Morpholine, Diethanolamine and Triethanolamine Prohibited Additives in the EU

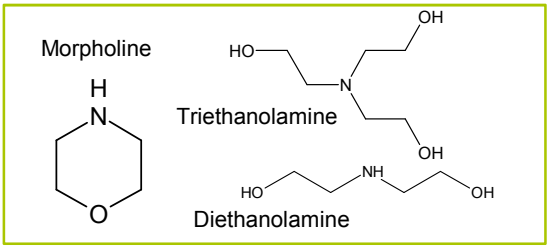
Diana I. S. Kolberg, Cristin Wildgrube, Ellen Scherbaum, Nadja Bauer, Anne Wolheim, Marc Wieland, Michelangelo Anastassiades
E-Mail: Diana.Kolberg@cvuas.bwl.de

Chemisches und Veterinäruntersuchungsamt Stuttgart

INTRODUCTION

Many fruits like mangos, papayas, citruses, apples, pineapples and avocados are coated post-harvest with glazing agents (waxes) to protect their surface from insects and fungi, to reduce moistures, and to improve their cosmetic appearance.

Morpholine, Diethanolamine and Triethanolamine are employed as carriers and emulsifiers in these waxes. They are widely used as food additives in the USA, Canada, Australia, South America, Israel and South Africa as well as in other parts of the world. However, as none of these three compounds are approved as additives, their use within the EU is prohibited.



Also prohibited is the marketing of imported food in which these compounds were used as addititives. Toxicological concerns with these three compounds exist due to their tendency to oxidize to nitroso compounds (e.g. N-nitrosomorpholine), which are known carcinogens. Interestingly, according to the Federal Office for Consumer Protection and Food Safety (BVL), triethanolamine may be used as a co-formulant in authorized pesticides, which makes its judgement complicated.

LITERATUR

[1] QuPPE method published by the EURL-SRM: www.eurl-pesticides.eu

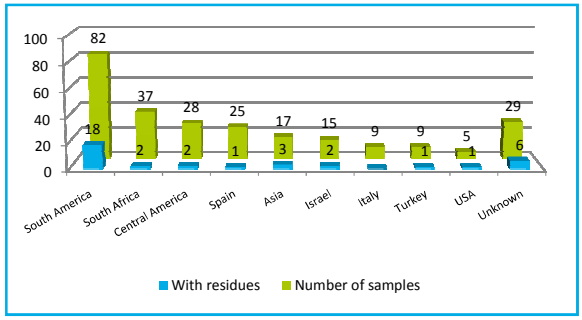
RESULTS

From Oktober 2010 to May 2012 a total number of 256 samples of fruit were analyzed for morpholine, diethanolamine and triethanolamine using the QuPPe method [1]. In 36 (14.1 %) of the samples residues of at least one of these three compounds were detectable.

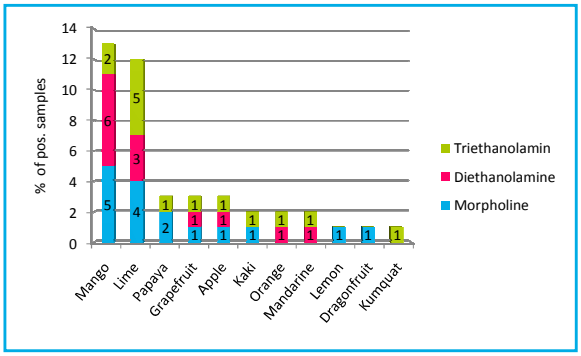
Positive samples and concentrations for the three compounds

Substance	Number of pos. samples	Ø Value of pos. samples [mg/kg]
Triethanolamine	14	0.012 - 5.3
Diethanolamine	13	0.016 - 0.37
Morpholine	16	0.047 - 25.3

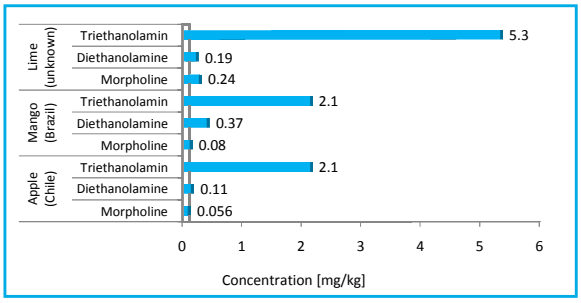
Origin of the samples



Samples with positive residues



Samples with residues of all compounds



PM 030

EPRW 2012

Baden-Württemberg