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The Effects of Organic Pollutants in Soil on Human Health

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The soil has always been depository of the organic chemicals produced naturally or anthropogenically. Soil contamination is a serious human and environmental problem. A large body of evidence has shown the risks of adverse health effects with the exposure to contaminated soil due to the large quantities of organic chemicals used in agriculture and urban areas that have a legacy of environmental pollution linked to industrial activities, coal burning, motor vehicle emissions, waste incineration and waste dumping. In agricultural areas, because of the effort to provide adequate quantities of agricultural products, farmers have been using an increasing amount of organic chemicals, but the resulting pollution has enormous potential for environmental damage. The types of organic pollutants commonly found in soils are polychlorinated biphenyls, polybrominated biphenyls, polychlorinated dibenzofurans, polycyclic aromatic hydrocarbons, organophosphorus and carbamate insecticides, herbicides and organic fuels, especially gasoline and diesel. Another source of soil pollution is the complex mixture of organic chemicals, metals and microorganisms in the effluent from septic systems, animal wastes and other sources of biowaste. The soils of the world are a vast mixture of chemicals and although conditions are such that an individual is rarely exposed to a single compound, the great majority of people are exposed to a vast chemical mixture of organics, their metabolites, and other compounds at low concentrations Human exposure to organic pollutants in the soil is an area of toxicology that is very difficult to study due to the low concentration of the pollutants. The toxicological studies of single organic pollutants found in soils are limited and research on the metabolites and of chemical mixtures is very limited. The majority of toxicological studies are conducted at relatively high doses and for short periods of exposure. This makes the application of this data to exposure from soil very difficult, with the exposure from soil usually being chronic and at very low concentrations. The vastness of the soil has led to the dilution of these pollutants and most of the pollutants remain on or near the surface of the soil unless they have moved by the action of water, organisms, or mechanical mixing. This dilution has reduced the toxicity of these pollutants but the unknown factor is the action of the soil, its chemistry, and the combined action of all the microorganisms, plants, and invertebrates that live in the soil. This biological action combined with the influences of the soil components has the potential of creating new metabolites and chemicals. Toxicologists needs expand their studies to include the persistent organic pollutants and the organic pollutants that can bioaccumulate in organisms. We do not know if the addition of organics chemicals to the soil is creating very toxic xenobiotics and at very low concentrations but with important health effects to humans and other organisms. These unknown compounds could be accumulating in plants that we use for food or as forage for our livestock, then bioaccumulating in the livestock and then on into us.