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Research Article

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[Effect of Khaya Senegalensis Bark and Oil on Post-Harvest Fungal Agents of Groundnut Seeds Rot in Adamawa State, Nigeria](#)

Standardized method of seed treatment is of prime importance in the production of groundnut. The study was to carry out control trial using bark extract (aqueous and ethanol) and oil (seed) of mahogany (*Khaya senegalensis*) on seven (7) isolated fungi from two groundnut varieties (peruvian and valencia). The result shows that both mahogany bark and seed extracts are capable of inhibiting mycelial growth of all the isolates. There was no significant variation between the aqueous and ethanol bark extracts in-vitro, however the in-vivo test shows a significant difference between the aqueous and the ethanol bark extract in which the ethanol extract reduced growth of the pathogens more than the aqueous. For all the pathogens except *Rhizopus stolonifer* there was no growth between 50% to 100% concentration of the *Khaya senegalensis* oil in-vitro, however in-vivo control at 50% produced scanty to moderate growth for all the pathogens except *Rhizopus stolonifer* on peruvian, while there was full coverage on the seeds of valencia variety with *Aspergillus niger* and *Rhizopus stolonifer* having total coverage though *Pseudallescheria boydii* and *Cylindrocarpon lichenicola* were effectively inhibited and showed no growth at the 50% and 100%. Further research to focus on the quantifying the chemical constituents and formulation are suggested.

Research Article

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[Determination of anthocyanin content in two varieties of Hibiscus Sabdariffa from Selangor, Malaysia using a combination of chromatography and spectroscopy](#)

The calyces of *Hibiscus sabdariffa* have been used by many communities as herbal tea. Their anthocyanin contents have been reported as the key component in anti-obesity studies. This present work reported results of anthocyanin content of calyces in two varieties of *H. sabdariffa* collected from Sabak Bernam, Selangor, Malaysia. The samples have been authenticated in the Herbarium, Institute of Bioscience, University Putra Malaysia prior to the study. The samples were processed and the ground dry raw material and its aqueous extract were analyzed using Fourier Transform Infrared (FTIR) and Two-Dimensional Infrared (2DIR). The short hybrid calyces (FT11-15A) raw material spectrum showed more than 80% similarity with long wild variety calyces (FT11-15B) when using "Compare" in analysis. The differences of both samples were obviously shown in their aqueous extract spectra. The peak at 1672 cm^{-1} and 841 cm^{-1} showed that tri-substituted double bond in FT11-15B aqueous extract was not present in FT11-15A aqueous extract spectra, whereby a double peak was assigned at 1221 cm^{-1} referred to anti symmetry stretching of aromatic and vinyl $=\text{C}-\text{O}-\text{C}-$ with other $=\text{C}-\text{O}-$ and 1192 cm^{-1} is assigned In-plane ? C-H in FT11-15A aqueous extract. The peak at 1071 cm^{-1} assigned as bonding C-H in plane bending of phenyl of both samples was the only peak comparable with standard delphinidin and cyanidin which are used for qualification and quantification of sample content. Aqueous extract spectra of both samples showed higher number of peaks detected compared with raw material spectra, which was attributed to the higher solubility of anthocyanins in water. The 2DIR correlation spectroscopy is advantageous in enhancing the qualitative analysis of herbal products. The anthocyanin content in both varieties of *H. sabdariffa* in descending amount is delphinidin-3-O-sambubioside (DS), cyanidin-3-O-sambubioside (CS), delphinidin-3-O-glucoside (DG) and lastly cyanidin-3-O-glucoside (CG). FT11-15A has more content of DS and DG of raw material and CG of water extract plus TFA than FT11-15B, whereby, FT11-15B has more content of CS, CG of raw material and DS, DG, CS of water extract plus TFA than FT11-15A.

Research Article

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[Causal agents of Post-harvest Rot of Pumpkin \(*Cucurbita pepo* L.\) and their control using Indigenous Practices in Hong, Adamawa State](#)

Pumpkins (*Cucurbita pepo*) are grown all around the world for a variety of reasons ranging from agricultural purposes to commercial and ornamental sales. The pathogens causing the rot of pumpkin in the world include fungi, bacteria, and viruses. The study was aim to identify fungal pathogens of pumpkin rot during storage, as well as control measures of the diseases using wood ash, mango leaf and rice chaff. Three hundred and sixty-six (366) fruits of pumpkins were studied in Pela, Gaya and Kulinyi districts of Hong Local Government Area of Adamawa State. The diseased samples (fruits) were randomly purchased. Of all the districts visited, Kulinyi has the highest percentage of disease samples (43.82%) while the least is Gaya district with 21.35%. Potato Dextrose Agar (PDA) was used for the isolation of pathogens and these gave *Fusarium solani*, *Aspergillus niger*, *Aspergillus flavus*, and *Phytophthora capsici*. All the fungal isolates exhibited different degree of pathogenic effect on the pumpkin fruits. The pathogens are susceptible to treatment both In-vitro and In-vivo control trials with wood ash and mango leaf at $p < 0.05$. Inhibition improved with increased in concentration of the wood ash and mango leaf. Rice chaff treatment equally proved worthwhile with significant inhibition compared to the control at $p < 0.05$.

Research Article

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[Cloning and Characterization of a Pseudo-Response Regulator 7 \(PRR7\) Gene from *Medicago Sativa* Involved In Regulating the Circadian Clock](#)

The circadian clock is an endogenous molecular oscillator with a period of about 24 hours, which regulates the physiology and developmental processes of almost all higher plants. Pseudo-response regulators (PRRs) are an important part of the central clock oscillator, together with other clock genes, constituting interlinked transcriptional feedback loops, which partly influence plant growth and development. In this study, a circadian clock-related gene MsPRR7 was cloned from *Medicago sativa* (alfalfa) by homologous cloning. The full length MsPRR7 gene was 2648 bp in length, with an open reading frame of 2385 bp encoding a protein of 795 amino acids. Phylogenetic analysis showed that the MsPRR7 was closely related to PRR7 from the PRR family of *Arabidopsis thaliana*. Subcellular localization analysis found that MsPRR7 was located in the nucleus. Quantitative reverse-transcription polymerase chain reactions (qRT-PCR) demonstrated that expression of MsPRR7 gene transcripts in leaves was affected by circadian rhythms, and that its expression level increased with an extension of illumination time, reaching a peak around 8–10 hours. These results will provide the experimental basis for further study of the regulation of PRR family genes in alfalfa.

Research Article

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[Non-chemical control of *Armillaria mellea* infection of *Prunus persica*](#)

Peaches, *Prunus persica* were planted as grafted saplings in an avocado orchard previously infested with *Armillaria mellea* (Vahl) P.Kumm. Trees were planted in large or small holes with or without fresh yardwaste chips added as an amendment and with or without a *Trichoderma* biocontrol product sprayed into the hole. Trees were monitored for six years -- growth and mortality was tabulated. Six years later 40% of the trees had died from the disease. Trees planted in a large hole were more likely to survive than in a smaller hole ($P=0.07$) and trees in large holes with fresh organic matter added were the most likely to survive ($P=0.04$). *Trichoderma* sprays in the planting hole did not increase survival rates. While growth was initially retarded by adding fresh yardwaste to the hole, in later years none of the treatments affected growth rates.

Research Article

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[Assessing the stand size of bay trees \(*Persea spp.*\) after exposure to laurel wilt disease in a North Florida Preserve](#)

Although laurel wilt disease was first reported in the United States in 2002 from redbay trees (*Persea borbonia*) around Savannah, Georgia it has rapidly spread throughout the southeastern coastal plain including Georgia and Florida. In the current study, transects were used to assess the spread and impact of the disease on two native bay trees redbay (*P. borbonia*) and swampbay (*P. palustris*) from north Florida in a semi-naturalized ecological preserve. Although tree size and mortality rates have been reported previously, this study provides the first size-based static life tables for both species. While a significantly higher percent (76%) of swampbay trees exhibited signs of laurel wilt disease compared to redbay trees (62%); redbay had more of its canopy damaged by the disease (41% vs. 32% for redbay vs. swampbay respectively); this resulted in a significantly smaller stem diameter for *P. borbonia* compared to swampbay, both species are experiencing significant declines due to the disease. Both species exhibited a Type III survivorship curve in which the vast majority of individuals were in the smallest size class (average stem diameter was only 2.5 and 3.6 cm for redbay and swampbay respectively). Although traditionally, population age (or size) structure that is heavily biased toward younger or smaller size classes suggests that the population is likely to expand in the future, for these bay trees high mortality rate due to beetle/fungal infestation of larger size classes is responsible for this trend; the smallest size classes are largely free from beetle infestation and laurel wilt disease because the stem diameter is likely insufficient to support beetle development. Results from this study suggest that swampbay is also highly susceptible to laurel wilt disease and its populations are likely to exhibit a similar (albeit slower) decline in Florida's wetland and mesic ecosystems.

Research Article

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[Asynchronous flowering in clonal seed orchards - An effective strategy for alternative management](#)

Tropical forests have long been of interest to biologists because of their high species diversity and their complicated patterns of community organization. The recent ecological studies which have demonstrated that tropical trees are diverse in their reproductive biology and dynamic population structure. Asynchronous flowering among the clones in a clonal seed orchard is an inherent problem resulting in poor seed and fruit set in them. These results in the complete defeat of the prime objective of establishment of clonal seed orchards (CSOs) i.e. abundant quality seed production poor flowering and asynchronous flowering between the clones are a major bottleneck in higher seed set in these clonal seed orchards across the country. Asynchrony found between clones may be attributed to the origin of clones, which are collected from different zonal populations as revealed by isoenzyme and DNA markers studies. This article reviews the work done in CSOs across the world and suggests an alternate strategy in designing the clonal seed orchards of the future.
