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The Agro-Ecological Evaluation to Some Sulfonylurea's Herbicides

Ali Mohamed El-Tayeb Hussein
University of Bahri, College of Applied and Industrial Sciences, Department of Biology and Biotechnology, Khartoum, Sudan.
Corresponding author email id: abuminna2008@gmail.com

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Abstract **– When herbicide are used , it is necessary to know the level of potential danger on living organisms in treated area by evaluating them hygienically. In hygienic evaluation are used some indicators like oral and dermal toxicity, lethal concentration for 50% in atmosphere zone. Also, can calculate pesticide overload and agro-ecological evaluation that suggested by some scientists. All the above mentioned indicators are calculated when we evaluate Granstar and Cowboy herbicides which belong to sulfonylurea's group that consider to be the modernist herbicide group.**

Keywords **– Pesticides, Health Status, Overloading, Agro-Environmental Toxicological Assessment.**

I. INTRODUCTION

Pesticides are one of the important means that leads to increasing the productivity of agricultural crops by eliminating the pests that feed on them and the weeds that compete with them for water and nutrients it leads to a decrease in productivity. The frequent and excessive use of pesticides has led to their accumulation and the emergence of Its negative effects on the surrounding environment also led to the emergence of resistant types of pests and weeds (Sabrina Gaba et al. 2014), the thing that required the production of new types of pesticides with better specifications than the previous ones; the less chemical used with more efficiency and better preservation of the environment. (William H. Clement, Jason R. Roh 2010). At the end of the seventies of the last century, Du Pont Company in the United States discovered a new group of pesticides known as sulfonylurea's pesticides (Beyer et al, 1987; Levitt, 1983). With the introduction of this group into practice, a new era for the use of pesticides began in farming. These pesticides are characterized by the fact that the amount of the active substance in them is much less than in previous pesticides however, it is more effective than it in killing weeds. Sulfonylurea's pesticides belong to the group of pesticides that are least toxic to warm-blooded animals. It represents no danger to fish, birds and wild fauna. Acute oral LD 50 toxicity to rats greater than 5000 mg / kg, LD 50 for chlorine is more than 2000 mg / kg, no allergy it has no cumulative toxicity (Ferguson Allison, 1980; Christian Wijntjes, 2022).

Among the other advantages of other sulfonylurea pesticides are the following:

- The level of the active substance of the pesticide decreased per unit area and method of use changed. The pesticide that was used before and after germination and is now used only after germination, as well as changing the pesticide After a while, until the weeds do not become resistant to it from frequent use. (Thomas B.1991; Barrentine Y. 1993).
- A decrease in the amount of the active substance of the pesticide 10-100 g/ha is accompanied by a rapid decomposition of this substance by microorganisms present in the soil, which leads to non-contamination of the soil with pesticide residues and thus the environment is preserved. (Marcos Garcia 2004).
- When these pesticides are used, their residues are less toxic, which makes them harmless to the environme-

-nt, for example in The United States is ahead of these pesticides over other old pesticides in effectiveness and preservation on the environment, which makes it desirable in the market, and the percentage of its sales increases annually by 10%. (Wasim Aktar et al.2009).

- These pesticides can be combined with old pesticides and used as compound pesticides, which increases the effectiveness the old pesticides are expanding and their effectiveness is expanding. The producing companies have realized this feature, and they have become it produces compound pesticides that are lower in the active ingredient compared to the old pesticides, but are more effective in weed resistance. (Spiridonov, 1995)

Objectives :-

Hygienic evaluation of Granstar and Cowboy pesticides compared to amino salt. - Evaluation of the overload factor of these pesticides. - Environmental assessment of agricultural toxicological for these pesticides. Research methods and results: To ensure appropriate environmental conditions when using pesticides, it is necessary to determine the amount of their accumulation on the unit area of agricultural land under the soil and climatic conditions of a given area. For this purpose various classification grades were established for the level of environmental toxicological hazardousness of pesticides. In Russia, the health classification of pesticides is used, which uses indicators as follows: Toxicity on penetration into the abdomen, toxicity when penetrating the skin, degree of volatility, cumulative properties, degree of stability (Gruzdev et al. 1981).

When we monitor the toxicity upon penetration into the abdomen, the toxicity upon penetration through the skin, the degree of volatility, Cumulative characteristics, degree of stability from references and evidence of Granstar and Cowboy pesticides that belong to the sulfonylurea group, compared to the amino salt, and the results were as in Table No. (1). (Allison, 1980; Ferguson 1985).

Table 1. Health characteristics of some sulfonylurea pesticides, according to the full evaluation of their toxicity compared to the amino salt, toxicity and hazard coefficient pesticides.

Toxicity and Hazard Coefficient	**Pesticides**			
	2, 4 D Amino Salt	**Cowboy**		**Granstar (Triboronmethyl)**
		Chlorsulfuron	**de Campa (of Campa)**	
L C 50 The lethal half-dose when depleted in the abdomen, mg/k	400	> 5000	1700	> 5000
L C 50 LEAD on skin contact, mg/kg	> 2000	2000	1500	>2000
L C 50 The lethal half-dose in the air of the work area, g/m	18000	> 20000	> 20000	> 20000
Accumulation coefficient	< 2	> 5	> 5	> 5
Duration of stability in the soil, Decomposition time into non-toxic compounds	30 weeks	60 weeks	60 weeks	6 weeks
The degree of danger	2	4	4	4

From: (Allison, 1980; Ferguson 1985).

Other scientists (Melnikov, 1993, 1989) put the general assessment of the dangers of pesticides on the medium perimeter, which is evaluated by the overload factor of pesticides, which is calculated by dividing the value of duration Half of the decomposition in the soil (T50%, per day) based on the value of the amount of pesticide multiplied by the dose The lethal halved (LD 50%) for warm-blooded animal.

Table 2. Specifications for the use of some sulfonylurea's pesticides (Granstar and Cowboy), compared to the amino salt.

Cursor Pesticides	**Pesticides**			
	2,4 D Amino Salt	**Cowboy**		**Granstar (triboronmethyl)**
		Chlorsulfuron	**de Campa (of Campa)**	
Recommended dose, g/ha	0.85- 1.4	3,3	70	10 - 20
Repeat treatment	1	1	1	1
The permissible dose within 24 hours is mg/kg of human body size	0.0001	0.01	0.06	0.01
The permissible maximum dose in the soil of the treated area mg/kg	0,1	-	0.25	-
The permissible maximum dose in the water of the area treated with the pesticide is mg/m^3	0.0002	0.0003	0.02	0.06
The permissible maximum dose in the air of the treated area is mg/m^3	1,0	0,5	1,0	1,0
The permissible maximum dose in the atmosphere when treated with the pesticide mg/m3	0.0002	0.001	0.01	0.0003
The maximum allowed in foodstuffs, mg/kg	0.005	0.001	-	0.005

From: (Allison, 1980; Ferguson 1985).

Table 3. The environmental overload of some sulfonylurea's pesticides (Granstar and Cowboy) compared to the amino salt pesticide.

Pesticides	**Quantity (Dose) kg/ha, or L/ha**	**T 50% in 24 hours**	**D50% mg/kg**	**Environmental Overload**
Amino salt 2,4-D	2	4	1175	0.007
Granstar	0.02	4	5000	0.000016
Cowboy	0.19	60	5000	0,0023

From the above table, we note that all pesticides with the environmental overload index do not pose a danger to soil life and this indicator of Cowboy and Granstar pesticides are 3 and 85 times lower than that of amino salt.

To describe the environmental situation, the method developed by (M.S. Sokolov and M.A. Glazkovski 1979) can be used. The degree of risk level created when using pesticides is measured in a specific area with the following parameters: the average evaluation index of the types of pesticides used, the value of pesticides overloading on the ground and the area self-cleaning correction indicator.

The average rating index describes the average hazard level of the pesticides used in a specific area, which is extracted from the evaluation scores of each pesticide. To calculate this indicator multiplies the outputs. The use of each pesticide in its value grade: Im = Ku.Bv

The value of the pesticide overload in any area is determined by the quantity of the dose in the total area.

For pesticide-treated land per unit area of the plowed layer treated with pesticides. Dose amount (WD) is determined by dividing the amount of substance used for one pesticide by the number of hectares planted.

In order to determine the level of risk of pollution of natural lands, we calculate the amount of pesticides used in all the land area in the region. The smaller the amount of pesticides used the pesticides used on agricultural lands have reduced the risk of pesticide pollution in the ecosystems natural and increased the possibility of self-cleaning of the land significantly. In order to objectively determine the environmental situation of different regions, it is necessary to calculate an indicator such as self-cleaning. This process occurs extensively in agricultural land (plowed shornzome, Borozome-podzol, brown soils) located in conditions of sufficient moisture and excessive moisture (The value of the degree is equal to one), and it occurs poorly in uncultivated lands (Score value is 0.1) the ability to self-cleanse this or that area is expressed by the correction index Imck, which It represents the average score value for the given region.

Divide all amounts of pesticide used by the units of all hectares of cultivated land. The value of self-cleaning varies according to the following indicators: very dense - 0, 80, dense - 0,80 - 0.61, Moderate - 0.60 - 0.41, Weak 0.40-0.20 Very weak 0.20 .

To assess and compare the ecological toxicological situation in different regions, the indicator can be used the ecological toxicological integrative, which is calculated by the following equation: ETin = Im x Imck.

The low-risk situation is given less than 50, the medium-risk - 50-150, and the situation seriously given more than 150.

F. L. Vasilov, F.N. Kavesky, L.E. Bublikov presented a way to describe the health situation significantly. They established the values and classification of environmental toxicological indicators that standardize the indicators, the health effects of pesticides on humans (Group A), the effect on beneficial animals and behavior in the ambient medium (Group B). The level of pesticide hazard (C) is determined by calculating the degree of risk for groups A and B by the following equation: C = (Ka + Kb) – 1.

Pesticides with a coefficient of C of 1 and 2 are described according to the level of risk as severe hazard, which has a coefficient of 3 is described as dangerous, and which has a coefficient of 4 And 5 is described as moderate risk, which has coefficients 6 and 7 are described as low risk. In order to assess the latent danger planned in the area for the types of pesticides, the expected pollution is calculated pesticides in the cultivated area (P) and agro-environmental toxicological index (AETI). This calculates the average degree of dangerousness of the pesticides used for the types of pesticides (Ccb) as follows: Ccb = C1 x M1 + C2 x M2 + C3 x M3 +…..+ Cn + Mn

M MMM

where M1 - the quantity of one pesticide planned to be used, M2 - The total amount of pesticides planned to be used in the area.

The average load of pesticides of the area is determined and expressed by the Environmental toxicological dose (DEKT), Kg /hectare.

DEKT = M : SWhere S is the total cultivated area in hectares.

The stability of pesticides depends on the rate of chemical decomposition in the soil (Gurpreet Sidhu et. Al 2019), which is determined by an indicator of ability self-cleaning (Isc). It reflects the intensity of pesticide breakdown depending on climatic and soil conditions, ranging from 0.1 grade for dryland and solonchak, to 1grade for chornozomes in wet areas. The ability to self-cleaning is considered very dense if given 0.8 degrees and dense if it is between 0.6 - 8.0, moderate between 0.41 - 0.60, and weak between -0.2.

The ability to self-cleaning is considered very dense if given 0.8 degrees and dense if it is between 0.6 - 8.0, moderate between 0.41 - 0.60, weak between 0.2 - 0.4, and very weak if it is less from 0, 20 After determining the self-cleaning index, the expected pollution (P) of pesticides can be calculated by the next formula: P = D E KT Kg/hectare.

CCB x Icon

From practical experiments, it was found that the relationship between the expected pollution of the area in its various degrees and the indicator of the toxicological environmental assessment can be expressed in a graph and an equation can be deduced from this define the expected pollution. It was possible to find an environmental assessment indicator, which is: A = 10X Pl X (1+ P) 3.

(1 + P) 4 + 5000

When planning to use types of pesticides in a particular area, it must be taken into account TSE index less than 1, the environmental overload of pesticides in the area that be greater than 4 kilograms per hectare using the above method and if we have the following data: The total area of the area is 1230000 hectares, the cultivated area is 250000 hectares, 80% Including treatment with pesticides, the index of the ability to self-clean the soil is equal to 0.8, it is possible to obtain on the agricultural toxicological environmental assessment of these pesticides on the surrounding environment as follows :

Table 4. Agricultural toxicological environmental assessment of some pesticides of sulfonylurea and amino salt on the environment.

Pesticides	Quantity (Dose) Kg/ha, or L/ha T 50% in 24 Hours	Medium Risk Level (Degree)	Environmental Toxicological Dose (Conditional) Kg/ha	Expected Pollution Kg/ha (P)	Agro-Toxicological Environmental Assessment Index
Amino salt 2, 4-D	2	4	0.33	0.1	0.0016
Granstar	0.02	6	0.003	0.0006	0.00004
Cowboy	0.19	6	0.03	0.006	0.000004

From the above table, it is clear that the agricultural environmental assessment index of pesticides, amino salt and Granstar and Cowboy is considered a little dangerous to the surrounding environment. Conclusion: By Health characteristics Cowboy and Granstar pesticides are best than amino acids. We note that all pesticides with the environmental overload index do not pose a danger to soil life and this indicator of Cowboy and Granstar pesticides are 3 and 85 times lower than that of amino salt. It is clear that the agricultural environmental assessment index of pesticides, amino salt and Granstar and Cowboy is considered a little dange-

-rous to the surrounding environment.

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AUTHOR'S PROFILE

Ali Mohamed Eltayeb Hussein, Sudanese, Married and father. Assistant professor at University of Bahri, college of applied and industrial sciences, department of biology and biotechnology from 2011 up to now .Bachelor and Master degree in crops sciences. Ph.D. in weeds and pesticides from Moscow Agrarian University 2000. I had worked also in University of Bahr ElGhazal-South Sudan, College of Education-Biology department from 2005 to 2011, also - at Shaqra University-Kingdom of Saudi Arabia College of Science and Humanities in Dwadmi. In my teaching task I taught the following courses: Introduction to Biology, General Botany, Plant Taxonomy, Systematic Botany, Plant Physiology, Plant Ecology, Pollution and Ecology Preservation. I published some papers on the followings topics: The harm of the w--eeds in crops and the calculation of their thresholds. Assessing constituents and efficiency of Neem seeds powder (Azadirachtaindica A. Juss) modifying Soil physical and Chemical Properties. Effects of NP and bio fertilizers on Growth and some yield attributes of sunflower helianthus annus L.; The effect of compost tea application on some soil characteristics and nutrient composition of fodder maize according to organic fertilization. Also, I published a book in botany named "Bases of Botany".