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Yield Characterization and Geosmin Quantification of Grain Amaranth Varieties

To feed and sustain the expanding world population, we must cultivate novel food crops that are nutritious and profitable. Nutritionally, amaranth grain is superior to other cereal grains. Furthermore, the southern states of the United States are a possible region of cultivation. There is a chemical in amaranth called geosmin which is terpene derivative that causes the earthy musty odour. Some people are put off by the presence of geosmin in beet, spinach, and Swiss chard, but others enjoy the flavours these vegetables provide. Streptomyces spp. are soil microbes responsible for producing geosmin. Although it is common knowledge that microorganisms can produce geosmin, whether the geosmin found in amaranth comes from microbes remains unclear. Accessions were selected from United States Department of Agriculture and Seed Savers Exchange (SSE) and planted at TSU AREC farm. The varieties included for further study were narrow down based on the yield. In this study, three varieties Crimson glow (red, *Amaranth spp;*), Tiger TSU1 (orange, *A. cruentus*), Plainsman (purple, *A. hypochondriacus*) were planted at AREC farm in May 2022 and harvested in October, 2022. The machine used for cleaning seed is Haldrup LT-15 for small seed cleaning. Yield, plant height, Number of panicles per inflorescence, Chaff weight, seed weight after cleaning were collected. To further promote Amaranth for consumption, we are characterizing the geosmin content in raw, cooked, and popped amaranth grains to determine the potential geosmin content of amaranth and to determine whether geosmin is altered by amaranth variety. Specifically, a gas chromatograph mass spectrometer (GC-MS) will be used to determine the precise geosmin concentration. From the work, we identified three varieties of Amaranth with high yield that can be fit into Southeast American crop system. Furthermore, quantification of geosmin in raw, cooked and popped grains will give US consumers with optimum suggestions in the way of amaranth consumption.