Abstract data

Abstract title: Effect of hydric stress on antioxidant compound content in commercial and traditional lettuce (Lactuca sativa L.) and wild relatives
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Abstract: Lettuce (Lactuca sativa L.), considered a healthy food, is one of the most important leafy vegetables worldwide. Nevertheless, modern varieties have a low phytonutrient content due to breeding programmes having been mainly focused on increasing yield and incorporating disease resistance. Water deficit is known to cause the accumulation of antioxidants in some crops, although in lettuce this has not yet been studied. We quantified vitamin C (ascorbic and dehydroascorbic acid, AA and DHAA) and anthocyanins in four groups of Lactuca spp. under control and hydric stress conditions: red and green commercial varieties, semi-red traditional varieties, and wild relatives. We also compared two different tissues, leaf and stem, in two wild species. We assayed three treatments 2 weeks before harvesting (control: 1L/day, DH1: 0.7 L/day, and DH2: 0.5 L/day) in a preliminary study in Winter-Spring 2018/19. We repeated the experiment applying severer stress conditions 3 weeks before harvesting (control: watering on demand, DH3: 0.45 L/1st week and 0.15 L/2nd-3rd week, and DH4: no watering) in Winter-Spring 2020/21. Vitamin C content was lower under hydric stress in most accessions and both tissues, being statistically significant in most green and semi-red traditional varieties, and wild species. The change in the total anthocyanin content in response to the water stress seemed to be genotype-dependent, as in other crops. Interestingly, total anthocyanin quantity was higher under, at least, one of the water deficit regimes in some accessions within all groups, being statistically significant in one wild species (2021) and very significant in one red commercial variety (2019). We found three different anthocyanins: peonidin 3-O-glucoside, cyanidin 3-O-(6′-O-malonylglucoside), the most abundant, and cyanidin 3-(6″-acetylglucoside), the rarest. The latter's content was raised under stress conditions in most cases, even when the total anthocyanin content decreased and, in some cases, it was only synthesised when the plants were grown under water stress.
Preliminary results show a contrary response to stress (increase/decrease) in the two tissues of the wild species studied for certain compounds (i.e. AA, cyanidin glucosides) though further verification is needed.
These studies could contribute to understand the role of anthocyanins in some mechanisms to tolerate water stress.
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