Determination of Lemongrass Oil and its Effectiveness
as Post-harvest Repellent for Stored Rice
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Abstract

In Phnom Penh alone about ten tons of lemongrass is being sold every day mostly for use in food but also for traditional medicines. But only the lower stem is used. The upper leaves that amount to approximately 3 to 4 tons per day are either burnt by farmers to use as fertilizer of simply thrown away. The upper leaves however contain a valuable essential oil that is also being sold in Phnom Penh for almost $400/L. The essential oil in lemongrass is well known for its biological activity. It shows bactericidal, fungicidal activity as well as being an effective insect repellant. The aims of this study were to determine the amount and composition of the essential oil extracted by steam distillation from lemongrass leaves in Phnom Penh and to determine its effectiveness as a post-harvest repellant for stored rice. Most Cambodian farmers do not use any form of post-harvest pesticide in seed rice, stored for the following season and losses due to insect damage are estimated at approx 2-5%. Samples of lemongrass were collected directly from four farmers in the main production area at Arekasaik, on the eastern bank of the Mekong River 10km from the center of Phnom Penh in March, 2012. Essential oil was extracted from fresh and dried leaves and stems and analyzed with GC/FID and GC/MS. The yield was on average 0.29% w/w from fresh leaves and 0.66% w/w from dried leaves and 0.06% from stems. 13 major components representing 98% of the oil were identified with an average citral (Geranial and Neral) content of 82%. The composition of oil from the lower stem and upper leaves were not significantly different. Heat treated organic seed rice that was stored for 35 days with dried lemongrass leaves in sealed jars and normal rice bags to which 10 weevils were added. It was shown under lab conditions that lemongrass oil was an effective repellant of rice weevils (*sitophilus orizya*) but that using lemongrass leaves directly under typical storage conditions was less effective.