

The influence of hull cracking on Aflatoxin contamination and insect infestation in pistachio nuts

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ABSTRACT

Samples of pistachio nuts including two types of damage, early splits and mature fruits with cracked hulls, were checked separately as possible sources for aflatoxin contamination under the pistachio orchard conditions in Rafsanjan. Hull cracking was found to be a common feature in pistachio fruits shortly after the maturation phase; it was a main route for subsequent insect infestation as well as aflatoxin contamination. Although the early split nuts were almost always contaminated with aflatoxin, this mycotoxin was also detected in the mature pistachio nuts with cracked and tattered hulls, with or without insect infestation, from all samples throughout three months of sampling (19 August to 19 November) at very high levels. It was found that the carob moth (*Apomyelois ceratoniae*), thrips (*Liothrips austriacus*) and ants (two unidentified species) only infest fruits with ruptured hulls, either at pre-maturation (early splits) or afterwards (mature fruits with cracked hulls). However, the pistachio fruit worm (*Recurvaria pistaciicola*) and the pistachio fruit hull borer moth (*Arimania komaroffi*) are able to bore the hulls. These insects commonly prepare an appropriate passage for mould development inside the nuts and may transfer the fungal spores into the nuts. Furthermore, hull rupture due to damage by birds was found to be another mean for aflatoxin expansion in the pistachio nuts. It is concluded that the hull cracking phenomenon, which occurs closely after nut maturation, plays an important role in aflatoxin development in pistachios. Therefore, harvesting must be completed promptly after physiological maturity of the pistachio nuts.

Key words: Aflatoxin, pistachio, *Pistacia vera*, hull cracking, early split, molds, *Aspergillus*, harvest time, insects' damage, pistachio pests, birds.

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