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MORPHOLOGICAL AND ESSENTIAL OIL VARIABILITY FROM NINE PORTUGUESE FENNEL (*FOENICULUM VULGARE* MILL.) ACCESSIONS

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Abstract:

Nine Portuguese fennel (*Foeniculum vulgare* Mill. subsp. *vulgare*) accessions, collected from wild populations growing mostly in the mainland north, were evaluated for morphological traits and essential oils variability. The fruits from the cultivated plants were collected for morphological and essential oil evaluation. Wild fennel fruits were also collected in Flores and Corvo Islands (Azores, Portugal), and two commercial cultivars, representing sweet and bitter fennel were also evaluated for comparison purposes. The morphological characterization of the plants was done according to the International Union for the Protection of New Varieties of Plants descriptors (UPOV) and others that were delineated and tested. The essential oils were isolated by hydrodistillation and analysed by Gas Chromatography (GC) and Gas Chromatography-Mass Spectrometry (GC-MS) and the percentage composition of the essential oils was used to determine the relationship between the different oil samples by cluster analysis. Morphological characters clustered the northern Portugal accessions in 3 groups. The main group was defined by seven accessions with morphological variability, where two of them were more similar to morphological traits. Two wild accessions defined two different groups linked to the main group. The commercial bitter fennel was a single element of a separate group. Essential oils analysis defined three main clusters: one group composed of 48 samples that were methyl chavicol (=estragole) rich (51-90%), a second group of 50 samples was *trans*-anethole rich (51-88%) and a smaller group was *trans*-anethole and methyl chavicol rich (32-51% and 31-42%, respectively). Morphological and essential oil cluster analysis did not gather the accessions in similar groups. Nevertheless, they were able to discriminate accessions significantly according to their traits, that is, on their possible genetic, agricultural or economic use. Based on this chemical evaluation the studied fennel fruits oils belong to two different chemovarieties: methyl chavicol and *trans*-anethole.