RESEARCH OF PESTICIDE DISSIPATION CURVES IN HORTICULTURE AND FRUIT CROPS IN URUGUAY

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Abstract: The current production systems of most vegetable and fruit crops require a high use of pesticides for the purpose of fulfilling the criteria of quality demanded by consumers. The agrochemical market is evolving, making available new pesticides usually with benefits not only in control but also in selectivity and safety. On the other hand, there are pesticides that have high toxicity and therefore their MRLs are constantly being reviewed by both the Codex Alimentarius and by Europe. Dissipation studies to correctly set timeouts are usually designed by the countries of the active developers, who do not always have environmental conditions similar to those which occur in Uruguay. This paper experimentally studied the dissipation curves of two neonicotinoids peach: acetamiprid and thiacloprid for 21 days; of azinphos-methyl for 34 days in pear and azoxystrobin and chlorfenapyr in tomato protected for 25 and 39 days respectively in the southern region of Uruguay. The analytical methodology used for the detection of acetamiprid and thiacloprid, is based on solid phase extraction (SPE) and detection by HPLC/DAD. For the detection of residues of chlorfenapyr, metil-azinfos and azoxystrobin was used, solid phase extraction (SPE) and detection by GC-MSD coupled. Curves were modeled mathematically using confidence intervals with a level of 95%. For acetamiprid in peach the best regression mathematical models were the exponential (r^2 = 0.973), and the quadratic polynomial model also showed a good fit with an r^2 = 0.948. For thiacloprid the second degree polynomial had an r^2 = 0.923, while the exponential regression had an r^2 = 0.914. The Codex Alimentarius provides no MRL for acetamiprid in peach, whereas thiacloprid is 0.5 mg/kg. The European Union establishes MRLs of 0.1 mg/kg for acetamiprid and 0.3 mg/kg for thiacloprid. According to the experimental curves for thiacloprid from day 12, values are below the MRLs established internationally, while for acetamiprid 26 days would be needed according to the exponential mathematical model that the MRL is below what established by the European Union. For azinphos methyl in pear, considered toxicologically by the World Health Organization as class Ib (Highly hazardous) mathematically modeled following an exponential form with a r^2 = 0.999, reaching as Codex MRLs (2 mg/kg) after 7 days while achieving the MRL established by the European Union (0.05 mg/kg) should spend 20 days in study conditions. For protected tomato chlorfenapyr residues were not detected within 16 days, after having the dissipation curve showed an exponential trend, while for azoxystrobin during the 25 day trial there was no decay of the concentration, maintaining the same at 0.40 ± 0.05 mg/kg. The fact that countries as Uruguay, fix their timeouts according to the recommendations of Codex Alimentarius, somehow implies that before top requirements as they can be those of the European Community; could exist the risk of not fitting to their requests.