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Impacts of the Environmental Pollution Residues in Human Food on the Public Health

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Abstract

The environmental pollution Polychlorinated dibenzo-p-dioxins, the polychlorinated dibenzofurans PCDD/F and the polychlorinated biphenyls (PCB) contamination in the food from the animal origin were caused by the industrially produced feed from the free range chicken, sheep, and beef. To elucidate the entry of the the environmental pollution polychlorinated biphenyls (PCBs) and the Polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans PCDD/Fs in the food related to the environmental contamination. The food products from the farm animals are sensitive to the environmental pollution dioxin/ polychlorinated biphenyls (PCB) exposure, the suckling calves and the laying hens housed outdoor at the soil concentrations that have previously been considered as safe. In the beef/veal when the soil is contaminated. The eggs/ the broiler, this can occur. The eggs consumer's especially the young children can easily exceed the health-based guidance values, the tolerable daily intake. The soil, the chicken eggs exposure pathway is probably the most sensitive route for the human exposure to both the environmental pollution dioxin-like polychlorinated biphenyls and the PCDD/Fs from the soil and needs to be considered for the soil guidelines. The calves from the suckler cow herds are the most prone to the impacts of the dl-PCB contamination due to the excretion/accumulation via the milk. The environmental pollution polychlorinated biphenyls (PCB) (and the PCDD/F) intake for the free-range cattle stems from the feed and the soil. The sources for the PCDD/Fs and polychlorinated biphenyls (PCBs) relevant to the environmental contamination in polychlorinated biphenyls respect to the food safety. It also includes the considerations on the assessment of the emerging persistent organic pollutants. The major sources of the environmental pollution PCDD/F and the dl-PCB contamination of the food of the animal origin are the soils contaminated from the polychlorinated biphenyls (PCB) and the PCDD/F releases; the polychlorinated biphenyls (PCBs) emitted from the buildings and the constructions; the environmental pollution polychlorinated biphenyls (PCBs) present at the farms. The impacted areas need to be assessed with the respect to the potential contamination of the food producing animals. The livestock management techniques can reduce the exposure to the environmental pollution PCDD/Fs and the environmental pollution polychlorinated biphenyls (PCBs). The control and the reduction measures are recommended for the emission sources and the new listed and the emerging persistent organic pollutants to ensure the food safety.

Keywords: Environmental Pollution; Dioxin; Food of Animal Origin; Beef; Food Safety

Abbreviations: PCBs: Polychlorinated Biphenyls; PCDD: Polychlorinated Dibenzofurans.

Introduction

The environmental pollution Polychlorinated dibenzo-p-dioxins, polychlorinated dibenzofurans (PCDD/Fs), and the environmental pollution polychlorinated biphenyls (PCBs) are widely recognized environmental and the food contaminants. The use of the environmental pollution polychlorinated biphenyls (PCBs) and their weak life-cycle management have resulted in a widespread contamination of the techno sphere and the environment. The open applications such as the sealants are still contributing to the environmental release and the human exposure [1-6]. The release of the environmental pollution PCDD/Fs of the industrial emissions has impacted the contaminated soils and the sediments, generating the contaminated sites and the hot spots. The humans are exposed to the the environmental pollution dioxins and the polychlorinated biphenyls (PCBs) mainly via the food, especially through the consumption of the animal-derived foods such as the meat, the dairy products, the eggs, and the fishery products (BMU) [7-13]. The fruits, vegetables, nuts and cereals have normally low levels of the environmental pollution PCDD/PCDFs and the polychlorinated biphenyls (PCBs), but due to the high consumption they also contribute to the food-borne uptake of these pollutants. The meat, the eggs and the milk contamination may be due to the animal feeds and the feed additives acts as the major sources of the dioxin and PCB contamination for the food of animal origin. The feed incidents have traditionally been the main reason for exceeding levels of the environmental pollution PCDD/Fs and polychlorinated biphenyls (PCBs) in the food of animal origin [14-19]. The sheep, in particular the sheep liver and the beef from the free-range production have also exceeded the limits for the sum of the environmental pollution PCDD/Fs and the dioxin-like polychlorinated biphenyls, even without the specific contamination of the feedstuffs. The eggs from the laying hens housed outdoors are particularly sensitive indicators of the environmental pollution PCDD/F and the PCB contamination in the soil and can also be a relevant exposure pathway for the humans. This has increasingly of the PCDD/F and the PCB contamination of the eggs [20-26]. This contamination has been demonstrated in a monitoring study, which found that the eggs from the small flocks. The impact of the environmental PCDD/F and the PCB contamination on the products of the animal origin, and evaluated the significance of the various sources. The contaminated soils and the feedstuffs linked to the food from the animal origin that for the soil contamination. The free range broiler/ the eggs and the beef cattle from the extensive farming may get contaminated with the environmental pollution dioxin-like the PCB and the PCDD/F even when the soils display relatively low levels. The soil pollution is one of the major soil threats. The environmental pollution PCDD/Fs and the polychlorinated biphenyls (PCBs) are among the most relevant soil pollutants [27-33]. There is an urgent need to eliminate pollution sources and to control, secure and remediate the contaminated sites and the reservoirs, to reduce exposure and guarantee the food safety. This compilation of the major environmental pollution PCDD/F and the polychlorinated biphenyls (PCB) sources and their potential pathways to the contaminated soils and the food-producing animals can inform the development of appropriate source monitoring and reduction measures. The dietary intake is the predominant exposure pathway to the environmental pollution PCDD/Fs and the polychlorinated biphenyls (PCBs). The environmental pollution PCDD/Fs, is due to the consumption of the contaminated food from the animal origin. The polychlorinated biphenyls (PCBs), indoor dust and the air also constitute a significant risk to the sensitive subpopulations. The undertaken the risk assessments of the dioxins and the dioxin-like polychlorinated biphenyls and developed a range of health based guidance values (HBGV) [34-40].

The Exposure of the Food Producing Animals and the Accumulation of the Environmental Pollution

The exposure of the food-producing animals1 and the accumulation of the environmental pollution PCDD/Fs and the polychlorinated biphenyls (PCBs). The livestock farming are prone to accumulate the environmental pollution PCDD/Fs and the PCBs. The food producing animals and their exposure to the PCDD/Fs in the soils. The exposure to the environmental pollution PCBs from the soils and the vegetation. The bioaccumulation of the environmental pollution PCDD/Fs and the polychlorinated biphenyls (PCBs) depends on the congener, the species, and the tissue of the food producing animals [41-47]. The bioaccumulation from the feed/ the soil to the food of the animal origin changes the congener patterns considerably. The determination of the congener specific rates for the transferring from the soil/ the feed to the livestock products as the meat, the eggs and the milk. The free range chickens are particularly prone to the environmental contamination. The free range chickens take up more soil than other farm animals per body weight. The soil chicken eggs are probably the most sensitive exposure pathway for the environmental pollution polychlorinated biphenyls (PCBs) and the PCDD/Fs from the soil to the humans. The people in the world especially the young children consuming the contaminated eggs [48-55]. The soil used for the production of the free-range eggs and the chicken meat. The cattle are sensitive to the exposure from the environmental PCB contamination. The cattle take up the environmental pollution polychlorinated biphenyls

(PCBs) and the PCDD/Fs from the feed, including from the feed contaminated with the soil particles as the grass, the grass silage or the hay. The grazing cattle are also exposed to the contaminated soil during the grazing. The amount of the soil intake depends on the quality of the meadow and the amount of the grass available [56-62].

The environmental pollution PCDD/F–PCB- toxic equivalent levels in the meat according to the age of the slaughtered animal. The environmental pollution PCDD/F and the PCB in the beef cows are reduced by the lactation, the transferring these contaminants to the calf as similar in the humans. For the sheep and the goat, in principle, the same applies as for beef cattle production. The critical levels in the feed and the soil are of the same order of magnitude as for suckler cow herds. The sheep are considered among the most sensitive animals. The grazing sheep nip closer to ground surface, and the share of the ingested soil may be high. For the dairy sheep computed the carry-over of the environmental pollution PCDD/Fs and the dioxin-like polychlorinated biphenyls from the soil to the milk for the different soil intake scenarios [63-69]. The sheep may be exposed to the more highly contaminated soils because they often graze on areas near rivers or industrial sites, along streets, or on former industrial or military areas. To protect the human health, the human consumption must also comply with the safety. The environmental pollution polychlorinated biphenyls (PCBs) and the PCDD/Fs have also been detected in goat products as the milk and the meat due to the environmental contamination. It is well known that the deer, like the sheep and the goats, eat the grasses and plants very close to the soil, resulting in increased uptake of the soil particles. Therefore, for the deer is similar to the cattle and the sheep the soil next to the feed can serve as a relevant the environmental pollution PCDD/F and the PCB exposure pathway. In addition, the forest soils, especially in populated areas, have a higher the environmental pollution PCDD/F and the PCB content than grasslands due to the adsorption of pollutants via leaves and transfer to the topsoil [70-77].

The environmental pollution PCDD/F and the dl-PCB levels in the liver of the deer are high and are elevated in some meat. The contaminants in the Food Chain the frequent consumption of the deer liver, especially for the high consumers may be of the health concern and that the frequent consumption of the sheep liver, particularly by the women of the child-bearing age and the children may be a potential health concern. The critical environmental pollution PCDD/F or the PCB levels in the soils or the vegetation have not been derived for the game. The environmental pollution polychlorinated biphenyls (PCB) containing buildings and other constructions increasingly need repair and maintenance work. If the maintenance, the repair or demolition measures are not carried out in a professional manner, larger quantities of the environmental pollution polychlorinated biphenyls (PCBs) are released uncontrolled into the environment, when removing the polychlorinated biphenyls (PCB) containing paint and anticorrosion coating or cleaning facades with joint sealants by abrasive blasting, large amounts of the polychlorinated biphenyls (PCBs) can be released and the contaminate soils, sediments, water bodies and plants [78-85].

The environmental pollution polychlorinated biphenyls (PCB) inventory only considers the emission of unintentionally formed the environmental pollution polychlorinated biphenyls (PCBs) from the combustion the plants and the other thermal sources neglecting the polychlorinated biphenyls (PCB) release from remaining open application. The environmental matrices as the soil, the air and the grass contain almost exclusively polychlorinated biphenyls (PCB) congener profiles of industrially produced PCBs. This demonstrates the dominance of industrially produced PCBs emission sources and the low relevance of thermally unintentionally formed PCBs, and supports the emission estimate [86-94]. The environmental pollution polychlorinated biphenyls (PCB) emission and contamination of the environment, including the vegetation, as the grass or the spruce needles, have decreased in the last few years. The sources of PCBs for the food-producing animals can be divided into local sources at the farm or the pasture and the sources impacting larger areas also impacting the pasture areas. The environmental pollution PCB sources impact the soil to the varying degrees as the exposure pathways in particular, the historic contaminations. Contemporary the environmental pollution PCB emission sources impact the grass the feed via the atmospheric deposition. The animals and the humans have been exposed to the PCBs around the production sites [95-101].

The Contamination and the Exposure via the Animal Products

The high environmental contamination and elevated the human exposure, the plant and the food animals as likely major the human exposure pathways. The environmental pollution polychlorinated biphenyls (PCB) production, the factory was destroyed by a major fire. The environmental pollution PCB and PCDF releases from this fire could have been substantial and the contamination might be relevant. Some manufacturing industries used the polychlorinated biphenyls (PCBs) for the production of the transformers, the capacitors, the paints, the sealants, the flooring, the paper or the textiles [102-107]. The hen eggs from the chicken holders close to a capacitor factory producing the PCB containing capacitors for some time were the highly contaminated with dioxin-like polychlorinated biphenyls. The soil levels in these areas were contaminated with the environmental pollution

polychlorinated biphenyls (PCB). The fish were analyzed in the receiving water which used by the local fishing association. The eel contained the environmental pollution polychlorinated biphenyls (PCB) portion of the eel, an adult would ingest the environmental pollution polychlorinated biphenyls (PCB). The contamination potential of the factory and the consumption of the fish from the direct receiving waters, the assessment of the food producing animals must be conducted, and the contaminated river and its fish are contaminated [108-113].

The need for monitoring the water pollution from the factories that used tonnes of the environmental pollution polychlorinated biphenyls (PCBs), as well as determination of the contaminant levels in the animal-derived foods in the surrounding area. A range of the industries have used the environmental pollution polychlorinated biphenyls (PCB) containing the equipment or the PCB oils [114-120]. This includes, the companies operating the electricity grid and the high-energy-consuming industries such as the steel and the metal production and the power plants. The contamination can occur where the transformers are operated or receive the maintenance and where the old transformers, the equipment's with the hydraulic fluid and the other the environmental pollution polychlorinated biphenyls (PCB) containing the equipment are stored. The contamination of the cattle's meat and milk, sheep and goats. The environmental pollution polychlorinated biphenyls (PCB) the soil contamination [121-128]. The grazing cattle are banned around the steel plant. The industries treating, the cutting or the pressing metals have used the polychlorinated biphenyls (PCB) containing the metal working fluids such as cutting oils. The environmental pollution polychlorinated biphenyls (PCBs) have been released from this open application and the metal residues containing such oils have most likely ended up in the plants that recover the metal waste, leading to the further environmental releases. The eggs monitoring conducted especially the eggs around the metal industries [129-136].

The environmental pollution polychlorinated biphenyls (PCBs) have also been used in the military applications as the hydraulic oils, the transformers, the paints for the equipment, the vehicles and the sealants. The environmental pollution polychlorinated biphenyls (PCBs) have been used also on the farms in the paints, the coatings and the sealants. The open use of the environmental pollution polychlorinated biphenyls (PCBs) in the fodder silos was a major food contamination pathway of cattle's milk. The meat and the eggs contamination from the open environmental pollution polychlorinated biphenyls (PCB) uses on the farms. The environmental pollution polychlorinated biphenyls (PCB) paint in the silos, on the asbestos roofs and the polychlorinated biphenyls (PCBs) in a rubber conveyor belt have contaminated the chicken's eggs and the beef [137-145]. The environmental pollution polychlorinated biphenyls (PCB) paints on the walls of a stable contaminated a beef herd. At the end of the life of the environmental pollution PCB-containing products and the materials, considerable amounts of the environmental pollution PCBs have been released and have contaminated the environment, especially the soils [146-152].

The Contamination of the Food of Animal Origin as Beef and the Sheep Meat

To reduce and, where feasible, eliminate releases of the unintentional persistent organic environmental pollutants, including the PCDD/Fs, polychlorinated naphthalenes, the PCBs, and the hexachlorobenzene. Since the PCDD/Fs are formed in the most processes together with the other unintentionally formed persistent organic pollutants (unintentionally formed persistent organic pollutants, unintentional persistent organic environmental pollutants), they are used as indicators for inventories and release the reduction efforts for all the unintentionally formed persistent organic pollutants, unintentional persistent organic pollutants. However, some processes of the organochlorine industry form the specific unintentional persistent organic environmental pollutants such as the PCBs, the PCNs or the hexachlorobenzene [153-158]. These legacies are now stored in the soil, sediments and other reservoirs, such as the landfills and the contaminated sites. The environmental pollution PCDD/F (and the PCB) pollution is ubiquitous in the soil and the sediments.

The soil contamination levels highly depend on historical deposition as the industrial point the sources, the flood plains, the agglomeration areas, the sludge entry areas and the special contaminated sites. The livestock with the outdoor access, the soil is the main exposure pathway to the environmental PCDD/F. Compared to the PCDD/F reservoirs in the soils, which largely reflect the high historic contamination, the current atmospheric environmental pollution PCDD/F the release and the deposition with the emission regulations in the place is of minor importance for the exposure of the livestock and the humans via the food consumption [159-165]. In addition, the feed and the bedding can lead to the environmental pollution PCDD/F contamination for the all livestock. The sources of the environmental pollution PCDD/Fs for the food-producing animals can be divided into local sources at the farm or pasture and regional sources impacting larger areas also impacting pasture areas. The main environmental pollution PCDD/F emission/exposure sources that have resulted in the contamination of the food products from the animals. The use of the pesticides and the other environmental pollution organochlorines containing the PCDD/Fs has led to PCDD/F contamination of the environment and the livestock. The

Chlorine-using or formerly chlorine-using industries, such as the industries producing paper, the magnesium, the aluminium or the titanium dioxide, have a high PCDD/F emission potential [166-172]. The Paper production with elemental chlorine led to significant environmental pollution PCDD/F pollution.

The environmental pollution PCDD/F releases were mainly via wastewater and sludge. Sludge residues from the paper production have the contaminated soils. The incinerators, the metal industry are the most important historic thermal source of the environmental pollution PCDD/F emissions. The eggs near the metal industries in developing countries in the world were frequently contaminated. The most contaminated eggs were detected in an industrial area with the various metal industries. The atmospheric deposition from the metal industries and waste incinerators was recently been identified as a main source of the environmental pollution PCDD/F in the soil. The industrial areas, the soils were unfit for raising the free-range the chicken and the eggs. The Sinter plants and copper industry are categorized of the Convention as having the highest environmental pollution PCDD/F release risk. The Sintering plants can release high levels of the environmental pollution PCDD/F and other unintentionally formed persistent organic pollutants [173-179]. The high levels in the environment, the cattle and the milk were found nearby a plant. The Primary copper production Although primary copper production is not classified as a significant environmental pollution PCDD/F source, certain processes in primary copper production have resulted in extremely high PCDD/F releases and have generated the environmental pollution PCDD/F-contaminated slags. The Electric arc furnace can also have high the environmental pollution PCDD/F releases, which depend on the air pollution control system and the quality of the scrap used.

High releases can be caused by the environmental pollution PCB-containing feed stocks. For one electric arc furnace, the environmental pollution PCB emissions resulted in the contamination of fish in the affected river [180-183]. The Secondary aluminum production Compared to primary aluminum production, the production of secondary aluminum was a much more important source of the environmental pollution PCDD/Fs. The Primary aluminum production In primary aluminum production, high loads of unintentionally formed persistent organic environmental pollutants as the hexachlorobenzene, the PeCBz and the octachlorostyrene (OCS) were generated in the purification process of aluminum with chlorine or other chlorine sources. Emissions from this process have resulted in high hexachlorobenzene, PeCBz and OCS releases into a river and contamination of fish. The flood plains of the river have not been assessed for the potential impact on the livestock. Extremely high environmental pollution PCDD/F releases have been detected in the secondary zinc industry during the processing of zinc-containing residues and filter dusts in the roller tube, as well as during the hot briquetting. The contaminated zinc oxides from these processes have been used as the feed additive, leading to the food/ the meat contamination [178-183].

The Systematic Assessment of the Environmental Pollution

The systematic assessment of the environmental pollution PCDD/F contamination in the vicinity of the metal industries in respect to the food-producing animals has not been done. The environmental pollution heavy metals are likely even more critical emissions from the metal industry compared to the unintentionally form persistent organic environmental pollutants, unintentional persistent organic pollutants. In particular, lead pollution has caused serious health impacts, including the death of the children .The cobalt and the nickel pollution needs more attention with increasing the global use and the smelting. The environmental pollution PCDD/Fs should become part of a more holistic assessment of the pollution and related the human exposure and the health impacts around the metal smelters. The plants using the oil or the gas have low environmental pollution PCDD/F emissions, without a significant impact on the surrounding soils [184-186]. The copper salts for improved burnout in the coal-fired power plants increases the environmental pollution PCDD/F emissions. The waste wood boilers/ the incinerators can also lead to high the environmental pollution PCDD/F releases due to the use of the PCP and the copper salts as the wood preservatives.

The waste wood must be kept out of the biomass boilers that use the ash as the fertilizer on the soils. The use of waste wood or waste oils for drying animal feed is a source of food contamination. If the feed is directly dried by the flue gas, the environmental pollution PCDD/Fs can be deposited onto it. The animal feed was dried in the off-gas from the combustion of the PCP-contaminated waste wood and was thus contaminated by the environmental pollution PCDD/Fs. The implementing of the best available techniques / the best environmental practices in large thermal PCDD/F sources in the industrial countries in the world, the emissions from domestic heating and small combustion plants have become major environmental pollution PCDD/F air emission sources in industrial countries in the world [33-39]. The emissions and ash from small combustion plants in which waste wood or other wastes are incinerated or co-incinerated can have elevated the environmental pollution PCDD/F release .The copper salts are commercially marketed for the “the cleaning” of the stoves from the soot deposits. The open drying of plants or feed and the smoking of the food in the exhaust stream

of the combustion processes are particularly the prone to the environmental pollution PCDD/F contamination. The environmental pollution PCDD/F emissions from the glass or ceramics industry are considered irrelevant and have small environmental pollution PCDD/F emission factors.

The environmental pollution Dioxin emissions from the transport sector were high at the time of leaded gasoline use. Chlorinated and brominated aliphatic compounds were added to leaded gasoline to volatize the lead [77-84]. This resulted in the formation and release of chlorinated, brominated and brominated–chlorinated mixed halogenated dibenzo-p-dioxins and dibenzofurans. The environmental pollution dioxin emission factors for unleaded petrol and diesel are small. Since the ban on leaded gasoline, the environmental pollution PCDD/F emissions from the transport sector have been insignificant. Landfill and dumpsite fires and major building or vehicle fires can release significant amounts of the environmental pollution PCDD/Fs. A single fire event will usually not lead to the significant soil contamination. The fires at landfill sites and dumpsites have the potential to contaminate the nearby soils and population with the environmental pollution PCDD/Fs and the PCBs. Open burning can lead to local environmental pollution PCDD/F contamination, especially when using materials that have the environmental pollution PCDD/F formation potential. The open burning is considered a major source for the contamination of the free-range eggs. Sites where e-waste or waste from end-of-life vehicles is burned have high levels of the environmental pollution PCDD/F and the brominated and the brominated–chlorinated mixed halogenated dibenzo-p-dioxins and dibenzofurans [12-18].

Through atmospheric deposition and the ability of leaves and needles to filter the PCDD/Fs and the PCBs before being deposited to the soil, forests function as a sink for the environmental pollution PCDD/Fs and the PCBs. The environmental pollution PCDD/F contamination in the sludge-amended the soils depends on the time sewage sludge had been applied and on specific industries with high dioxin contamination in effluent discharge. Especially the sludge from the pulp and paper industry, the chemical industry and leather and textile production have had high environmental pollution PCDD/F contamination, leading to potentially significant concentrations in the sludge-treated soils that should be assessed. In the past, sediment from river dredging was partly applied to grassland and arable land. Pasture areas contaminated with sediment from the river were identified as contamination source for a cattle herd resulting in increased the environmental pollution dioxin and the dl-PCB levels in the meat of the grazing animals.

The compost occasionally had the environmental pollution PCDD/F content due to the PCDD/Fs in the pesticides, such as the PCP, or additional formation from the PCP or other precursor pesticides during the composting process [5-11]. The green waste and bio-waste composts from the composting plants were found to contain the environmental pollution PCDD/F. The commercial garden fertilizers were contaminated. The systematic assessment of the soil contamination in the vicinity of pollution sources has not been conducted in the industrial and the developing countries in the world. The assessment of the environmental pollution PCDD/F or the PCB emission sources is the area where the contamination in the soils and the grass/the feed for the most exposure-sensitive livestock as the chicken and the beef cattle. The contamination footprint of areas affected by large sources can be substantial have caused increased the human environmental pollution PCB exposure with the food from the animal origin considered the most important exposure pathway. The environmental pollution PCDD/Fs released from the magnesium/titanium production and the chlorine use has contaminated the river and is transported with the sediment into the Sea water. The use/disposal of smaller volumes such as scrap yards, substations/transformers or shredder plants can lead to the environmental pollution PCB contamination and should be assessed for their pollution footprint and for potential exposure of food animals [1-9].

The Precautions and the Recommendations to the Animal Farms

The pasture area was used for beef cows, resulting in the environmental pollution dl-PCB meat contamination. The environmental pollution PCB sources along the life cycle should be assessed, as well as areas where the PCB and other environmental pollution PCDD/F-containing pesticides have been applied in significant amounts. For farms where point sources of the environmental pollution PCDD/Fs or the PCBs caused contamination of the food, the management measure consists of removing the source or excluding or restricting access for livestock following the discovery that PCB paints in feed silos caused the PCB-contamination of milk. The PCB-painted silos were removed. In the case of the cattle contamination on a farm by the PCB-containing wall paints, the paints were professionally removed and the levels in the meat decreased. For herds grazing on areas where the soil or vegetation is the cause for the contamination of the meat or the milk, the soil removal is normally not an option due to the high cost. In highly contaminated areas, the production of the food might need to be stopped [182-186]. The management measures to reduce the exposure in impacted areas might be sufficient for further livestock farming.

The management measures have been developed for the highly contaminated floodplains; it is possible to decrease the environmental pollution PCDD/F levels in

beef by feeding non-contaminated feed in the fattening phase before slaughtering. For reducing the environmental pollution PCDD/Fs and PCBs in sheep. For a suckler cow herd it has been found that toxic equivalent values in the meat decrease after weaning. Extending the duration between weaning and slaughtering might, therefore, be a relevant factor for reducing the environmental pollution PCB and toxic equivalent levels in the meat from the beef cattle. The reduction of the suckling time, which has already been applied on the flood plains. These reductions are mainly due to increase in the body mass diluting the load from the higher PCB intake when suckling milk or from the high exposure to the environmental pollution PCDD/Fs on the contaminated land before the fattening in the stable [51-56]. The selection of appropriate feed and cultivation methods on the impacted fields can reduce the exposure for the livestock.. Optimizing the harvesting technique of the fodder on the contaminated soils can also reduce the dioxin contamination of the grass/ green fodder from the soil. Free-range areas should have a continuous soil vegetation cover to reduce exposure to the environmental pollution PCDD/Fs via the soil while foraging. Additional concentrate the feed can also reduce the grass/ the soil intake and therefore the overall exposure. With these moderate management measures, for the vast majority of the slightly impacted offspring from the suckler cow herds it seems feasible to bring low contamination limits. These are encouraging examples for further assessing the management measures might be applicable for the other contaminated areas and what type of livestock can be addressed by which management measures.

Due to the increasing demand for animal products from sustainable species-appropriate livestock farming, there is an increasing trend of housing farm animals outdoors. Unless measures are taken to reduce exposure there will likely be a number of instances of the animal-origin food contaminant levels. The farms producing chicken/ the eggs, the cattle and the sheep the assessment and the management have been developed. The Poultry, the cattle and the sheep, the food, the agriculture, the consumer protection .The rural development developed a leaflet with the recommendations for the affected chicken/ the egg farms. This material is used by the competent food control authorities and by the farmers for the identification of the possible sources and, when the regulatory limits are exceeded, for the exposure source identification and the mitigation [101-107].

The Measures Applied in the Farm

The following measures should be taken into account .Visual inspection of stables and free-range areas. The removal of possible point sources and hot spots on the site. Expert examination of the soil. The proper replacement of the contaminated soil and the whole-quality feeding. The feeding in the stables or on the paved areas and covered outside area. The restricted access to the free-range areas and the closed vegetation cover on free-range areas. Since farmers do not normally have the knowledge and experience for assessing the environmental pollution PCDD/F or the PCB sources and reducing the exposure, support from authorities, institutions or consultants is needed. In some parts support affected farmers. The following possible supporting measures should be evaluated by the authorities and offered, as appropriate, to farmers: Provision of practical examples of potential sources of contamination and general advice for preventive measures for the farmers and in particular for the holders of the backyard poultry flocks. Provision of elaborated instructions for affected farmers [81-88].

Advice for Farmers in the World with the Food Products

We must support the farming practice in the world. Must support for the expensive PCDD/F and the PCB monitoring of the affected farms in the world. The cost for the management measures should be covered by the polluter considering the polluter pays principle and the extended producer responsibility. The grass/the feed growing on flood plains can lead to POP exposure for livestock. But also, the quality of the pasture is a relevant factor for the contamination of livestock and the livestock products. The factors are related to the weather conditions, and the change in the precipitation and the increased flooding can be impacted by the climate change. The cattle have a certain intake of the soil when grazing. The amount of the soil ingested by cattle during the grazing is closely related to the condition of the soil and the grass cover [162-167]. When the grazing areas become wet and muddy a higher share of the soil/ the mud particles is transferred to the vegetation due to the splashing water and the trampling damage caused by the grazing livestock. The rivers contaminated by the industrial emissions, more frequent and the extensive flooding increases the distribution of the contaminated sediments to the floodplain soils leading to the increased exposure risks for grazing the livestock. The increased sea water level rise and the erosion of the coastal areas result in the pollutant releases from the landfills located next to the shoreline.

An important aspect in the identification of the environmental pollution PCDD/F and the PCB sources is the assignment of source profiles. The environmental pollution PCDD/F or the PCB fingerprint in the environmental media or the feed and the food can help identify the contamination sources and the pathways. The biogas production has strongly increased. The residues from the biogas production are often distributed on the agricultural land. To some extent, the industrial sludge is added/used in the biogas production such as sludge from pulp and paper. Depending

on the production process, pulp and paper sludge can be contaminated with the environmental pollution PCDD/F or with per- and the polyfluorinated alkylated substances. This can lead to large contaminated areas, as recently demonstrated for a PFAS-impacted pulp and the paper mill sludge added in a composting plant. In the environmental pollution PCB risk assessments has categorized the PCBs in the highest carcinogenic to the humans, with a need for minimizing the exposure. The environmental pollution PCBs are immunotoxic and neurotoxic at very low levels, which should be taken into account [172-177].

Prevention the Children and People Exposure

The people in the world living or working in the environmental pollution PCB-contaminated buildings should be informed about the existence and magnitude of the pollution. The appropriate guidance regarding the duration of use of the buildings should be given along with this information. The farmers are responsible for the safe feed and food production and often bear the costs when food contaminant and the food product is restricted on the market and needs to be destroyed. However, the cost of the damage should be covered by the polluters considering the polluter pays principle and the extended producer responsibility [14-20]. The farmers are not responsible for the use of the environmental pollution PCBs. The control of the hazardous chemicals are regulated by the law, and these chemicals were produced and released by the companies and continue to be released via their products. The farmers are normally not responsible for the environmental pollution PCDD/F contamination except for, e.g., the open burning in the backyard or non-authorized use of the waste sludge on the pasture land. The farmers were not responsible for the environmental pollution and the feed or the food contamination, they need to be supported by the government and financially compensated by the polluters and producers or the government [31-37].

The Reduction of the Environmental Pollution

Reduction of the environmental pollution PCB and the PCDD/F release, management and reduction of the exposure. The contamination of the food from the animal origin and the low levels of the environmental pollution PCDD/F and the PCB in the soil at which food-producing animals become contaminated need to further control and reduce the releases into the environment. The industrial countries in the world with significant former use of the environmental pollution PCBs in open application, the remaining the environmental pollution PCBs, mainly in the construction sector, have a significant emission potential as demonstrated [64-70]. Furthermore, extreme high release occurs if paints or sealants are sandblasted or otherwise removed without proper technology or waste management measures. Therefore, inventorying and control of remaining the environmental pollution PCBs in open applications is important for lowering and controlling the current PCB impacts on the atmosphere and the grass, and the resulting burden on the food-producing animals. The environmental pollution PCBs from open applications can also impact construction debris. The recycling/reuse of such materials around farms or grazing areas can result in exposure. Other persistent organic pollutants also need to be inventoried, controlled and managed, and their exempted uses phased out as soon as possible [111-117].

To Support Safe Food Production and To Avoid the Environmental Pollution

The meat and, the dairy products and the fish are the major sources of the PCDD/F and the PCB intake with lower impact from the vegetables. Therefore, an overall reduction of the food from the animal origin reduces the exposure to these persistent organic pollutants. The environmental pollution PCDD/F, the PCBs and other accumulated carcinogens in the meat are considered a cause of increased cancer rates with increased red meat consumption. the reduction of the red meat consumption, in particular the processed red meat, therefore, also reduces the associated cancer risk but also the other meat-related diseases such as the cardiovascular disease, as well as the total mortality, in both the men and the women in the world. The more vegetable and the fruit based diet reduce the overall mortality. The reduction of the meat consumption also significantly reduces the ecological footprint of the food. Therefore, overall the reduction of high meat consumption can combine reduced health risks and reduced ecological footprint for a more healthy and sustainable nutrition. The most persistent organic pollutants, in particular newly listed industrial fluorinated and brominated persistent organic pollutants are not regulated in the feed and the food globally. However, these and other POP-like substances accumulate in the food of animal origin, potentially leading to the food contamination, and should, therefore, be assessed. The Brominated dioxins and the furans (PBDD/Fs) have toxicities similar to those of the environmental pollution PCDD/Fs and are, therefore, of concern.

The eggs from the free-range hens found highly contaminated with the environmental pollution PBDD/Fs . The PBDD/Fs are even formed from the PBDEs during cooking of the fish. The major source of the environmental pollution PBDD/Fs is the aromatic brominated flame retardants, in particular the PBDEs. The environmental pollution short-chain chlorinated paraffins are also transferred from the

food contact materials such as the baking ovens or the food blenders to the food and the human intake. The soil pollutants as the inorganic compounds. Other organic compounds as the xenobiotic molecules, the antibiotics, the polycyclic aromatic hydrocarbons and the mineral oil. It called the chemicals of emerging concern (CECs) in the soil amendments. The CECs also include the nanoparticles, the pharmaceuticals and the personal care products, the estrogen-like compounds, the antibiotics and the hormones, the flame retardants, the detergents, the currently used pesticides, the plastics and the micro plastics, the PFAS, the various industrial chemical additives such as the softeners, the UV-stabilizers and the antioxidants, and the pollutants from the open burning of the electronic waste, such as the chlorinated and the brominated polycyclic aromatic hydrocarbons. Many of the organic wastes can enhance the risk of spreading the infectious diseases. For a comprehensive and the holistic protection of the soils for the sustainable food production, all these pollutants need to be monitored and controlled. One challenge is the impact of the mixture toxicity, which is currently not considered in the risk assessment.

Bold approaches are needed to protect the soil and the environment from further pollution and degradation, Environment strategy for a non-toxic environment, which is conducive to innovation and the development of the sustainable substitutes, including the non-chemical solutions. Management of the environmental pollutants and the contaminated sites for the safe food production. The management measures for livestock farming, to reduce exposure on moderately contaminated areas [6-13]. They have already been applied in a few cases, and have potential to be further developed and optimized. Experiences regarding the environmental pollution PCDD/F and PCB exposure of food-producing animals have been compiled. Further such experiences should be gathered and made public, to help mitigate exposure pathways, including for other persistent organic pollutants groups used in the techno sphere. These chemicals might have different exposure pathways due to different technical uses in products and different physico-chemical properties. To support safe food production and to avoid the environmental pollution PCDD/F-, the PCB- and other POP contamination of the food of animal origin. The Prevention and Reduction of the environmental pollution Dioxin and Dioxin-like PCB Contamination in the Food and the Feeds [39-46].

For the Food Safety and Minimizing the Exposure

For the food safety and for minimizing exposure, contaminated sites should by systematically screen and appropriately secured, managed and possibly remediated. Such an assessment could also clarify what areas are safe for producing the feedstuffs and the food products from the animal origin and the plants, the vegetables. The development of an inventory of potentially the environmental pollution PCDD/F-contaminated areas is, therefore, necessary, both for meeting the obligation to implement the Stockholm Convention and for the food safety. Since chlorinated paraffins were a major substitute for the environmental pollution PCBs in these open applications, and since short-chain chlorinated paraffins are listed as persistent organic pollutants, they should be included in such an assessment of open applications and related management. The flow analysis might help to predict trends in the fish contamination or estimate the burden of the food-producing animals grazing on floodplains [21-27].

Conclusion

The impact of contaminated sites and the waters on the feed/ the food contamination. The information on the potentially contaminated sites could be used for developing monitoring strategies for the food-producing animals. Competent authorities should cooperate and inform potentially affected people in the world. The consumption of the meat/ the eggs from the chickens that ingest the polluted soil. The soil contamination might be established for the less-exposed animals although, again, the particular care needs to be taken in relation to those animals whose liver or kidneys are consumed, such as the beef and the sheep. The protection of the aquatic environment and the human health. The most sensitive protection goal for the environmental pollution dioxins and the dioxin-like compounds was the protection of the human health via the consumption of the fishery products.

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