

Effects of milling on the extraction efficiency of incurred pesticides in cereals - DTU Orbit (09/11/2017)

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This study investigated the effects of particle size and milling temperature on the extraction efficiencies of pesticide residues from cereal flour. Samples of cereal grains (barley, oat, rye and wheat) were milled using a centrifugal mill with four different sieves (0.2, 1.0, 3.0 and 5.0 mm) or a knife mill both at room temperature and after freezing of the grain at -80°C overnight. The incurred pesticides in the test materials were extracted by the QuEChERS method and analysed by LC-MS/MS and GC-MS/MS. The particle size distribution for the milled samples was determined using a vibratory sieve shaker. Based on the pesticide levels recovered from each of the different millings and the corresponding particle size distributions, it was confirmed that smaller average particle sizes increase the extraction efficiency up to 31%, with all other factors equal. The cereals milled at room temperature produced lower pesticide extraction efficiencies compared with cereals milled when still frozen, especially for heat-sensitive pesticides. Furthermore, milling frozen grains was easier and resulted in more homogeneous samples with smaller relative particle sizes.

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