

Using wastewater to enhance mint production

March 3 2011



Researchers found that plant distillation waste can increase yields and essential oil content in peppermint and spearmint. Credit: Photo courtesy of Valtcho D. Zheljazkov

When essential oils are extracted from plants through the process of steam distillation, wastewater is produced and subsequently released into rivers and streams. Finding new uses for these unused by-products could benefit essential oil crop growers and processors as well as the environment. A team of researchers has found that the residual distillation water of some aromatic plant species has a beneficial effect on yields and can increase essential oil content of peppermint and spearmint crops.

Peppermint and spearmint are commercially produced for their essential oils, dry leaves used in herbal teas, and as fresh culinary herbs. Essential oils from both mints are widely used in the production of chewing gum, toothpaste, mouthwashes, confectionaries, pharmaceuticals, and

aromatherapy products. New methods of improving yield and essential oil content in peppermint and spearmint crops could produce economic benefits for large-scale production operations and create more environmentally sustainable systems.

One previous study of plant distillation wastewater found that wastewater from sage, thyme, and rosemary contained antioxidants and could be used as an ingredient in marinades for turkey meat. "We hypothesized that residual distillation water could have an effect on peppermint and spearmint plants when used as a foliar spray", said Mississippi State University professor Valtcho D. Zheljaskov, corresponding author of a study that tested plant hormones and distillation wastewater on peppermint and spearmint plants.

Zheljaskov and colleagues reported on their collaborative research in HortScience. The team evaluated the effects of three plant hormones (methyl jasmonate, gibberellic acid, and salicylic acid) at three concentrations and the residual distillation water from 15 plant species applied as foliar sprays on biomass yields, essential oil content, and essential oil yield of peppermint (*Mentha x piperita* 'Black Mitcham') and spearmint (*Mentha spicata* 'Native').

The application of salicylic acid at 1000 mg/L increased biomass yields of both species. Methyl jasmonate at 100 and 1000 mg/L, gibberellic acid at 10 mg/L, salicylic acid at 10 or 100 mg/L, and distillation water of seven plant species all increased the essential oil content of peppermint, whereas the oil content of spearmint was increased only by distillation water of one plant species.

"The study demonstrated that the residual distillation water of some aromatic plant species may have an effect on crop species and may be used as a tool for increasing essential [oil content](#) or essential oil yields of peppermint and spearmint crops. Further research is needed to elucidate

the effect of these treatments on essential oil composition and to verify the effects under field conditions", said Zheljzkov.

More information: The complete study and abstract are available on the ASHS HortScience electronic journal web site:

[hortsci.ashspublications.org/c ... t/abstract/45/9/1338](https://hortsci.ashspublications.org/content/abstract/45/9/1338)

Provided by American Society for Horticultural Science

Citation: Using wastewater to enhance mint production (2011, March 3) retrieved 26 April 2024 from <https://phys.org/news/2011-03-wastewater-mint-production.html>

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