

DIFFERENT PCR PRIMER SYSTEMS REVEAL STRIKINGLY DIFFERENT COMPOSITION OF ARBUSCULAR MYCORRHIZAL FUNGAL COMMUNITIES

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Arbuscular mycorrhiza (AM) formed by the majority of terrestrial plants and the fungi belonging to phylum Glomeromycota is the most widespread symbiosis on the Earth. The number of described species of AM fungi (AMF) is relatively low: ~230 species have been described, however molecular diversity studies revealed a much higher species richness. Because of pitfalls of spore based methods, PCR-based molecular diversity screening techniques are commonly used to study AMF communities. For this, several primers and primer systems for general and specific amplification of AMF have been designed and used. In this study we tested whether four widely used primer-systems resulted in a similar community structure when AMF communities were studied. Both NS31-AM1 primers and the AML primers target the SSU gene of nrDNA, da Silva's primers amplify a segment of the LSU nrDNA while Krüger's nested primer-system amplifies the ITS and partial LSU of nrDNA. An artificial AMF community was established using DNA extracted from spores originating from a reference AMF collection. Three different mixtures of AMF species representing different orders of Glomeromycota were made and screened by the primers listed above. 96 clones from each primer-test of each mixture were sequenced. The four systems gave strikingly different results regarding both AMF species richness and the frequency based diversity estimators calculated. Our results suggest that the species number of AMF can be much higher than thought before based on molecular diversity studies and stress the importance of simultaneous use of different primer systems for screening AMF diversity.

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POSTANTIFUNGAL EFFECT OF CASPOFUNGIN IN 50% SERUM AND EFFICACY OF SINGLE HIGH DOSE OF CASPOFUNGIN AGAINST THE „PSILOSIS” GROUP

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Caspofungin (CAS) activity was determined in vitro and in vivo against two-two *Candida orthopsilosis*, *C. metapsilosis*, and *C. parapsilosis* sensu stricto isolates. Postantifungal effect (PAFE) was determined in RPMI-1640 with and without 50% human serum. Duration of PAFE was defined as the difference in the time required for control and test isolates to grow 1 log₁₀ following drug removal. Neutropenic mice were intravenously challenged with 5x10⁶ CFU/mouse. Mice were assigned to seven treatment groups for *C. orthopsilosis* and *C. metapsilosis* (no treatment, 1, 2 and 3 mg/kg CAS daily for five days, a single 5, 10 and 15 mg/kg CAS doses). For *C. parapsilosis* there were five treatment groups (no treatment, 3 and 4 mg/kg CAS daily for five days, a single 15 and 20 mg/kg CAS doses). All regimens were started 24 hours postinoculation, the drug was administered intraperitoneally. At the end of treatment all mice were sacrificed and fungal tissue burden in kidney pairs was determined by quantitative culturing. Kidney burden was analyzed using the Kruskal-Wallis test with Dunn's post-test. PAFE of CAS at 16-32 mg/L concentrations for *C. parapsilosis*, *C. orthopsilosis* and *C. metapsilosis* were 8.7->36.7, 21.1->37.5 and 4.6->37.3 hours, respectively. In case of mice inoculated with *C. parapsilosis*, the kidney tissue fungal burdens were significantly decreased by a daily 4 mg/kg CAS dose and 15 and 20 mg/kg single CAS doses when compared to the untreated group.

EXAMINATION OF PLANT GROWTH-PROMOTING HORMONE PRODUCTION OF BACTERIA ISOLATED FROM STRESS SOILS

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In Hungary, as worldwide, economically important food and forage plants are grown mostly on low fertility soil. In our country, more than 40% of the cropland is of low fertility and - in terms of soil's microbial life - degraded, "stress"-soils (strongly acidic, alkaline-saline, structureless, sandy soils, etc). Economical and environmentally-sustainable farming in these areas is difficult due to the deteriorated quality of soil. The new generation of soil vaccines will include naturally present (not genetically modified), stresstolerant and adaptive soil bacteria strains, which are able to efficiently stimulate crop growth, increase resistance capacity and crop yield in „stress”-soils. The Biofil Ltd.'s researchers – in collaboration with strategic partners – select and examine the bacteria with state-of-the-art microbiological technology and molecular biological and biotechnological tools. The outcome shall provide a complex environmentally safe and biological-based tool in order to limit the use of chemical fertilizers and synthetic soil conditioners, and thereby reduce environmental load. We isolated bacteria from soils which impose an extreme environment for the bacteria. We collected soil samples from natural habitats and ploughed lands of Hungary. We isolated hundreds of strains from the samples and among these strains there are around 100 that produce indole-acetic acid (IAA). Thereafter we selected the ones with the highest capacity for further examination. We verified IAA production by the TLC method, after that we selected the ten most effective strains and examined the IAA production in extreme conditions. During the research, we performed examinations in a wide range of salt concentrations and