Mycology 2017

2nd International Conference on

MYCOLOGY & MUSHROOMS

September 25-26, 2017 Chicago, USA

Scientific Tracks & Abstracts

Day 1

Mohammad Babadoost, Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

Inducing sporulation of *Drechslera graminea*

Mohammad Babadoost
University of Illinois, USA

Barley stripe, caused by the fungus *Pyrenophora graminea*, is a single-cycle, seedborne disease. *P. graminea* is rarely observed in the nature, but its imperfect state, *Drechslera graminea*, occurs in all infected barley leaves. *D. graminea* produces conidia, which are in clusters of three to five. The fungus can also produce pycnidia, but it is rare in nature. Although barley stripe is effectively managed by seed-treatment with fungicides, losses to this disease still incurs wherever proper seed treatment is not practiced. *D. graminea* does not sporulate on commonly used artificial culture media. Therefore, production of spores to be used for screening accessions and breeding lines of barley for resistance to barley strip was not possible. A simple method was developed to induce sporulation *in D. graminea*. Thirty-six isolates of *D. graminea*, gathered from Canada, Germany, Montana and Syria, were cultured, developed vigorous colonies and produced abundant conidia. Sporulation of the fungus was induced using straw extract from the barley cultivars arta, bowman, bracken, clark, gallatin, and salmas. There were significant differences in sporulation among isolates from different areas as well as among isolates originating from the same barley field. Incubating the culture plates at 16^0C under fluorescent light (12 h light/12 h dark) for 5 d following incubation under near ultraviolet (NUV) light for 7 d resulted in 40% higher conidia production. Extract of seed, green straw or green leaves of barley as well as extract of mature wheat straw did not induce sporulation *in D. graminea* in culture. Twenty-one of the 36 isolates produced pycnidia following the 7-day incubation under NUV light. Five of 25 isolates grown on V8-juice agar failed to sporulate. Germination of conidia of 12 isolates ranged from 72 to 99%.

Biography

Mohammad Babadoost has received his MS degree in Plant Pathology from Washington State University and completed his PhD in Plant Pathology from North Carolina State University. During 1979-1999, he conducted research on barley and wheat diseases. In 1999, he joined the Faculty of the University of Illinois at Urbana-Champaign (UIUC), and is now a Professor of Plant Pathology and Extension Specialist. At UIUC, he conducts research and extension programs on the biology and management of vegetable and fruit crops diseases, and teaches plant disease diagnosis and management and outreach education skills. He has published one book, four book chapters, one monograph, 10 bulletins, 51 refereed articles, 86 articles in proceedings, 88 abstracts and 175 articles in newsletters. He has developed a profound commitment to sharing his expertise in developing countries to advance the science of plant pathology and establishing food security in the world.

babadoos@illinois.edu

Notes:

Wade Abbott, Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

Microbial metabolism of yeast mannans, a symbiosis that spans from humans to domesticated livestock

Wade Abbott
Agriculture and Agri-Food Canada, Canada

Yeasts, which have been a component of the human diet for at least 7,000 years, possess an elaborate cell wall α-mannan. The influence of yeast mannan (i.e. α-mannan) and other cell wall carbohydrates on the ecology of the human distal gut microbiota remains unclear. Here we show that α-mannan is a viable food source for the Gram-negative bacterium *Bacteroides thetaiotaomicron*, a dominant member of intestinal microbiome. Detailed biochemical analysis and targeted gene disruption studies support a model whereby limited cleavage of α-mannan on the surface generates large oligosaccharides that are subsequently depolymerized to mannose by the action of periplasmic enzymes. Co-culturing studies showed that metabolism of α-mannan by *B. thetaiotaomicron* presents a 'selfish' model for the catabolism of this difficult to breakdown polysaccharide (see Figure). Genomic comparison with *B. thetaiotaomicron* in conjunction with cell culture studies show that a cohort of highly successful members of the microbiota has evolved to consume sterically-restricted yeast glycans, an adaptation that may reflect the incorporation of eukaryotic microorganisms into the human diet. Harnessing knowledge of dietary carbohydrate interactions provides a promising road forward for intestinal health and livestock production.

Biography

Wade Abbott has been investigating the structure-function relationship of CAZymes for over 10 years. In first PDF with Alisdair Boraston (UVIC, 2005-2008), he focused on protein-carbohydrate interactions involved in host-pathogen relationships. In his second PDF with Harry Gilbert (UGA-CCRC, 2008-2010), he studied carbohydrate utilization pathways in Bacteroides. In 2011, he joined Agriculture and Agri-food Canada as a Research Scientist. His program currently focuses on enzyme discovery and engineering for carbohydrate-based applications in animal health and performance.

wade.abbott@agr.gc.ca.

Notes:

Anike F N et al., Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

Groundbreaking: Truffle (*Tuber borchii*) production time reduced by half

Anike N F, Isikhuemhen O S and **Wain Wright L**
North Carolina A&T State University, USA

Introduction: The acute decline in wild and world production, a burgeoning market, a hard to crack production system, and the limited understanding of biotic and abiotic interactions that lead to truffle fructification have contributed to desperate search for orchard (farm) raised truffles. To boost production, truffle orchards are planted using truffle mycorrhized seedlings and managed blindly for many years (5-9 years depending on species) with no guarantee of truffles. The long period of wait time and uncertainties that surround out-planted truffle seedlings are major set-backs to commercial truffle production. We hypothesized that aspects of truffle cultivation that are critical to productive orchard are linked to good quality seedling, orchard management practices that promote underground synthesis, and technologies that monitor and enhance healthy microbial competition in favor of truffle fungus.

Methods: Loblolly Pine (*Pinus taeda*), an economically important tree in North Carolina were selected as host plant for *T. borchii*. Certified mycorrhized pine seedlings of *T. borchii* were planted in two acres plot and managed systematically according to developed standard practices. Seedling quality was a measure of seedling overall health and the level of pine root mycorrhization by *T. borchii*.

Results: The quality of out-planted seedlings was exceptional with more than 90% colonization, which is way above 30-60% reported in literature. Pine growth parameters (height, width, and crown diameter) were higher in mycorrhized than non-mycorrhized tree. The ground-breaking result from this project was that *T. borchii* truffles were harvested in 2 years and 3 months from out-planted seedlings. This is the shortest production period ever reported compared to Europe 4-5 years and Australia 3 years.

Conclusions: Truffle production is possible and can be ramped up in the United States. In the long run Farmers/investor's and funding agencies could have increased interests in truffle production

Biography

Anike F N is an experienced Researcher and Educator with expertise in mushroom and fungal biotechnology. She conducts research and trains students in this field of study, authored and co-authored many peer reviewed journals and publications.

fnanike@ncat.edu

Notes:

Eric M Hinsch, Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

A comparative analysis of extracted fungal pigments and commercially available dyes for colorizing textiles

Eric M Hinsch
Oregon State University, USA

With the resurgence in the interest of using natural textile dyes, a solution must be found that will overcome the limitations of traditional natural dyes. This solution must also be safer for both humankind and the environment than are synthetic dyes. This study compares the colorfastness of commercially available synthetic and natural dyes to wood-staining fungal pigments on both unmordanted and mordanted fabrics. Colorfastness to rinsing, washing, perspiration, and crocking were tested using AATCC standard test methods. A modification of the AATCC standard test method for colorfastness to light was developed using a QUV Accelerated Weathering Tester. Colorfastness was determined using statistical analyses of overall color changes as determined by color readings taken with a colorimeter and using the CIE L*a*b* color space. Results indicate that the wood-staining fungal pigments, especially xylindein, show good potential as a competitor to both synthetic and natural dyes. There are, however, some limitations, such as color intensity and consistency of performance, which still need to be researched and overcome.

Biography

Eric M Hinsch has a BFA in Art and Design, a Master's Degree in Wood Science, and is currently a PhD candidate in Wood Science at Oregon State University, specializing in Applied Mycology. He has pioneered work in dying textiles with wood-staining fungal pigments, reducing or eliminating the need for heat and water during the dyeing process. He is currently, working on developing biopigmented inks for printing textiles utilizing fungal pigments.

eric.hinsch@oregonstate.edu

Notes:

Ilia V Yampolsky et al., Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

Fungal bioluminescence system: luciferin, luciferase and luciferin biosynthesis

Ilia V Yampolsky[1] and **Hans Waldenmaier**[2*]
[1] Institute of Bioorganic Chemistry, Russia
[2] University of Sao Paulo, Brazil
*Presenting Author

Many living organisms emit light, a phenomenon named bioluminescence. There are estimated to exist ~40 different chemical mechanisms underlying the generation of "cold light". The energy required for light production is generated by the oxidation of a small organic molecule, luciferin, catalyzed by a specific enzyme, luciferase. More than 100 species of bioluminescent higher fungi are known. The international research group led by the speaker reported elucidation of fungal luciferin in 2015. In 2016, the same group identified and cloned fungal luciferase and the enzymes of luciferin biosynthesis (publications in press). Discussed will be structure elucidation of fungal luciferin, cloning of fungal bioluminescnce enzymes, light emission mechanism and perspectives of practical applications of fungal bioluminescence.

Biography

Ilia V Yampolsky has completed his PhD from Institute of Bioorganic Chemistry (Moscow) in the field of chemistry of red fluorescent proteins' chromophores and his DrSc in bioluminescence mechanisms. He is the Head of Total Synthesis Lab at the same institute. He has published more than 40 papers in reputed journals. His research interests include fluorescence and luminescence in nature, natural products isolation, function and biosynthesis.

ivyamp@ibch.ru

Hans Waldenmaier has completed his PhD in Biochemistry at the age of 31 years from the University of Sao Paulo, Brazil. Hans also earned a Masters degree in Botany from Miami University in Oxford Ohio and prior to that a BSc in Biochemistry at Clemson University. Currently he is developing a botany based biotech startup focused on bioluminescence. He is one of the foremost experts of fungal bioluminescence, with extensive field experience studying the ecology of the phenomena as well as a deep understanding of the molecular nature of the trait.

HansWaldenmaier@gmail.com

Notes:

Mycology 2017

2nd International Conference on

MYCOLOGY & MUSHROOMS

September 25-26, 2017 Chicago, USA

Scientific Tracks & Abstracts

Day 2

Irum Mukhtar et al., Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

Construction of mutant strains with inducible mating type genes to identify the A mating pathway in *Flammulina velutipes*

Irum Mukhtar, Aron Osakina, Baogui Xie and **Arend F Van Peer**
Fujian Agriculture and Forestry University, China

Mating is the initial step of sexual development in higher fungi and involves the fusion of two compatible mycelia, which brings together complementary sets of mating type genes; HD and PR mating type genes. This pairing of complementary HD and PR genes results in activation of the respective A (HD) and B (PR) mating type pathways. Although HD and PR mating type genes have been identified in many fungi, their downstream pathways have remained largely unknown. The present study aims to develop a tetracycline inducible gene based system for basidiomycetous fungi, followed by the construction of mutants with inducible HD and PR mating type genes to study these pathways in detail. We successfully adapted the doxycycline (a tetracycline derivative) inducible promoter system (TET-On) using two expression units in a single vector; the reverse tetracycline transactivator (rtTA2S-M2) gene that encodes the doxycycline binding TetR protein, and the tetO7 (TetR binding) sequence fused with a minial *gpd* promoter to control expression of the gene of interest. The functionality of this system was confirmed in *F. velutipes* with two different reporter genes, one for a Green Fluorescent Protein (gfp) and one for a Red (dTomato). Next, we selected complementary HD and PR mating type genes for *F. velutipes* strain L11, that were subsequently cloned in the doxycycline inducible system. The first doxycycline inducible HD mating type mutants have recently been obtained and were confirmed by qPCR. These mutants are currently being analyzed, while transformation experiments for inducible PR and HD+PR *F. velutipes* mutants are underway.

Biography

Irum Mukhtar has expertise in fungal taxonomy, genetics and plant pathology. Her passion in fungal genetics and skill is improving information about mating in higher fungi. Her current experimental work is based on inducible system to in study detail mating genes and downstream pathways involve in A and B pathways in *Flammulina velotipes* in which initial results showed that this approach is responsive in determining pathways in *F. velotipes* and can be used in other higher fungi.

erumm21@gmail.com

Notes:

Kalsi Avneet Singh et al., Med Mycol Open Access, 3:2, 2017
DOI: 10.21767/2471-8521-C1-002

Extensive Tinea corporis and Tinea corporis et cruris due to *Trichophyton interdigitale*

Kalsi Avneet Singh, Thakur Rameshwari and **Kushwaha Pragya**
Muzaffarnagar Medical College, India

Dermatophyte infections are prevalent all over the world and more common in countries with hot and humid climate. Recently, extensive and atypical dermatophytoses is being reported in Western U.P., India. Potent steroids like clobetasole propionate is being mixed with topical antifungal agents and antibiotics. Moreover, such unethical combination can be procured very easily by the patients. Applying such topical preparations for the treatment of dermatophytoses, without any oral antifungal agents can result in extensive lesions and also fungal resistance. Any species of the genus Trichophyton, Epidermophyton and Microsporum, can cause dermatophytoses. A study was carried out in the tertiary care center by the Department of Dermatology and Microbiology during the period starting from October 2016 to April 2017. A total of 158 patients were consented. Any patient with tinea corporis and KOH and/or culture positive was enrolled in the study. A detailed history was taken. Samples were collected after cleaning the part with 70% alcohol and all KOH positive or negative samples were inoculated on Sabouraud's Dextrose Agar supplemented with Chloramphenicol and Cycloheximide. The culture plates were incubated at 25°C for four weeks. Lacto Phenol Cotton Blue mounts were prepared to study the microscopic structures in details. Other tests like urease, in vitro hair perforation tests were also set up to differentiate Trichophyton interdigitale from Trichophyton rubrum. A total of 155(98.10%) patients were KOH positive and 158(100%) were culture positive. We isolated only Trichophyton interdigitale from all our patients. None of the patients was HIV positive, 6 patients (4%) had diabetes. About 70% of the patients gave history of using various combinations of antifungal, antibiotic and topical steroid combinations and about 10% used pure steroid creams. Topical steroid lowers the local immunity and contribute to the extensive and atypical lesions. Dermatophytoses has acquired epidemic proportions in this region of western UP. Misuse of unregulated combinations of steroid is rampant in this region.

Biography

Kalsi Avneet Singh is an eminent physician who obtained his MBBS degree from Chaudhary Charan Singh University, Meerut, a premier university in India. He obtained his Diploma in Dermatology (Alternative Medicines) degree and Bachelors of Alternative System of Medicines degree from Indian Board of Alternative Medicines. He is an active participant in various CMEs both at National as well as International level. He has been the co-author of manuscript titled ''Clinical manifestations of Tinea faciei and Tinea genitalis and their diagnostic challenges'', which has been submitted for publication in Indian Journal of Dermatology, Venereology, and Leprology, India. He has been awarded with the prestigious ''Health Excellence Award'' by Indian Board of Alternative Medicines, Kolkata, India.

avneet.singh.kalsi@gmail.com

Notes: