Effective Control Of Residues In Honey

C. Lüllmann, G. Beckh and P. Wessel
Quality Services International GmbH, Institute for Honey Analysis
Flughafendamm 9 a, D-28199 Bremen, Germany

Introduction:

Since a few years the European Commission is focusing on the Quality Control of imported foodstuffs especially of animal origin thus influencing also the honey trade. The main concerns for the industry are caused by an increasing number of legally required residue parameters especially Antibiotics based on EU Regulation 2377/90. This Regulation lays down a Community procedure for the establishment of MRLs of veterinary medicinal products in animal food including honey . Based on this Regulation no Antibiotic use is allowed in the EU for beekeeping thus every residue of any Antibiotic found in honey is illegal. As in many honey producing countries the use of some Antibiotics e.g. Tetracyclines , Sulfonamides are legally allowed or even traditionally recommended the imported honey must be strictly controlled respectively preselection in the country of origin before shipment is unavoidable. Caused by scandals e.g. the use of even in the EU illegal Antibiotics like Chloramphincol the consumers in the EU are extremely sensitive to that issue. Honey is regarded as a natural and pure product and is expected to be free of residues. Therefore the number of analyses carried out by the industry increased in the last years constantly. New methods for different veterinary drug residues have been developed and detection techniques have been improved in order to protect the consumer. QSI collected data of the last five-year period (1999-2004) for analyses on Annex I substances like Streptomycine (by HPLC mod. ac. Kocher), Tetracyclines (by HPLC and LC-MS/MS) and Sulfonamides (by HPLC) as well as data about Annex IV substances Chloramphenicol (by LC-MS/MS + ELISA) since 2002 and Nitrofuran-Metabolites since January 2004. Further parameters of Annex I have been recently incorporated e.g. Tylosin (by HPLC or LC-MS/MS) or others of the Macrolid-group, Lincosamides , Penicillins (LC-MS/MS) in routine quality control of honey.

Fig. 1: Development of Streptomycine Analysis

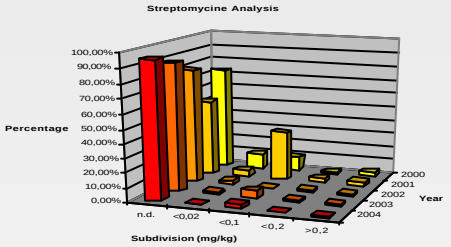
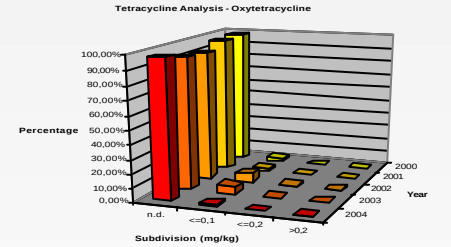


Fig. 2: Development of Tetracycline Analysis – example Oxytetracycline



Streptomycine, Tetracyclines and Sulfonamides:

These antibiotics once seemed to be recommended solutions against the American Foulbrood (AFB) resp. its causer *Paenibacillus larvae*. Although it is proven that the treatment is only effective on living bacteria after the outbreak of the disease but not on spores and with constant preventive use the pathogens become more and more resistant Antibiotics are world-wide still used preventively or as ingredients of e.g. Vitamin preparations just in order to strengthen the bee colonies. The use of all Antibiotics e.g. Streptomycine, Tetracyclines and Sulfonamides in honey production is forbidden according to EU Regulation EEC 2377/90, Annex II. Only in Germany the Pesticide Directive sets a MRL of Streptomycine at 0,02 mg/kg as it is permitted as ingredient of a special pesticide (Plantomycin).

In 2001 for Streptomycine and Sulfathiazole (see Fig. 1+3) an increased number of positive results compared to the former year was detected. Since 2002 the trend of not contaminated, negative samples increased.

Oxytetracycline detection increased in the years 2002 and 2003 and decreased since then (see Fig. 2).

Sulfamethacine-free samples showed a slight decrease in 2003, but the trend goes to less contaminated samples (see Fig. 4).

For all tested substances an improvement by less contaminated samples can be shown in the statistics. There are several reasons for this – one is obviously the permanent quality control in the exporting countries as well as strict control of imported goods.

Fig. 3: Development of Sulfonamide Analysis – example Sulfathiazole

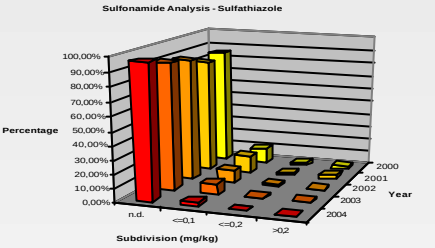


Fig. 4: Development of Sulfonamide Analysis – example Sulfamethazine

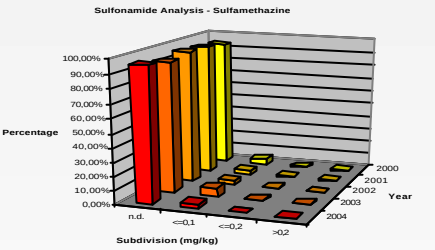
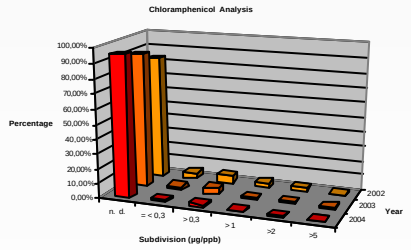


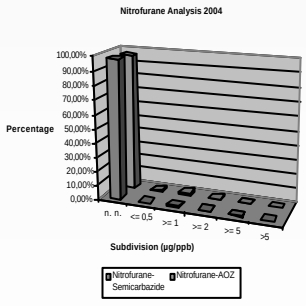
Fig. 5: Development of Chloramphenicol Analysis



Chloramphenicol (CAP) and Nitrofurane:

Annex IV of Regulation (EEC) No 2377/90 lists substances for which no MRL can be set for all animal food because they pose a risk to human health in whatever quantity. This list includes Nitrofuranes as well as CAP. Illegal CAP residues were detected first in Chinese shrimps which led to a complete ban (30.1.2002-31.8.2004) of all Chinese products from animal origin. Nitrofurane-metabolites are tested in honey since 2003. Especially in packed jars it could be shown that Semicarbazide (SEM) residues might be due to metal lids sealed with plastic gaskets. But AOZ and AMOZ residues are due to illegal use in animal production. Although most of the analysed samples are not contaminated (see Fig. 5+6) the use of forbidden substances by a few users leads to an economic loss and damages reputation of the entire branch of industry.

Fig. 5: Nitrofurane Analysis for the year 2004



Conclusion:

The number of negative (n.d.) samples increased for most of the tested parameters during the last three years: Streptomycines, Oxytetracycline, Sulfathiazole and CAP. Only in case of Sulfamethazine the situation seems to have changed for the worse. For Nitrofurane-metabolites it is not possible to compare with former data as well as for recently new incorporated analyses on more Antibiotics e.g. Dapson, Tylosin, Erythromycin and other Macrolids, Lincosamides, Penicillines. As there are no statistically sufficient data available up to now – the future will show their importance.

The overview on the latest five years shows the fact that only strict control leads to better quality.