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UV and FTIR characterization of dissolved organic carbon in soil extracts and
Leachates from tropical lowland rainforest transformation systems

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The properties of dissolved organic carbon (DOC) are diverse and complex in nature with varying structural, functional and molecular weights. Tropical lowland rainforest transformation may lead to major modifications of soil properties including DOC in the forest floors. The aim of this study was to characterize spectroscopic properties of DOC from the soils using hot and cold water as extraction agents. The spectroscopic properties were determined by a combination of spectroscopic techniques (UV-Vis and FTIR). Soil samples were collected from the forest transformation systems of Bukit Duabelas National Park from 0-10, 10-20 and 20-30 cm of soil depths with three replications. Dissolved organic carbon was extracted from the soils using soil-water ratio of 1:5. The suspension was agitated for 15 minutes and the supernatant was filtered through 0.45 µm cellulose membrane following centrifugation and immediately analyzed. Fractions of the supernatant were used for incubation study up to 15 days and analyzed at day 1, 5, 10 and 15. The total DOC in top soil (0-10 cm) of natural forest (378 µg C/g soil) slightly higher than the rubber plantation (370 µg C/g soil) and rubber jungle (375 µg C/g soil), but significantly higher of palm plantation (304 µg C/g soil). Depth profiles of total DOC decreased following the soil depth of each forest transformation systems. Hot water extractable DOC is slightly higher than cold water. UV Spectrum of DOC showed a sharp peak at 235 nm and indicates the present of aromatic hydrocarbon. Incubation up to 15 days decreased UV peak high gradually. This probably indicates majority of DOC has been converted into gaseous phase and released into atmosphere in the form of CO₂. However, hot and cold water extracts showed variation in response to incubation and this probably indicates different characteristics of DOC in the extracts. We need more lab works on spectroscopic properties of DOC to gather FTIR data analysis.