Detection and Identification of Microplastics in Rice (Oryza Sativa L.) from Kadiwa Public Market in Dasmariñas City, Cavite

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Abstract: In the Philippines, rice (Oryza sativa L.) holds the position of being the primary staple food which offers essential nutrients and vitamins to individuals across all social strata. However, waste mismanagement and pollution have caused the infiltration of microplastic (MP) contaminants into agricultural biomass in recent times. Six samples of Dinorado white rice variant, obtained from a public wet and dry market located in Dasmariñas City, Cavite underwent analysis using FTIR- ATR to determine the presence of microplastics. Characteristic peaks in the spectra for -C=C (alkene) stretch or aromatic (C6H6) group (1636.3cm-1), along with -OH stretch (3278.2cm-1), non-symmetric -C-O-C stretch (1153cm-1), and C-O stretch (1082cm-1) in the samples were recorded. A mixture of plastics was present, but polyamide (PA), polyurethane (PU), polyvinyl chloride (PVC), and polytetrafluoroethylene (PTFE) were ruled out. No significant difference was determined between the ultrapure water-washed and unwashed Dinorado white rice in terms of MP content. Therefore, the act of washing rice grains prior to cooking and consumption does not contribute to the reduction of plastic particles present within them. The identification of microplastics (MPs) in rice highlights the necessity for further investigation into their prevalence, entry routes, and potential consequences for both human consumption and the environment at large.

Keywords: agriculture; detection; infrared spectroscopy; microplastics; rice grain