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Use of crushed bark of *Picea abies* as a soil conditioner in organic spring wheat production

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Adding organic matter in the soil is especially important for organic agriculture, which relies on good soil health for plant production. Crushed bark (CB) of *Picea abies* (L.) Karsten is a forestry by-product, which has been developed into a new soil conditioner for organic farming. It contains up to 80 % organic matter with C/N ratio of 78 and pH 5.7-6.0, but is rather nutrient poor.

Organic field experiments on loamy sand with moderate soil fertility took place in Mikkeli, Finland in 2017-2018 in order to test the substance. The fertilization was based on commercial organic fertilizers: chicken manure and blood meal fertilizer in the first year and meat and bone meal fertilizer in the second one. The treatments were control (only fertilization) and one- or two-year applications of CB (40 t ha⁻¹) with or without base ash (4 t ha⁻¹). Other half of plots were left without substances in 2018.

No differences between treatments were observed without the base ash in any of years. A one-year application of crushed bark with base ash increased both spring wheat yield quantity and quality. The statistically significant effects were found for yield, N uptake, grain protein content, 1000-seed weight and hectolitre weight compared to control in 2018, a year after application. Despite the severe drought during that growing season, the wheat yields for CB with base ash and control were 3100 kg ha⁻¹ and 2250 kg ha⁻¹, respectively. The positive effects of soil amendments were not as clear in the first year as in the following. No benefits were visible after two-year successive application of CB either alone or with base ash. Spruce CB in addition with base ash may be beneficial in terms of yield and quality when it is applied only once in large amounts. In our study the effects were overall greater in the following year after the application.