

Analysis of Fungicides in Disposable Chopsticks by HPLC

Fungicides are used as post-harvest agricultural chemicals for long-term preservation of fruits and vegetables. Four types of fungicides are approved for use in Japan: imazalil (IMZ), orthophenylphenol (OPP), thiabendazole (TBZ), and diphenyl (DP). Residue standards have been established for these fungicides on citrus fruits such as lemons and grapefruit, and bananas. In addition, in Notification No. 1113001 of the Inspection and Safety Division, and No. 1113001 of the Standards and Evaluation Division of the Department of Food Safety (Nov. 13, 2007) of the Ministry of Health, Labour and Welfare (MHLW), it is stipulated that limits for these 4 types of fungicides in disposable chopsticks should be “not detected.”

Presented in this report, based on the regulations cited above, are examples of individual analyses of imazalil and simultaneous analyses of orthophenylphenol, thiabendazole, and diphenyl in disposable chopsticks. Various types of disposable chopsticks were analyzed (bamboo, wood, domestically produced, produced in China), but no fungicides were detected in any samples.

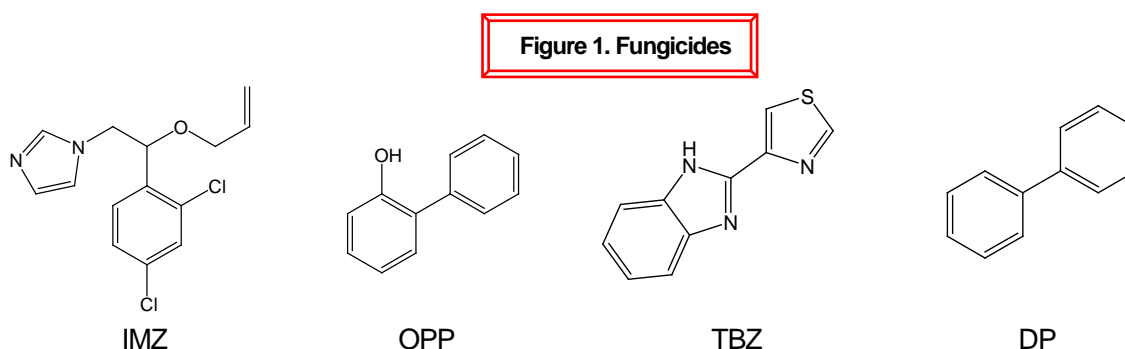


Table 1. Conditions for individual analysis of Imazalil

Column:	TSKgel ODS-100V, 5µm, 4.6mm ID x 25cm
Mobile phase:	methanol/water=75/25
Flow rate:	1.0mL/min
Detection:	UV@230nm
Temperature:	40°C
Injection vol.:	20µL

Table 2. Conditions for simultaneous analysis of orthophenylphenol, thiabendazole, and diphenyl

Column:	TSKgel ODS-100V, 5µm, 4.6mm ID x 25cm
Mobile phase:	10mmol/L SDS in methanol/acetonitrile/water=60/5/35, pH 2.70 adjusted with phosphoric acid
Flow rate:	1.0mL/min
Detection:	FL (Ex: 285nm, Em: 325nm)
Temperature:	40°C
Injection vol.:	20µL

Figure 2. Chromatograms of IMZ reference standard, disposable chopstick (bamboo) extract, disposable chopstick (wood) extract, and disposable chopstick (bamboo) extract (added sample)

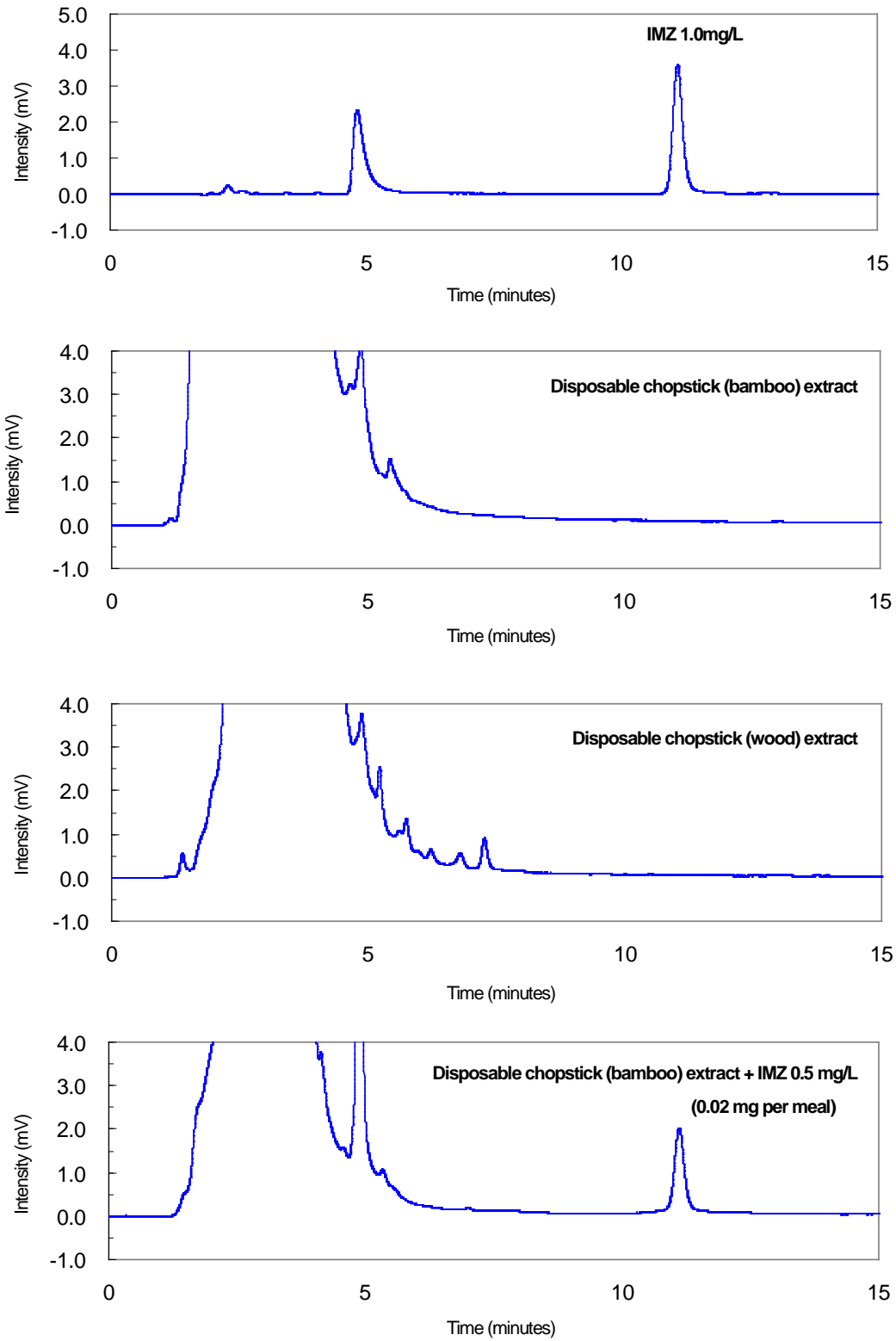


Figure 3. Chromatograms of reference standard (OPP, TBZ, DP), disposable chopstick (bamboo) extract, disposable chopstick (wood) extract, and disposable chopstick (bamboo) extract (added sample)

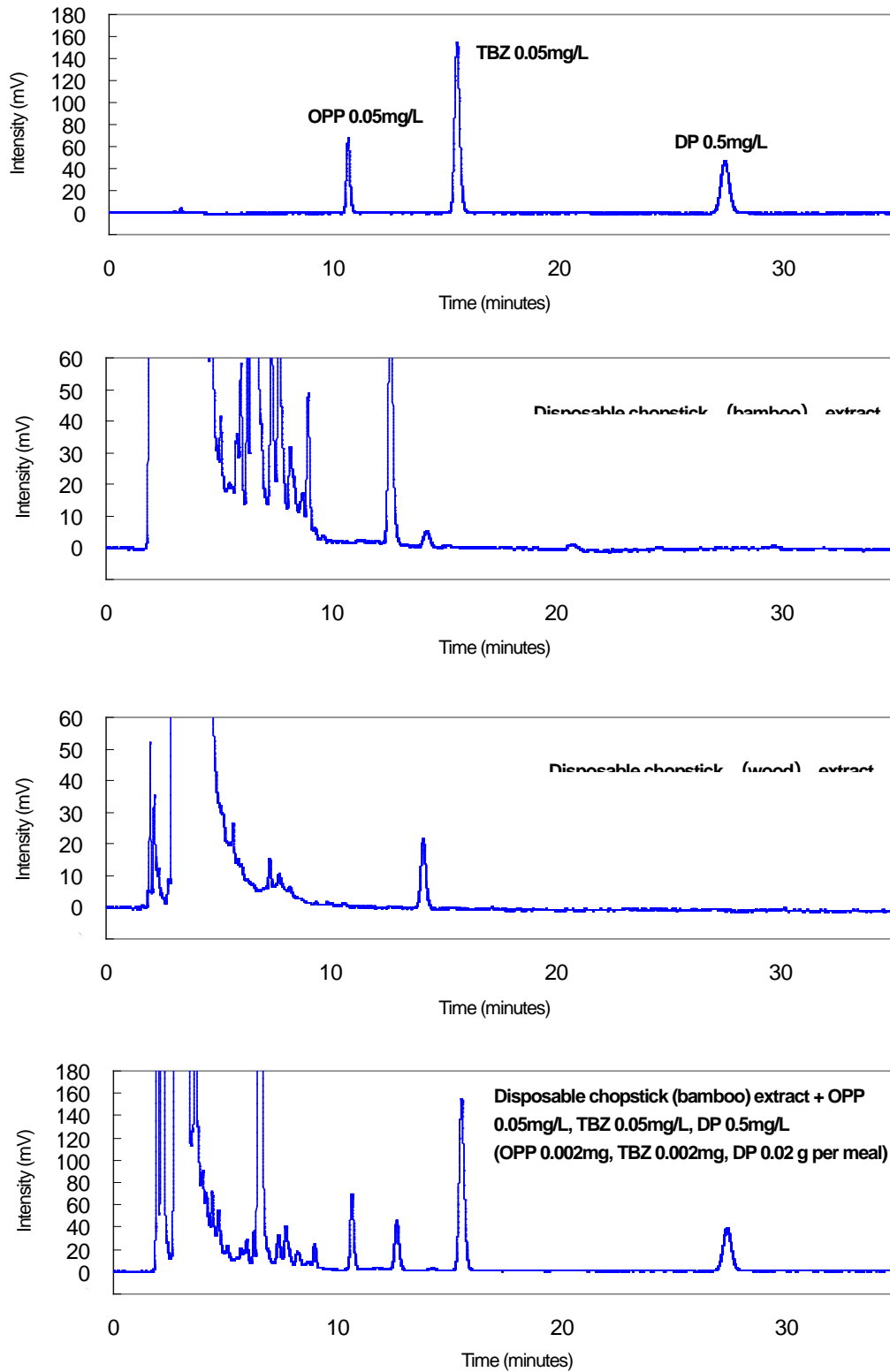


Figure 4. Procedure for extracting fungicides from disposable chopsticks

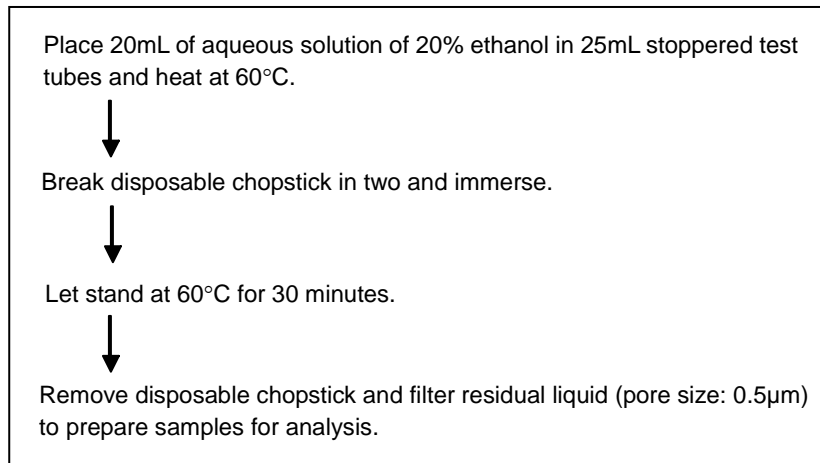
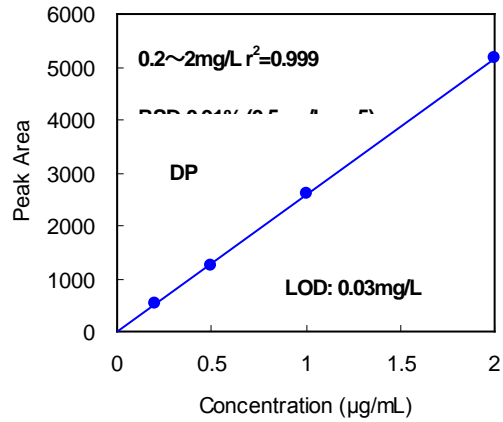
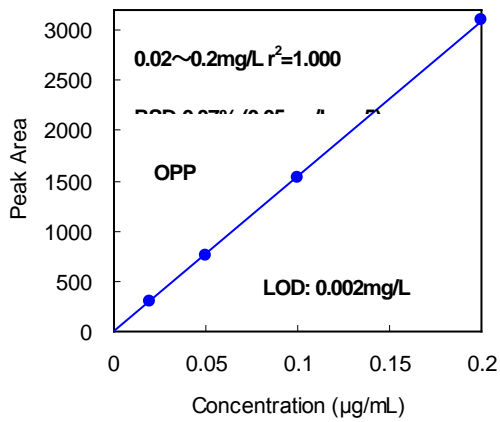
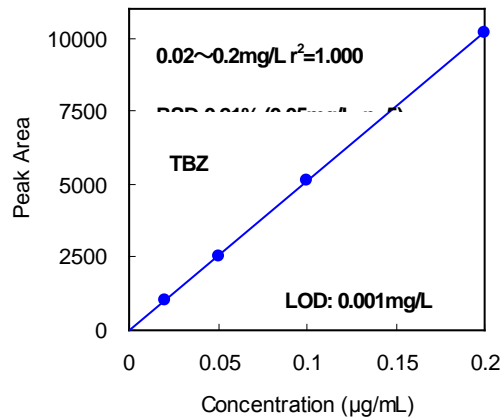
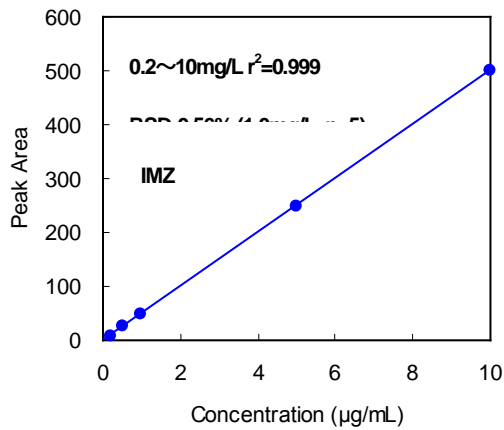


Figure 5. Calibration curves, repeatability and LOD





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