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LAYMAN'S ABSTRACTS

Simple Sequence Repeat Analysis of Selected NSIC-registered Coffee Varieties in the Philippines

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Coffee is an important commercial crop worldwide. *C. arabica* and *C. canephora*, commonly known as Arabica and Robusta coffee, respectively, comprise most of the global coffee production. The latter is inferior in terms of taste and aroma but is more resistant to coffee diseases, such as leaf rust, berry borer, and Wilt disease. Another coffee species, *C. liberica*, commonly known as Liberica coffee, is also cultivated in the Philippines because of its strong taste and flavor. The Philippines has been trying to revive the coffee industry by producing specialty coffee with NSIC-registered varieties. The differences in the cup quality of the varieties are the main factors that determine market value. Therefore, there is a pressing need for the correct identification and isolation of pure coffee beans. Local farms usually misidentify and mix coffee beans of different varieties, depreciating their value. This study used simple sequence repeats (SSRs) to distinguish Philippine NSIC-registered coffee varieties. SSRs are tandem repeats in DNA sequences, with each repeat consisting of about two to six nucleotides. SSRs differ in terms of the number and kinds of repeats. The markers used in this study were able to separate the Arabica, Robusta, and Liberica coffee from each other.

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Chemical Characterization and Behavior of Respirable Fractions of Indoor Dusts Colleged Near a Landfill Facility

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Fractionated airborne particulate matter (total suspended particulate, coarse, and fine) were separately collected from a junkshop, school, and money changer shop situated near a landfill facility. Particulate matter samples were extracted and chemically analyzed for water-soluble metals, as well as organic constituents. In general, lead and cadmium were found to be abundant in the total suspended particulate fraction (10-100 μm), while copper was abundant in $PM_{2.5}$ (<2.5 μm). In addition, manganese, arsenic, strontium, cadmium, and lead were detected to be significant in the PM_{10} fraction (2.5-10 μm) compared to the $PM_{2.5}$ fraction. The metal and phthalate concentrations were used in a geochemical modeling software for speciation characterization under different relative humidity conditions. Several solution complexes of the metals were predicted to form from the simulation runs. Results of the study indicate the potential formation of inorganic and organic species on inhalable particulate surfaces under different relative humidity conditions.

Effect of Zeolite Treatment on the Blooming Behavior of Paraffin Wax in Natural Rubber Composites

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Soluble additives of natural rubber are known to bloom and form solid precipitates in the product surface. While some applications find blooming to be beneficial, the presence of bloom in products is usually visually offensive and unattractive. This work studied how three different chemical treatments of natural zeolite filler, namely acid activation, ion exchange with a tertiary amine salt, and organic modification with a non-ionic surfactant, affect the blooming of a model compound (paraffin

wax) in vulcanized natural rubber. Specifically, we want to know: (1) how paraffin wax blooms with time in rubber; (2) what will happen to wax blooming in natural rubber if raw and treated zeolite fillers are added; and (3) how zeolite treatments affect blooming. We found out that: (1) bloom amount varies linearly with the square root of time; (2) raw, acid-activated, and ion-exchanged zeolite fillers reduce bloom, while surfactant-treated fillers increase bloom in rubber; and (3) ion exchange and surfactant treatments enhance the speed and initial amount of bloom in natural rubber composites. Among the fillers, raw and acid-activated zeolites greatly reduce the amount of wax blooming out of natural rubber. Meanwhile, surfactant-treated zeolites increase the amount of bloom.

White Rot Disease and Epiphytism on *Halmenia durvillei* Bory de Saint-Vincent (Halymeniaceae, Rhodophyta) in Culture

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The current drive for research and development on Philippine seaweed resources is directed towards developing culture technologies that expand the current seaweed industry, which is largely based on *Eucheuma* and *Kappaphycus* (locally known as gusô), by tapping on the large majority of seaweeds that remain underdeveloped. The focus of our current research is the red alga *Halymenia durvillei*, which produces high-priced chemicals, such as carrageenan (a gelling agent) and the pigment *r*-phycoerythrin. We highlight herein the challenges we faced during the development and refinement of the vegetative and spore culture technology of *H. durvillei*, particularly while tackling white rot disease and heavy infestation of epiphytes. To our knowledge, this is the first report of both white rot disease and heavy infestation of cultured *H. durvillei*. We identified the epiphyte as *Neosiphonia apiculata*, a common epiphyte infesting other seaweeds in culture. We also describe the nature of the white rot disease, which is characterized by a distinct discoloration and disintegration of the affected portion. Both white rot disease and epiphytes have negative effects on the growth and development of *H. durvillei*, resulting in significant losses in biomass and potential profit.

Marine Macroalgae: A Review

Irene M. Villaseñor

This review highlights the role of science and technology in the development, sustainability, and commercial viability of the seaweed industry in the Philippines. It covers the substantial contribution of Academician Marco Nemesio E. Montaño and his co-authors on the post-harvest side of seaweed production. This review is limited to the research done on the optimization of extraction methods to enhance the quantity and quality of hydrocolloids, specifically agar and carrageenan, from red seaweeds; and the characterization of the physicochemical properties of the hydrocolloid extracts. Gaps requiring the conduct of sound research and development initiatives still exist in the seaweed industry.

Keywords: Seaweeds, hydrocolloids, agar, carrageenan, postharvest