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The influence of cooking procedures on doxycycline residues in contaminated eggs

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Doxycycline antibiotic is a forbidden compound in laying hens producing eggs for human consumption and its presence in eggs can be harmful for consumer's health. Most information about drug residues in eggs concern their concentrations in raw matrix and the data about the influence of cooking on antibiotics residues in eggs are rather limited. Cooking procedures are often associated with inactivation and reduction of eventually occurred drug residues in food. However, depending on the amount of heat involved, as well as chemical structure and properties of drugs, the susceptibility to degradation by heating can be various. Thus, the residues concentration of doxycycline in eggs after different cooking methods was investigated. Doxycycline was orally administered to laying hens with water for 5 days and incurred eggs were treated by boiling, frying and microwaving. Analyses of DC were assayed by Liquid Chromatography - tandem Mass Spectrometry (LC-MS/MS) method. The stability and losses of doxycycline in eggs were depended upon the type of cooking procedure, as well as the cooking time. Cooking operation results showed, that by microwaving doxycycline residues was reduced most effective with concentrations decreased by 53% and 50.3% after 4 min of microwaving without cover and microwaving with cover, respectively. After frying process doxycycline was more stable. In fried eggs, doxycycline residue was reduced by 39.8% in 6 min. By the boiling cooking, the smallest reduction was observed with the concentration decreased by 29.8% after 8 min. The time required to destroy 90% of the initial doxycycline concentration (D-values) was 56.8, 30, 12.8 and 12.2 min for boiling, frying, microwaving without cover and microwaving with cover, respectively. The obtained results show that high temperature influenced the doxycycline reduction, but ordinary cooking does not eliminate the all doxycycline residues present in eggs.

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