

[Title] Soil carbon storage effect of applying biochar derived from pruned fruit tree branches in an orchard (First report)

[Summary] The carbon content of biochar derived from branches pruned from peach trees and grape vines is approximately 4 per 1000 (0.4%) of the carbon content in the soil of orchards in Yamanashi Prefecture. Carbon storage technology that utilizes this biochar increases soil carbon storage the same value (4 per 1000 or 0.4%), thereby contributing to the suppression of global warming.

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[Classification] Technology/Reference

[Background/Aim]

With the increase in global warming, the need to reduce greenhouse gas emissions, including those of CO₂, has become urgent; active measures are also required in the agriculture sector. In recent years, there has been a spotlight on the use of biochar, a traditional technology that has recently become popular again. The movement to store carbon in the soil in fruit tree production areas using biochar derived from pruned branches is spreading in Yamanashi Prefecture; however, its effect has not been clarified. Therefore, we estimated the amount of carbon that biochar produced from branches pruned locally can store in the soil and clarified how much carbon storage technology utilizing the biochar derived from pruned fruit tree branches can contribute to the 4 per 1000 initiative.

[Contents and characteristics of the results]

1. The average number of pruned branches (raw weight) in peach orchards in the prefecture is 2 t ha⁻¹ or more, and the amount of carbon that can be stored when these branches are applied to the soil is approximately 0.3 t ha⁻¹.
2. The average amount of pruned branches (raw weight) in vineyards in the prefecture is 3 t ha⁻¹ or more, and the amount of carbon that can be stored when these are applied to the soil is approximately 0.4 t ha⁻¹.
3. The average amount of soil carbon (up to a depth of 30 cm) in the orchards in the prefecture from 2008 to 2020 was 75 t ha⁻¹; 4 per 1000 (0.4%) value of this was 0.3 t ha⁻¹. Thus, the application of biochar to the soil increases soil carbon storage by 4 per 1000 (0.4%) every year.

[Expected effect]

1. This study demonstrated that the technology of applying biochar derived from pruned fruit tree branches to soil increases soil carbon storage capabilities. This promotes the 4 per 1000 initiative and contributes to the suppression of global warming by reducing greenhouse gas emissions.
2. Carbon storage technology utilizing biochar derived from pruned fruit tree branches can be a “new sustainable agricultural model” provided from the production site of Yamanashi Prefecture, the Kingdom of Fruit.



Figure 1. Carbonizer used for the test
(Made by MOKI Co., Ltd.)



Figure 2. Finished biochar