Synthetic Pesticide Challenges in the United States

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11 Major Challenges

Many difficulties persist today surrounding pesticides in the United States:

1. Endocrine (hormonal) Disruption: In 1996, congress passed the "*Food Quality Protection Act*" (FQPA) forcing the EPA to regulate chemicals for their hormone disruption properties. Two years later the EPA created the "*Endocrine Disruption Screening Program*" (EDSP) but failed to implement it on the then estimated 87,000 chemicals. Finally in 2012, an astounding 16 years later, the EDSP was finally implemented. This is a perfect scenario epitomizing the bureaucratic governmental agencies' ineptness and their lack of dedication to the urgency concerning human-health and safety. Many chemicals that pose serious health-threats to humans are hormone disruptors also known as "endocrine disruptors" (ED). They interrupt human hormonal function at very low doses much less than 1.00 part per billion (ppb). Most lab animals tested before the year 2012 were exposed to pesticides in parts per million (ppm) and rarely in doses parts per billion (ppb) to test for ED effects. This means regulatory agencies have very limited data on their adverse hormonal-effects on humans and animals. Many approved pesticides used today in the U.S. (e.g., *atrazine, glyphosate, 2,D-4, and paraquat*) are banned in many other countries due to their adverse effects on humans and animals. Hundreds of independent scientific studies show many of these pesticides disrupt healthy hormonal function while contributing to various chronic diseases and interfering with healthy sex-organ development. Impartial studies have shown that lab-animals exposed to various approved U.S. pesticides at concentrations ppb (and even ppt) have an elevated risk of developing breast cancer, uterine cancer, enlarged ovaries, prostate cancer, low sperm-count, malformation of male testes, male feminization of voice box, sex-reversal, homosexual behavior, and hermaphroditic occurrences (with exposures less than .1 ppb). [1,2,3,7,8,9,10,23,29,30,31,32,35,38]

2. Few Human Studies: When animal-trials are complete, regulations do not require human-trials to be carried out despite the fact humans will be eating and drinking the particular synthetic pesticide residue daily. This is allowed because synthetic pesticides are not used to treat a health condition like with pharmaceuticals. This is a very serious concern due to the absence of accurate scientific evidence supporting how synthetic pesticides impact human health. Thus, this approval process has been proven highly erroneous; growing numbers of dangerous pesticides approved are applied to our food-supply still today despite overwhelming evidence of their significant dangers. This occurs because of the grueling legal-process and biased, wealthy "corporate science" attacking impartial science. These two reasons greatly discourage toxic pesticides from being removed from our food-supply today. [19,28]

3. Residues Everywhere: Pesticides such as *atrazine*, g*lyphosate*, and *glufosinate* are banned in many developed nations yet used here and commonly found in alarmingly dangerous concentrations in almost all grain crops in the U.S. They're often even found throughout most of our food-supply and much of our groundwater, drinking-water, rivers, lakes, and surprisingly rainwater. Even our organic food-supply in the U.S. is at high risk of pesticide cross-contamination because government policies are extremely vague in their regulatory pesticide-control standards. Land distance between organic and non-organic farmlands only require an unspecified distance "buffer zone" between croplands (§205.202 Land requirements) not effectively protecting against pesticide and GMO drift. The concentrations of Atrazine found within these sources are typically within the range that interferes with animal and human hormonal function according to various independent reputable scientific studies. *Glyphosate* and *glufosinate* are found in about 80% of processed non-organic foods (the most common pesticides in the U.S.). At residues as low as .1 ppb,

these pesticides slowly erode the health of our digestive tract, liver, and kidneys. These are terrifying concerns considering the fact that we are exposed chronically to these chemical-levels daily. Our hormones can be chemically altered, our liver and kidneys malfunction, and digestion simply erodes. We also run an elevated risk of developing other serious chronic health conditions including various forms of cancer. [1,2,3,7,14,29,32]

4. Rate of Disease (morbidity): Current regulation does not take morbidity due to accumulative, chronic, or recurrent exposure (i.e., over 3 years) into consideration in the long-term for regulatory approval. This is highly disconcerting considering the fact that hundreds of independent scientific studies have shown that long-term exposure to various synthetic pesticides causes everything from neurodevelopmental disorders (autism and ADD/ADHD), endocrine disruption, many types of cancer, mental health disorders, kidney disease, liver disease/dysfunction, heart disease, diabetes, psychiatric disorders, autoimmune diseases, and immune-mediated inflammatory diseases (IMIDs). People have literally become human guinea pigs here in the U.S. because of poor regulatory standards and practices while pesticides approved decades ago are confirmed dangers to human and environmental health (thanks to independent researchers). Yet, these disease-causing pesticides are still on the market despite the independent scientific community's findings. Poor regulatory standards are often to blame due to the high expense associated with longitudinal studies (over 3 years) that attempt to accurately isolate symptoms attributed to specific chemical exposures. A high-level of bureaucracy is also to blame. Chemicals and drugs are approved regularly to only later have their approval-status revoked often because of public outcry due to their severe toxic effects (human guinea-pig effect). This revocation is commonly brought about by unbiased scientific think-tanks, grass-roots community organizations, and independent scientists dedicated to impartial scientific discovery. [1,3,4,5,8,11,12,13,15,20,23,24,30,36,37,38]

5. Quality of Life: Current regulators primarily measure morbidity (disease rate) and mortality (death rate) due to pesticide exposure and almost never measure pesticide impact on overall quality of life (QOL). Human QOL is something that is difficult to measure because it adjusts very slowly (micro impactions) for hundreds of reasons. Although this is the case, it seems obvious that the greatest factors would be those that are inhaled and ingested. It's not common for authorities to even consider exposure to pesticides (concentration and time) when determining a person's QOL in the U.S.

6. Plant Microbiome: There are over 50 pesticides on the market today that act as antibiotics. They destroy both beneficial and threatening microbes on the plant and in the soil. The most common antibiotic pesticide on the market today is *glyphosate* which acts by disrupting the shikimate pathway in plants and microbes by blocking the production of amino acids. It kills many bacteria and fungi in the soil that crops rely on to nourish themselves. This is a very serious concern because plants rely on bacteria and other microorganisms to digest nutrients and minerals so these micronutrients become bioavailable (or useable). Essentially, the soil is rendered sterile and plants are left too weak to fight off pathogens and insects. This process forces farmers to add even more pesticides on the crops to counteract the malnourished plants' ability to fight off pathogens and insects. A very similar process occurs in the human digestive tract. [12,13,14,37]

7. Human Microbiome: Current regulations do not take into account a pesticide's ability to disrupt and/or destroy (as an antibiotic) the healthy microbiology (probiotics) within our digestive tract. Over 50 pesticides act as antibiotics and pose a serious threat to healthy human gut microbiology. Probiotics are critical for the production of hormones involved in up to 90% of serotonin (e.g., *Candida, Streptococcus, Escherichia, and Enterococcus*), while some also can produce dopamine (e.g., *Bacillus and Serratia*). Others are also involved in the production of many different vitamins (e.g., B_1 thru B_{12}, K, K_2, and C). Some even help metabolize minerals to create mineral metabolites and conjugates (absorbable forms of minerals). This is a relatively new area of research where scientists still have much more to discover. Medical doctors unfortunately know very little about the extreme importance of a healthy and diverse microbiome in our gut for complete mental and physical wellbeing. [12,13,14,34]

8. Mental Health: Many mental health diseases are often associated with chronic, low-level, long-term synthetic pesticide exposure in our air, food, and water supply. But because human trial-studies with pesticides do not occur today, it is impossible to accurately measure pesticide-impact on human mental health. So how do we know whether or not these chemicals are affecting the human mind? The answer is, there is absolutely no way of clearly knowing without human studies. It is no wonder psychological and neurological disorders have sky-rocketed today. We see a massive spike in autism, depression, bipolar, schizophrenia, Alzheimer's, anxiety, ADD/ADHD, cognitive disabilities, and mental-health homelessness. Data shows that the increase started about 50 years ago when synthetic pesticides were introduced into our food and water supply. Current research points a finger directly at industrial toxins and pesticides as the highest risk-factors associated with chronic (long-term) illnesses such as mental health diseases. [14,16,34]

9. Self-Regulation Data: Chemical and drug companies have always performed testing on their own products for product approval and for setting standards for regulating their own product. This is a major conflict of interest (and threat-to-validity) within the pesticide industry that also exists across all chemical and drug market-sectors. It is a method that is highly flawed and must change immediately toward a third-party impartial research group that has no financial stake in whether the product passes or fails. The chemical corporations today who perform so-called “science” is really “corporate science” thick with financial bias leading potentially toward misleading or falsified data and a possibly harmful product. [27]

10. Adjuvant Mixtures: Adjuvants are added to pesticides to increase the absorption, surface retention, and overall physical properties of the pesticide. These adjuvant/pesticide mixtures are not tested for safety by any regulatory agency. Independent scientific studies have found that when many of these adjuvants are blended with certain pesticides, they greatly magnify the pesticide’s toxicity by altering the chemical composition. Many mixtures have been shown to greatly increase the risk of developing autoimmune diseases, endocrine (hormonal) disruption disorders, and even various types of cancer. This lack of regulatory oversight is not just careless but highly dangerous. [4,5,6,18,33]

11. Toxic Metabolites: A serious problem occurs with synthetic pesticides when they are broken down into their metabolite forms. These can often be more toxic than their original form. This is seen with the pesticide *glyphosate* which breaks down into many different metabolites—most toxic are amino *methyl phosphonic acid* (AMPA) and *N-nitrosamines* (nitrates & nitrites). Both of these are very toxic. AMPA is shown to cause kidney disease and N-nitrosamines are highly carcinogenic. [11,14,21]

Concluding Remarks

The fact of the matter is, synthetic pesticides pose too much of an incalculable threat to humans, animals, plants, microorganisms, and our environment to continue to disseminate them into our food-supply and ecosystem. It is nothing more than purely irresponsible. The vast ocean of unknowns is too perilous to navigate with the little knowledge we have of the long-term pesticidal impact on our children's and family's health and collectively on the health of the human species. [24]

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