

Residue finding of chlorate, benzalkonium chloride (BAC), didecyldimethylammoniumchloride (DDAC) and ethoxyquin in fish over the years (2019 – 2022)



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INTRODUCTION

- wide spectrum of pesticides regulated in Regulation (EC) No 396/2005 [1] Ο
- o for food products of annex I a maximum residue level (MRL) of 0.01 mg/kg is set
- fish and fish products are not listed in annex I
 - \rightarrow no MRLs for this matrix exist
- o following parts: overview about current regulation of chlorate, BAC, DDAC and ethoxyquin and our findings of these analytes in fish over the last four years

BENZALKONIUM CHLORIDE (BAC) & DIDECYLDIMETHYLAMMONIUMCHLORIDE (DDAC)

- detectable in food products due to disinfecting processes
- belong to group of cationic surfactants

 CH_3

commonly used in disinfecting and cleansing agents in the food industry for Ο cleaning purposes

CHLORATE

- o sodium and potassium chlorate (salts of chloric acid) have been used to herbicide application in the past
- Commission decision 2008/865/EC: use of chlorate based pesticides or biocidal products are no longer permitted in the EU [2]
- chlorate is regulated in Regulation (EC) No 396/2005
- fish and fish products are not listed in annex I [1] \rightarrow there is no MRL for chlorate in fish
- fish and fish products very sensitive regarding microbiological spoilage
- fish is often frozen to maintain the quality and freshness
- o surface of frozen fish products (especially pangas catfish) covered with glaze of water \rightarrow this water may contain chlorine containing agents \rightarrow can lead to chlorate residues in the water-glaze and thus in fish products.



- BAC and DDAC as pesticides regulated in Regulation (EC) No 396/2005 [1]
- fish and fish products not included in annex I of the Regulation
 - \rightarrow there is no MRL for BAC and DDAC in fish H₃C

structural formular of benzalkonium chloride (BAC-C12)

structural formular of didecyldimethylammonium chloride (DDAC-C10)

 CH_3

CI

 $H_3C - N - CH_3$



ETHOXYQUIN

- group of chinolene derivates
- o feed additive to protect fat containing feeding stuff from oxidation processes up to a maximum level of 150 mg/kg till 2017
- since 2011 no longer permitted for the use as a pesticide [3]
- ethoxyquin as pesticide regulated in Regulation (EC) No 396/2005
- fish and fish products not included in annex I of the Regulation
 - \rightarrow there is no MRL for ethoxyquin in fish

CH₂ NH

ETHOXYQUIN RESIDUES IN FISH OVER THE LAST 4 YEARS < 0.01 mg/kg = > 0.01 mg/kg





structural formular of ethoxyquin

2019 2020 2021 2022 n = 118 n = 31 n = 45 n = 44

CONCLUSION

- fish and fish products are sensitive regarding microbiological spoilage Ο
- values of chlorate, BAC/DDAC and ethoxyquin decreased over the last 4 years Ο
- chlorate residues can be found above 0.01 mg/kg in fish Ο
- common maximum residue level of 0.01 mg/kg is applicable for all matrices of Ο annex I of Regulation (EC) No 396/2005 (not for fish)
- matrix fish should become part of annex I of Regulation (EC) No 396/2005 Ο
- also high residue findings of BAC and DDAC in cream and ice cream Ο

LITERATURE

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[1] REGULATION (EC) NO 396/2005 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 February 2005 on maximum residue levels of pesticides in or on food and feed of plant and animal origin and amending Council Directive 91/414/EEC

[2] COMMISSION DECISION of 10 November 2008 concerning the non-inclusion of chlorate in Annex I to Counsil Directive 91/414/EEC and the withdrawl of authorisations for plant protection products containing that substance

[3] COMMISSION DECISION of 3 March 2011 concerning the non-inclusion of ethoxyquin in Annex I to Council Directive 91/414/EEC and amending Commission Decision 2008/941/EC