



INTISARI

Salah satu sumber bahan organik yaitu serasah yang terdekomposisi dalam tanah. Hasil humifikasi serasah menghasilkan asam organik berberat molekul tinggi seperti asam humat dan asam fulvat. Vegetasi menghasilkan eksudat akar berupa asam organik berberat molekul rendah seperti asam sitrat. Asam organik berperan penting dalam proses pelapukan mineral vulkanik. Penelitian ini bertujuan untuk mengetahui pengaruh senyawa organik seperti asam humat, asam fulvat, asam sitrat dan C-larut air terhadap proses pelepasan kation basa dari material vulkanik. Selain itu untuk mengetahui laju kinetika pelepasan kation basa dari proses pelarutan material vulkanik di bawah tegakan kayu manis, sengon, bambu dan akasia. Sampel tanah dan material vulkanik diambil dari rhizosfer di bawah tegakan kayu manis, sengon, bambu dan akasia yang berada di wilayah Gunung Merapi yaitu Turgo dan Kinahrejo. Laju kinetika pelepasan kation basa dihitung dengan pendekatan enam persamaan kinetika yaitu: *zero order*, *first order*, *second order*, *elovich*, *parabolic diffusion*. Hasil penelitian memberikan informasi bahwa asam humat mampu melarutkan lebih banyak K, Na, Mg. Sedangkan asam sitrat mampu melarutkan lebih banyak Ca. Laju kinetika pelepasan kation basa di bawah tegakan kayu manis dengan menggunakan lima jenis pengektak adalah sebagai berikut: kalium (-0,0719-0,0307 mg.kg⁻¹.jam⁻¹); sodium (0,0048-0,1632 mg.kg⁻¹.jam⁻¹); magnesium (0,0015-0,0520 mg.kg⁻¹.jam⁻¹) dan kalsium (0,0054-0,0532 mg.kg⁻¹.jam⁻¹). Laju kinetika pelepasan kation basa di bawah tegakan sengon dengan menggunakan lima jenis pengektak adalah sebagai berikut: kalium (0,0167-0,0566 mg.kg⁻¹.jam⁻¹); sodium (-0,0892-0,242 mg.kg⁻¹.jam⁻¹); magnesium (0,0011-0,0520 mg.kg⁻¹.jam⁻¹) dan kalsium (0,0062-0,0532 mg.kg⁻¹.jam⁻¹). Laju kinetika pelepasan kation basa di bawah tegakan bambu dengan menggunakan lima jenis pengektak adalah sebagai berikut: kalium (-0,0925 -0,0167 mg.kg⁻¹.jam⁻¹); sodium (-0,0341-0,060 mg.kg⁻¹.jam⁻¹); magnesium (0,0010-0,0789 mg.kg⁻¹.jam⁻¹) dan kalsium (0,0030-0,0532 mg.kg⁻¹.jam⁻¹). Laju kinetika pelepasan kation basa di bawah tegakan akasia dengan menggunakan lima jenis pengektak adalah sebagai berikut: kalium (-0,0921-0,0307 mg.kg⁻¹.jam⁻¹); sodium (-0,0333-0,2062 mg.kg⁻¹.jam⁻¹); magnesium (0,0010-0,0520 mg.kg⁻¹.jam⁻¹) dan kalsium (0,0123-0,0532 mg.kg⁻¹.jam⁻¹). Berdasarkan hasil penelitian dapat disimpulkan bahwa asam humat hasil ekstraksi serasah kayu manis memiliki peranan paling besar dalam proses pelapukan material vulkanik.

Kata kunci: pelarutan, laju kinetika, kation basa, asam organik



ABSTRACT

One of the sources of organic material is litter that decomposed in soil. The litter humification results in high molecular weight organic acids such as humic acid and fulvic acid, while, vegetation produces root exudates of low molecular weight organic acids such as citric acid. Organic acid plays an important role in the weathering process of volcanic minerals. This study aims to determine the influence of organic compounds such as humic acid, fulvic acid, citric acid and dissolve organic carbon to the releasing process of base cations from volcanic materials. Furthermore, to know the kinetic rate of base cations release from the process of dissolving the volcanic material obtained from underneath the cinnamon tree, albizia tree, bamboo and acacia tree. Sample of soil and volcanic materials were taken from the rhizosphere underneath the cinnamon, albizia, bamboo and acacia tree which located in the region of Mt. Merapi, that is Turgo and Kinahrejo. The kinetic rate is calculated by six kinetic equation approaches, they are: zero order, first order, second order, elovich, parabollic diffusion, power funcion. The results showed that humic acid is able to dissolve more ions K, Na, Mg, while citric acid is able to dissolve more ion Ca. The kinetics rate of the base cations release from the sample obtained underneath the cinnamon tree using five types of solvents is as follows: potassium (-0.0719-0.0307 mg.kg⁻¹.hour⁻¹); sodium (0,0048-0,1632 mg.kg⁻¹.hour⁻¹); magnesium (0.0015-0.0520 mg.kg⁻¹.hour⁻¹) and calcium (0.0054-0.0532 mg.kg⁻¹.hour⁻¹). The kinetics rate of base cation release from the sample obtained underneath the sengon tree using five types of solvents is as follow: potassium (0.0167-0.0566 mg.kg⁻¹.hour⁻¹); sodium (-0,0892-0,242 mg.kg⁻¹.hour⁻¹); magnesium (0.0011-0.0520 mg.kg⁻¹.hour⁻¹) and calcium (0.0062-0.0532 mg.kg⁻¹.hour⁻¹). The rate of kinetics of the release of base cations from the sample obtained underneath the bamboo tree using five types of solvents is as follow: potassium (-0.0925 -0.0167 mg.kg⁻¹.hour⁻¹); sodium (-0.0341-0.060 mg.kg⁻¹.hour⁻¹); magnesium (0.0010-0.0789 mg.kg⁻¹.hour⁻¹) and calcium (0.0030-0.0532 mg.kg⁻¹.hour⁻¹). The kinetics rate of the base cations release from the sample obtained underneath the acacia tree using five types of solvents is as follow: potassium (-0.0921-0.0307 mg.kg⁻¹.hour⁻¹); sodium (-0,0333-0,2062 mg.kg⁻¹.hour⁻¹); magnesium (0.0010-0.0520 mg.kg⁻¹.hour⁻¹) and calcium (0.0123-0.0532 mg.kg⁻¹.hour⁻¹). Based on the results, it can be concluded that humic acid extract of cinnamon litter has the biggest role in the weathering process of volcanic material.

Keywords: dissolution, kinetics rate, base cation, organic acid