

## COUNTRY REPORT

## CONTROL OF FOOD AND AGRO PRODUCT CONTAMINATION IN BULGARIA

NIKOLAY RIZOV

*National Center of Hygiene, Medical Ecology and Nutrition, Sofia, Bulgaria*

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The ban of organochlorine pesticides in Bulgaria (1969) has led to their significant drop below the maximum residue limits. The climate and the imperfect storage facilities benefit the production of *Fusarium* toxins desoxygenivalenol (folytoxin), zearalenon (F-2), T-2, ochratoxin A and aflatoxins in grain products, M<sub>1</sub> in milk products, and patulin in apple juices and nectars. Heavy metals are found in smaller concentrations than in industrially developed countries with the exception of lead, which may be due to the wide use of leaded gasoline. Bulgaria has 5 »hot spots« related to sources of heavy metals. An elaborated inventory PCB, PCDD, and PCDF sources suggests that there are no toxicologically significant environmental and food pollutions with these substances. Sanitary control is enforced by several laws and subordinate regulations on the national level, which, however, have failed to coordinate it with the relevant activities of the Ministries of Health and of Agriculture and Forestry.

*Key words:*  
heavy metals, legislation, monitoring, mycotoxins, organochlorine pesticides, PCB, PCDD, PCDF, sanitary control

**B**ulgaria with its 8-million population and an area of 111,000 sq km is mainly an agricultural country with well developed food industry. Until 1989, the land was state-owned and integrated in cooperative and state farms. This kind of organisation of agricultural production and the economic system as a whole were the reasons for the frequent use of pesticides above the recommended doses, which resulted in exceeding the maximum residue limits (MRL).

Planned monitoring is performed by the Central Veterinary Medical Laboratory for foods of animal origin and by the Central Laboratory for Plant Protection – for plant products. The plans of both bodies conform with the EU requirements. The National Center of Hygiene, Medical Ecology and Nutrition conducts topical surveys such as dietary intake of heavy metals and nitrates in children from full-board kindergartens and schools.

Since 1969, the application of organochlorine pesticides in Bulgaria has been banned with the exception of lindane (g-hexachlorocyclohexane) for technical cultures and domestic use and of heptachlor for disinsection of seed material. Some years ago their application was also practically suspended. The levels of organochlorine pesticides in foods are very low, significantly below MRL. This type of analyses is very rarely performed for the purposes of the State Sanitary Control (SSC), mainly for some products imported from countries bearing such risk. In single cases, in the export of cheese it is necessary to determine hexachlorocyclohexane isomers and even these analyses show concentrations well below MRL.

At present the entire agricultural production is private and is not financed by the state. The use of pesticides (organophosphorous, pyrethroids, herbicides, and fungicides) has decreased dramatically due to their high price and the progressive application of good agricultural practice. The State Sanitary Control focuses mainly on certain organophosphorous pesticides, herbicides based on 2,4-D, and some fungicides. Concentrations exceeding MRL are rarely found. Grain cultures, such as wheat, corn, barley, and sunflower constitute a significant part of agricultural production. The climate and the imperfect storage facilities benefit the production of *Fusarium* toxins desoxynivalenol (folytoxin), zearalenon (F-2), T-2 as well as ochratoxin A and aflatoxins in grain products, M1 in milk products, and patulin in apple juices and nectars. The percentage of positive samples is a little greater than that for pesticides. Practically, they are found in input materials rather than in foods ready for consumption.

Heavy metals are found in smaller concentrations than in industrially developed countries. Lead, of course, is an exception, due to the wide use of leaded gasoline. In fact Bulgaria has 5 »hot spots« connected with sources of heavy metals: the metallurgy plant »Kremikovtsi« in Sofia (Pb, Mn, Cd), a smelter plant in Plovdiv (Pb, Cd) and in Kardzhali, and two copper plants: »Eliseina« (Cu, As) and »Srednogorie« (Cu, As).

Compared to other chemical pollutants, practically the greatest number of analyses for SSC and export purposes are conducted to determine the presence of those elements, mainly lead and cadmium, and in certain cases arsenic, copper, manganese, mercury, and zinc. Few are the samples showing excessive concentrations. They concern products mainly originating from the above mentioned »hot spots«. The determined concentrations are the real findings of food contamination. It is difficult to classify them uniquely as positive or negative as the same level of contamination may be considered positive by the EU standards and negative by the FAO, Russian, or other standards and vice versa.

Safety of food and agricultural products, and in particular of their contamination with chemical pollutants is controlled by the control bodies of two ministries – the Ministry of Health (MoH) and the Ministry of Agriculture and Forestry (MAF) – with fully overlapping authorities.

The »state sanitary control« (SSC) is enforced by several laws and subordinate regulations. The duties of the hygiene and epidemiology network of MoH are regulated

by the Health Act, Food Act and some 10–15 subordinate regulations. The control bodies of MAF, the State Veterinary Sanitary Control (SVSC) and the National Service for Plant Protection, Quarantine, and Agrochemistry, work according to the Veterinary Medical Practice Act and Plant Protection Act and their subordinate regulations. The laws and the relevant SSC activities of MoH and MAF are not coordinated. Each of the 28 large cities (regions) in Bulgaria has its Hygiene & Epidemiology Inspectorate (HEI) and bodies of the State Veterinary Sanitary Control and plant protection services.

Each body comprises an inspectorate and a laboratory unit. As a rule, the laboratories are poorly equipped, particularly for determination of major chemical pollutants in food. All pollutants are determined at the National Center of Hygiene, Medical Ecology and Nutrition, the Central Veterinary Medical Laboratory, the Central Laboratory for Plant Protection, HEI – Sofia, HEI – Plovdiv, and HEI – Varna. Other bodies are also engaged in determining certain pesticides and mycotoxins, mainly using the TLC. Besides the SSC bodies, there are several well-equipped and accredited laboratories mainly for determination of heavy metal concentrations in foods.

Beside determination of chemical pollutants through the current sanitary control, until 1985 Bulgaria was almost fully monitoring pesticides, heavy metals, mycotoxins, and nitrates. That huge amount of analytical results was not entirely adequate, as some were obtained through invalidated methods which were often guided by secretive and illogical socialist government policies at the time. The number of samples analysed for the presence of chemical pollutants is now much smaller. These analyses are performed for the needs of the SSC and for export, if required by the importing country. Planned monitoring is performed by the Central Veterinary Medical Laboratory for foods of animal origin and by the Central Laboratory for Plant Protection – for plant products. The plans of both bodies conform with the EU requirements. The National Center of Hygiene, Medical Ecology and Nutrition conducts topical surveys such as dietary intake of heavy metals and nitrates in children from full-board kindergartens and schools.

The elaborated inventory of sources of PCBs, PCDDs, and PCDFs suggests that there are no toxicologically significant environmental and food pollutions with these substances.

Nevertheless, we have joined the WHO Programme for the determination of those compounds in human milk, and a team from the National Center of Hygiene, Medical Ecology and Nutrition is developing methods for determination of PCBs and PAHs in environmental samples and foods.

*Sažetak***KONTROLA ONEČIŠĆENJA HRANE I POLJOPRIVREDNIH PROIZVODA U BUGARSKOJ**

Zabrana uporabe organoklorovih pesticida u Bugarskoj 1969. godine dovela je do njihova značajnog smanjenja ispod maksimalno dopuštene razine. Klima i neprimjereni uvjeti skladištenja pogoduju nastanku toksina dezoksinivalenola (folitoksin), zearalenona (F-2), T-2 te okratoksina A i aflatoksina u žitarica, M<sub>1</sub> u mlijeku te patulina u jabučnim sokovima i nektarima.

Teški metali prisutni su u koncentracijama manjim nego u razvijenim zemljama, što ne vrijedi za olovo čiju široku rasprostranjenost možemo zahvaliti uporabi olovnog benzina. U Bugarskoj postoji pet onečišćenih područja koja su izvori onečišćenja teškim metalima. Praćenje onečišćenja osmišljavaju i provode Središnji veterinarski laboratorij (za hranu životinjskog podrijetla) te Središnji laboratorij za zaštitu bilja (za proizvode biljnoga podrijetla). Planovi praćenja koje izrađuju obje ustanove u skladu su sa zahtjevima EU. Državni centar za higijenu, zdravstvenu ekologiju i prehranu provodi istraživanja unosa teških metala i nitrata putem hrane u djece u vrtićima i školama. Detaljan popis izvora, PCB-a, PCDD-a i PCDF-a upućuje na to da u Bugarskoj nema toksikološki značajnoga onečišćenja okoliša ovim tvarima. Državna sanitarna kontrola regulirana je putem više zakona i propisa koji međutim nisu usklađeni sa sanitarnom kontrolom koju provode ministarstva zdravstva te poljoprivrede i šumarstva.

*Ključne riječi:*

organoklorovi pesticidi, teški metali, mikotoksini, monitoring, legislativa, PCB, PCDD, PCDF, državna sanitarna kontrola

Requests for reprints:

Nikolay Rizov, Ph. D.  
National Center of Hygiene, Medical Ecology and Nutrition  
15 D. Nestorov Str., 1431 Sofia, Bulgaria  
E-mail: [N.Rizov@NCH.Aster.Net](mailto:N.Rizov@NCH.Aster.Net)