Germination of *Camelina sativa* producing modified fatty acids under low temperature conditions

Joe Ballenger[1], Sam Kenney[1], Jared Gordon[1], Autumn Brown[1], Annika Fischer[1], Maneesh Lingwan[1], Katia Gutierrez[1], Doug Allen[1,2], and Malia Gehan[1]

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October 18, 2023

Abstract

Plants store carbon as oil in their seeds, which is a resource that needs to be mobilized in order to germinate. *Camelina sativa* is a prospective biofuel crop which has the potential to be used as a cover crop in corn and soy growing regions. *Camelina* plants have been engineered to produce medium-chain fatty acids useful in the production of biofuels, lubricants, and other products. To test suitability of these modified *Camelina* lines for growth in cool climates such as those found in the midwestern US, we performed germination tests on seeds in growth chambers at temperatures similar to those encountered in early season in corn-growing regions (6°C, 15°C, and 22°C). Controls were the untransformed background Suneson genotype, as well as plants from the far northern and southern ranges of *C. sativa*. Germinating seedlings were imaged using Raspberry Pis, and analyzed with PlantCV for the number of plants and the cotyledon area. To determine effects of seed fatty acid content later in the growth cycle, seedlings were transplanted and grown at 22°C until seed set. These plants were imaged every 20 days to track height, width, area, and solidity using PlantCV to analyze the data.

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ORCiD: 009-0007-7341-6663

Keywords: Camelina, germination, temperature, seed oil, biofuel

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