

## NEGATIVE IMPACTS OF THE USE OF PESTICIDES ON HUMAN HEALTH

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**Abstract:** The use of agrochemicals has increased significantly in recent years, which can have serious impacts on health. Brazil is one of the largest consumers of pesticides in the world, and this increase in the use of these substances generates several problems. The objective is to analyze the negative effects that the use of pesticides can have on human health and the environment. Such risks extend beyond the health of agricultural workers, reaching local communities close to the cultivation area and even the final consumers of the products. Resulting in proof that the indiscriminate use of pesticides generates impacts on health, requiring public policies that guarantee compliance with legislation and the encouragement of more sustainable agricultural practices to protect the well-being of the population.

**Keywords:** Brazil, agricultural products, biodiversity, agrochemicals, health.

## INTRODUCTION

The use of pesticides in modern agriculture plays a crucial role in large-scale food production, enabling the supply of a constantly growing global population. However, this extensive use of agricultural chemicals does not come without consequences, and the negative impacts of pesticide use on human health have emerged as an extremely relevant concern. The issue of the adverse impacts of agrochemicals on human health goes beyond borders and directly affects the lives of thousands of people around the world. (VEIGA, 2007).

This concern is not limited to acute exposure to these substances, which can result in instantaneous and, in some cases, fatal poisoning. It goes further, covering the chronic effects of constant exposure to pesticide residues in food, water and the environment. This prolonged exposure has been linked to a range of health problems, such

as cancer, hormonal disorders, neurological diseases, damage to the reproductive and immune systems, affecting people of all ages, but with particularly serious consequences for vulnerable groups such as children and workers. rural. (INTOXICATION, 2023)

Furthermore, the spread of pesticides in the environment also has implications for food security and the sustainability of ecosystems. The contamination of soil, water and the destruction of beneficial organisms harm not only the quality of the food we consume, but also the health of the natural ecosystems that support life on the planet. (‘‘REVISTA SAUDE EM DEBATE’’ , 2017).

It transcends the limits of public health by demanding in-depth analysis and the application of more sustainable public policies and agricultural practices to protect the health of present and future generations. (‘‘REVISTA SAUDE EM DEBATE’’ , 2017).

## METHODOLOGY

This research is a bibliographical, exploratory, narrative review with a descriptive objective about the negative impacts of the use of pesticides on human health and used qualitative data through virtual files of review bases of literature articles, published in the years 2009 until 2023, with the exception of agricultural input legislation that is older (1989). The databases consulted were in the Health Sciences Descriptors (DeCS) referring to the topic in question, using the academic research platforms Pubmed, Lilacs, BVSalud and Scielo. The search terms ‘‘pesticides’’ and ‘‘negative impacts’’ were used. Articles were limited to Portuguese, Spanish and English. The selection of articles was based on the analysis of titles and abstracts of theoretical, experimental and observational studies. An average of 50 articles, newspapers, interviews such as podcasts and magazines were used, which contained subjects that were compatible

with the objective of the bibliographic review. Articles that did not have a time limit in the work were excluded from the search, along with repeated articles and studies in which there is no direct relationship. Used as a basis for the articles “Pesticides and GMOs: solution or problem for human and environmental health?” and “Pesticide poisoning and death in Brazil: the new version of oligopolistic Capitalism”.

## **RESULTS AND DISCUSSIONS**

### **AGRICULTURAL PRODUCTION AND POISONING RECORDS**

Agriculture plays an important role in Brazil's economy, in the food production and export sector, but the increasing use of agricultural chemicals has raised concerns about the safety of agricultural workers and public health.

According to the Brazilian Institute of Geography and Statistics (IBGE), Brazilian agricultural production in 2015 was dominated by soybeans and corn. It emphasizes the importance of this sector for the national economy (IBGE, 2016). However, increased production is often associated with the extensive use of pesticides and fertilizers, which can lead to risks for human health and the environment.

Regarding poisoning notifications, the National Toxic-Pharmacological Information System (SINITOX) recorded a total of 3,337 pesticide poisoning notifications in 2015 (SINITOX, 2015), of which 77% were events registered in the South and Southeast regions of Pau -Brazil. These data reveal the tenacity of a worrying problem, highlighting the need for effective measures to reduce the population's exposure to pesticides.

Poisoning caused by pesticides is a serious health problem (MALASPINA, ZINILISE, BUENO, 2011). According to estimates by

the World Health Organization (W.H.O.), annually, 1.5% to 3.0% of the world population is affected by exogenous poisoning. In Brazil, around 4.8 million cases occur each year and approximately 0.1 to 0.4% of poisonings result in death (MINISTRY OF HEALTH, 2018).

The main routes of contact with pesticides during poisoning are the mouth, nose, skin and eyes. Poisoning is generally acute, and symptoms appear quickly, making it possible to identify the causative agent. However, the effects of some pesticides are cumulative, worsening symptoms over time and establishing chronic health problems in individuals, which are unlikely to be related to the causative agent (ANVISA, 2011).

### **DAMAGE CAUSED TO THE ENVIRONMENT**

Brazilian agricultural products require large quantities of pesticides, which have differential effects on species not affected by them and cause ecological degradation. Several studies have demonstrated the effects of pesticides on natural predators, such as phytoseiid mites (COSTA et al., 2012; POLETTI et al., 2008).

Saraiva et al. (2015) An agricultural practice proven to be associated with herbivore relationships is the use of the herbicide glyphosate, which can have direct or indirect effects on non-target organisms. The authors state that the system has no difficulty competing with grasses, which is important to keep natural enemies in the system, as it serves as a refuge for them.

Organic agricultural inputs provide several benefits to agriculture and the population in general. They are products obtained from living organisms, such as bacteria, fungi, viruses, insects and plant extracts, which promote plant growth, indirectly combat diseases, improve soil health and eliminate pesticides that are harmful to the environment. Used to

reduce use and risks to human health. Some benefits of organic agricultural inputs include reduced pesticide use, improved food quality, environmental sustainability, and resistance to pests and diseases. (EMBRAPA PORTAL, 2016).

## HEALTH RISKS CAUSED BY PESTICIDES

Basic classification to understand the toxicity of the product in terms of acute effects. Various classifications are used as per the example below. Ministry of Health classification based on the lethal dose (LD50) of liquid and solid preparations in laboratory animals. According to Order Number 3 of the National Health Surveillance of the Ministry of Health, dated January 16, 1992. National Health Surveillance Secretariat, of the Ministry of Health Access via (link: [http://www.fcav.unesp.br/Home/departamentos/fitossanidade/JO-AQUIMGONCALVESMACHADONETO/port\\_%200392\\_anvisa\\_class\\_toxicol.pdf](http://www.fcav.unesp.br/Home/departamentos/fitossanidade/JO-AQUIMGONCALVESMACHADONETO/port_%200392_anvisa_class_toxicol.pdf))

FORMULATION: DL50 mg/kg			
Class	Toxicity	LIQUID (mg/kg)	SOLID (mg/kg)
I	EXTREMELY TOXIC	<200	<100
II	HIGHLY TOXIC	200 – 2000	100 – 500
III	MEDIALLY TOXIC	2000 - 6000	500 – 2000
IV	LITTLE TOXIC	> 6000	>2000

Classification of the World Health Organization (W.H.O.) based on the LD50 in rats, oral and dermal, in mg/kg of weight, of liquid and solid formulations:

Class	Toxicity	ORAL ((mg/kg of weight)		DERMAL (mg/kg of weight)	
		Solid	Liquid	Solid	Liquid
I	EXTREMELY TOXIC	<5	<20	<10	<40
II	HIGHLY TOXIC	5 - 50	20 - 200	10 - 100	40 - 400
III	MEDIUMLY TOXIC	50 - 500	200 - 2000	100 - 1000	400 - 4000
IV	LITTLE TOXIC	>500	>2000	>1000	>4000

By legal determination, all products must present a colored band on the labels, indicating their toxicological class (Ordinance MS/SNVS, number: 03/1992):

Class	Toxicity	DL 50	Band color
I	Extremely toxic	< 5 mg/kg	red
II	Highly toxic	5 – 50 mg/kg	Yellow
III	Medium toxic	50-500 mg/kg	Blue
IV	A little toxic	500-5000 mg/kg	Green

Three of the ten most used active ingredients in Brazil (acephate, atrazine and paraquat) are banned in the European Union, the United States, Japan, China and other Mercosur countries. There are also other regulatory differences, among which there are differences in the maximum permitted levels of residues in foods, as can be seen in Table 1, which compares the limit values of five active ingredients used in Brazilian corn production. (MORAIS, 2019)

As it was mentioned above, Brazil's limits for glyphosate in corn cultivation (the most widely used substance in the country) are lower than those in the United States and comparable to the European Union's limits. In contrast, the second most common 2.4D limit in the country is four times the limit accepted in the European Union, the United States and Japan. (Morais, 2019).

Active ingredient	Codex	Brazil	China	USA	Japan	European Union
2,4-D	0,05	0,2		0,05	0,05	0,05
Chlorpyrifos	0,05	0,1	0,05	0,05	0,1	0,05
Deltamethrin	2	1	0,5	1	1	0,05
Malathion	0,05	8	1	8	1	8
Glyphosate	5	1	1	5	1	1

TABLE 1: Maximum residue limits allowed in food – corn (In ppm)

Source: Handford, Elliott e Campbell (2015, p. 529); Anvisa (2018).

## LEGISLATION

Federal Law Number: 7,802, of July 11, 1989, defines in item I of article 2 the following: In meadows intended for the protection of native or established forests and other ecosystems, as well as urban, aquatic and industrial environments, whose objective be it modifying the composition of flora and fauna; to the detriment of organisms considered harmful; as well as from substances and products used as defoliantes, desiccants, stimulants and growth inhibitors.” (Brazil, 1989).

## FINAL CONSIDERATIONS

In this article we look at the negative and alarming effects that the use of pesticides can have on human health. Scientific evidence accumulated over the years has shown a wide range of adverse effects associated with exposure to these chemicals, from acute problems such as immediate poisoning to chronic problems such as respiratory diseases, neurological diseases, cancer and hormonal disorders. The risks to the health of agricultural workers, local communities close to the cultivation area and even the final consumers of agricultural products are undeniable.

The toxic substances contained in pesticides accumulate in the environment, contaminate groundwater, threaten biodiversity and affect entire ecosystems, affecting not only human health, but also the health of soil and non-target organisms.

It is important to highlight the urgency of stronger and more effective public policies to regulate the use, sale and production of pesticides. Promoting sustainable agricultural practices, such as: Promoting the use of organic farming, integrated agriculture and management systems that reduce dependence on these products is essential to reduce damage to health and the environment. Raising public awareness, investing in research into safer alternatives and promoting education among farmers on the responsible use of pesticides will ensure a healthier and more sustainable future for all. These are the basic steps.

Therefore, legislation exists, but public policies are needed to guarantee its compliance, as well as the promotion of healthier and more sustainable agricultural practices. In view of the evidence of the negative effects of pesticides and the proof that organic foods provide benefits to human health and environmental sustainability.

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