The culture species of Umbelliferae or Apiaceae family are the most valuable medicinal and aromatic plants cultured in the world and also in Turkey. In this research, some varieties and populations of anise (Pimpinella anisum L.), dill (Anethum graveolens L.), cumin (Cuminum cyminum L.), coriander (Coriandrum sativum L.) and fennel (Foeniculum vulgare Mill.) was investigated to determine the possibilities of utilization as a source of fixed oil and petroselinic acid. A randomized complete block design with three replicates was used for a total of 15 genotypes including varieties and populations of each species in Isparta ecological conditions of Turkey in 2014. The seed/fruit oil contents were determined using the Soxhlet extraction with n-hexane for 6 hours, and the fatty acid methyl esters were determined by GC–FID. According to the results, the seed or fruit yield varied between 437.4-777.5 kg/ha in dill, 571.1-636.6 in fennel, 570.7-828.5 kg/ha in coriander, 333.9-470.1 kg/ha in anise, and 259.3-870.0 in cumin. Seeds/fruits of all analyzed genotypes contained between 19.18-30.17 % fixed oil and the avarages of the oil contents were 20.48, 22.98, 24.89, 26.97, and 28.17 % for dill, fennel, coriander, anise, and cumin, respectively. The unique feature of Umbelliferae members was the accumulation of large amounts of petroselinic acid (C18:1, cis 6), an positional isomer of oleic acid. The amount of petroselinic acid in the seed/fruit oils ranged from 55.44 to 87.28 %, and according to the averages, the order of the species from high to low ranked as follows; dill (84.98 %) > fennel (83.36 %) > coriander (79.56 %), anise (61.51 %) > cumin (57.85 %). Thus, our results suggest that all varieties and populations of the culture species of Umbelliferae are suitable for commercial uses of fixed oil and petroselinic acid.