1. INTRODUCTION

Mycotoxins are worldwide contaminants in food and feed, and they generate an increasing concern for human and animal health (Pittet, 1998). Cases of acute primary mycotoxicosis in humans have been reported, although with low frequency, while acute intoxication of animals is relatively common. However, chronic disease caused by low but constant dietary intake of mycotoxins seems to be the most important factor in aspects of public health. Long-term effects are well documented in animals, and epidemiological studies indicate that a correlation between chronic intake of some mycotoxins and the incidence of specific diseases may exist.

Therefore, many countries, including the European Union have adopted special regulations regarding the control of some mycotoxins in foods, and, undoubtedly, more regulations will follow in the years to come.

The control of mycotoxins is associated with economic costs, has implications on national and international trade, and therefore is the subject of not only scientific but also political discussions. An important factor influencing mycotoxin legislation is the knowledge of dietary exposure of the consumer. In this respect, there is the interest of each country to survey the occurrence of mycotoxins in foods, to assess the exposure of consumers, and ensure that food-producers apply all necessary measures to minimize the mycotoxin contamination in food. In Germany, research groups from federal or state laboratories, as well as from academic institutions, have spent considerable efforts during the last years to provide the necessary data basis.

The natural occurrence of about 20 mycotoxins has been investigated. Most attention has been given to aflatoxins, ochratoxin A (OA), deoxynivalenol (DON), zearalenone (ZEA), and fumonisins. This paper will therefore focus on recent studies regarding the occurrence of these mycotoxins, and on the exposure of the German consumer.

2. OCCURRENCE OF MYCOTOXINS AND CONSUMERS’ EXPOSURE

2.1. Aflatoxins

Aflatoxins occur mostly in foods originating from tropical and subtropical countries. In Europe, they are considered as an imported problem, and therefore a strict control system is applied to the imported critical foods. Like in other EU countries, aflatoxins have been frequently detected in imported pistachio, figs, hazelnuts, and spices in the 1990s. Within a monitoring program developed between
1995 and 1999, about 50 to 70% of pistachio samples contained aflatoxins exceeding the maximum admissible level (4 μg/kg, sum of aflatoxins B₁, B₂, G₁, and G₂) (BGVV, 1999). Since 1999, the situation has gradually been improved, and less than 20% of samples exceeded the maximum admissible level (Landesanstalt für Umweltschutz Baden-Württemberg, 2003). In another study, only 6.3% of food samples were reported with aflatoxin content exceeding the maximum admissible level (Bayerisches Landesamt für Gesundheit und Lebensmittelsicherheit, 2001). However, pre-processed material may also be of importance, as demonstrated by the high aflatoxin B₁ contamination of up to 415 μg/kg found in pistachio-paste for ice-cream production (Burgmaier-Thielert & Thielert, 2000).

The authors reported particular cases of uncontrolled imports from other EU countries. With low frequency, aflatoxins are still found in imported spices, like paprika, chilli, and nutmeg, but the incidence of samples with aflatoxin content exceeding the maximum admissible level seems to decrease with increasingly efficient control measures (Landesanstalt für Umweltschutz Baden-Württemberg, 2003).

Likewise, the control of imported feedstuffs for aflatoxin B₁ resulted in a marked decrease of aflatoxin M₁ (AFM₁) levels in milk. In the late 1980s, domestic milk contaminated with AFM₁ was relatively often identified; the levels occasionally exceeded the maximum admissible level (50 ng/kg; European Commission, 2001). Due to stringent control of certain imported feedstuffs, the situation has been changed in the 1990s, when the incidence of AFM₁ in milk decreased yearly. Continuing monitoring studies of farm milk for AFM₁ performed in several states of Germany in recent years show that - in almost all samples - toxin levels are below 10 ng/L (Milchprüfring Baden-Württemberg, 2002).

2.2. Ochratoxin A

Ochratoxin A is a mycotoxin with nephrotoxic, teratogenic, and carcinogenic properties. It occurs mainly in foods and feeds of plant origin, but can also move up into the food chain. OA may accumulate in edible animal tissues, and therefore humans are exposed to OA not only by consuming contaminated vegetable foods but also by consuming food of animal origin.

Unlike aflatoxins, ochratoxins are considered a local problem in the European countries. In Germany, numerous surveys on the occurrence of ochratoxins in foodstuffs have been carried-out over the last 2 decades. The presence of OA was reported in different commodities, like cereals and cereal products (Wolff & Richter 1992; Majerus et al., 1994; Rother & Taschan, 1998), coffee (Majerus et al., 1993; Koch et al., 1996), beer (Majerus et al., 1993; Thellmann & Weber, 1997), animal edible tissues and meat products (Scheuer, 1989; Kipper et al., 1991; Scheuer et al., 1997; Gareis, 1996), and in human blood (Gareis et al., 2000; Schwerdt et al., 2001).

Although many data on the occurrence of OA have been available, the estimation of the exposure to this toxin from food surveys remained questionable, because the