the aim of improving their resistance against fungal pathogens. Various methods for estimating of a protein antifungal potential have been used, and most of them evaluate the results by measurement of a colony or inhibition zone diameter. Proper quantification of these data is often problematic and subjective. Quantification of the antifungal potential of proteins by spectroscopic measurement of fungi biomass growth is more accurate and reproductible in comparison with "disc-based" methods. Purified chitinase from *Drosera rotundifolia* and purified β-1,3-glucanase from *Drosera binata* produced by the procaryotic *E. coli* expression system were tested for their antifungal potential against *Trichoderma viride*, *Fusarium poae*, *Alternaria solani* and *Rhizoctonia solani*. Purified chitinase shoved significant inhibition effect against *Trichoderma viride* (21%), *Fusarium poae* (24%) and *Alternaria solani* (20%), purified β-1,3-glucanase inhibits growth of *Fusarium poae* (24%), *Alternaria solani* (14%) and *Rhizoctonia solani* (18%). The results showed that although the antifungal factor exhibit a minor fungi growth inhibition, the proposed spectroscopic method is suitable and accurate for its quantification.

Keywords: antifungal activity, chitinase, glucanases, pathogenic fungi