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Effects of pesticides on the hearing health of rural workers

Efeitos dos agrotóxicos na saúde auditiva de trabalhadores rurais

Efectos de los pesticidas en la salud auditiva de los trabajadores rurales

*Karlla Cassol**
*Simone Soledade Kanazawa**
*Roberta Martins Szekut**
*Andrea Cintra Lopes**

Abstract

Introduction: The pesticide is a complex issue and is powdered in various institutions and actions, both within the SUS and in other government agencies, requiring the urgence to set up a group to facilitate the articulation of different instances. **Objective:** To assess the effects of pesticide contamination on hearing health of rural workers. **Methods:** Participants were eight rural workers with at least two years of experience. Selected employees underwent two questionnaires, and audiological evaluation, using the following procedures: interview specifies, quality of life questionnaire at work, pure tone audiometry and high frequency, speech audiometry, tympanometry. Data collection was performed at the at the Speech Patology and Audiology of the Bauru School of Dentistry-University of São Paulo **Results:** In the audiological evaluation the results showed normal, according to established standards, however the participants were asked to perform periodic monitoring due to normal range in conventional audiometry and high frequencies as well as the presence of recruitment in some individuals. **Conclusion:** The results suggest that constant exposure to pesticides are likely to cause changes of the peripheral auditory system even if there is not noise present in the workplace. This study and many others propose data demonstrating the importance of prevention programs of the exposition to these agrochemicals to the worker health,

* Faculdade de Odontologia de Bauru – Universidade de São São Paulo (USP), Bauru, SP, Brazil.

Authors' contributions:
KC: a Ph.D. student, participated in planning, executing, and writing the entire manuscript.
SSK: collected data, applied questionnaires, and performed audiological evaluations.
RMS: participated in executing and preparing the manuscript.
ACL: performed all the planning, execution, and preparation of the manuscript and guided the data collection process.

Correspondence e-mail: Karlla Cassol - karlla_cassol@hotmail.com
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highlighting vigilance . Other studies with larger populations should be developed in order to expose more evidence.

Keywords: Rural Health; Agrochemicals; Hearing loss.

Resumo

Introdução: O agrotóxico é um assunto complexo e está pulverizado em diversas instituições e ações, tanto no âmbito do SUS como em outros órgãos de governo, necessitando urgente de constituição de um grupo para viabilizar a articulação das diferentes instâncias. **Objetivo:** verificar os efeitos da contaminação por agrotóxicos na saúde auditiva de trabalhadores rurais. **Material e Métodos:** Participaram 8 trabalhadores rurais com no mínimo dois anos de experiência. Os trabalhadores selecionados foram submetidos a dois questionários e avaliação audiológica, por meio dos seguintes procedimentos: entrevista específica, questionário de qualidade de vida no trabalho, audiometria tonal liminar e de alta frequência, logoaudiometria, imitanciometria. A coleta de dados foi realizada na Clinica de Fonoaudiologia da Faculdade de Odontologia de Bauru-Universidade de São Paulo. **Resultados:** Na avaliação audiológica os resultados encontrados mostraram normalidade, de acordo com padrões pré-estabelecidos, entretanto os participantes foram orientados a realizar acompanhamento devido à faixa limite de normalidade na audiometria convencional e altas frequências, assim como a presença de recrutamento em alguns indivíduos. **Conclusão:** Os resultados sugerem que as exposições constantes aos agrotóxicos podem causar alterações do sistema auditivo periférico, mesmo que não haja presença de ruído no local de trabalho. Este estudo, e muitos outros, propõem dados que demonstram a importância de programas de prevenção quanto à exposição ao agrotóxico na saúde do trabalhador, implementar o controle dos agentes, assim como a vigilância. Outros trabalhos com uma população mais robusta devem ser desenvolvidos de forma a expor as evidências de comprometimento periférico.

Palavras-chave: Saúde da População Rural; Agroquímicos; Perda Auditiva.

Resumen

Introduccion: El agrotóxico es un asunto complejo y está pulverizado en diversas instituciones y acciones, tanto en el ámbito del SUS como en otros órganos de gobierno, necesitando urgente de constitución de un grupo para viabilizar la articulación de las diferentes instancias. **Objetivo:** verificar los efectos de la contaminación por agrotóxicos en la salud auditiva de trabajadores rurales. **Material y Métodos:** Participaron 8 trabajadores rurales con al menos dos años de experiencia. Los trabajadores seleccionados fueron sometidos a dos cuestionarios y evaluación audiológica, por medio de los siguientes procedimientos: entrevista específica, cuestionario de calidad de vida en el trabajo, audiometría tonal liminar y de alta frecuencia, logoaudiometría, imitanciometría. La recolección de datos fue realizada en la Clínica de Fonoaudiología de la en la Clínica de Logopedia de la Facultad de Odontología de Bauru-Universidad de São Paulo **Resultados:** En la evaluación audiológica los resultados encontrados mostraron normalidad, de acuerdo con estándares preestablecidos, sin embargo los participantes fueron orientados a realizar seguimiento debido al rango límite de normalidad en la audiometría convencional y altas frecuencias, así como la presencia de reclutamiento en algunos individuos. **Conclusión:** Los resultados sugieren que las exposiciones constantes a los agrotóxicos pueden causar alteraciones del sistema auditivo periférico aunque no haya presencia de ruido en el lugar de trabajo. Este estudio y muchos otros proponen datos que demuestran la importancia de programas de prevención en cuanto a esos químicos. Otros trabajos con mayor población deben ser desarrollados para exponer mayores evidencias.

Palabras clave: Salud Rural; Agroquímicos; Pérdida auditiva.

Introduction

The use of organic or inorganic chemical substances in agriculture began in classical antiquity. Currently, with the process of "agricultural modernization," agricultural productivity has significantly increased, mainly in Brazil, which, on the other hand, has dramatically damaged the health of rural workers and the environment.

Pesticides are a complex issue and are dispersed in several institutions and actions, both within the scope of Brazil's Unified Health System (SUS) and other government agencies. Thus, these two instances urgently need to create a specific group to enable the conversation between them. This complexity also brings the challenge of better understanding the different types and levels of exposure in the general population[1].

These chemicals have reportedly caused damage, often irreversible, to those who handle them, and are incredibly aggressive products for workers to handle, especially in farms. Continuous, long-term exposure to pesticides at relatively low levels can affect human health, leading to chronic, ill-defined, sometimes extremely severe cases [2,3]. Inthis case, the occupational risk group includes rural workers, pest control workers, health agents who work in the pest and vector control field, workers in pesticide formulation and synthesis industries, chemical weeding workers, pesticide transport, and trade. Also, it includes occupational exposure of health and agriculture professionals working in research, care, surveillance, and inspection [4,5].

Cases of pesticide poisoning are frequently observed and reported by workers. Studies have shown how much agricultural workers know regarding the use of the pesticide and the symptoms they could associate with the work they did in the crops. They all claimed to know someone who became ill, and many reported their own experience, describing symptoms such as "dizziness," "eye floaters," "headache," and nausea [6].

Thus, it seems to be clear to them that the pesticide application is a dangerous procedure. Research discover that the norms recommended by the Brazilian National Health Surveillance Agency are not followed for two reasons, namely: 1) workers cannot afford to use appropriate personal protective equipment (PPE); 2) workers do not know that such standards exist or consider that the procedure they are already performing is enough[7].

The proper use of pesticides should aim at the best agronomic results for increasing productivity, improving crop protection and avoiding issues with potential poisoning, environmental pollution, and food contamination with banned waste[1].

There is evidence that agricultural workers identify the use of chemicals as essential to the harvesting activity[8]. None of them could think of alternatives to these chemicals or recognize their toxicity. Another study examined individual pesticide poisoning investigation forms and discovered that between 2002 and 2011, there was a high percentage of pesticide poisoning; 67.12% of the studied subjects were male and mainly in the age group of 20 to 39 years (44.41%). The difference found between sexes is due to the predominance of males in farm work. The findings show that pesticides cause 62.60% of poisoning cases, and herbicides 26%, as both are the most used products in agriculture[9].

Among the chronic effects pesticides can reportedly have on humans, they can also cause immunological and genetic alterations; congenital malformations; cancer; harmful effects on the nervous, hematopoietic, respiratory, cardiovascular, genitourinary, gastrointestinal, hepatic, reproductive, and endocrine system, as well as to skin and eyes; in addition to allergic reactions to these drugs and behavioral changes, among others. There is evidence that hearing loss can be an early manifestation of poisoning. Besides, the neurotoxic product can damage not only the peripheral component of hearing but also the central component[10].

Currently, the model of development of both urban and industrial societies in Brazil presents a disorderly and unplanned growth, favoring the increasing levels of pollution and environmental degradation. Thus, it is clear how serious the problem is, as well as the need for integrated public policies aiming to define strategies and create management instruments to control the direct or indirect health impacts on the population exposed to chemical substances. Considering that, the health care field has taken into account the complexity and dynamics of the environmental problems and their impact on human health[1]. It is necessary to adopt concepts that reconcile the multidisciplinary framework from a transdisciplinary perspective so that these concepts are shared by several areas. There must be an intersectoral and interdisciplinary approach that can cover health care, agriculture,

science and technology, the environment, work, and the agricultural extension [12,13].

Pesticides kill and poison thousands of people in Brazil and worldwide, and the diseases it causes represent a severe public health problem[9]. On the other hand, data on chronic diseases caused by exposure to pesticides in Brazil are scattered and rare, and there is still a lack of specialized services that can diagnose acute and chronic poisoning. It is still a challenge to perform investigations and studies on the harmful effects of pesticides and, consequently, on public policies to be implemented in favor of workers that can manage to maintain high production rates without affecting human health in equal proportion[1].

In this sense, there is a need for further research to understand better the associated effects between noise and chemicals on hearing, prioritizing standards for improved safety. A better understanding of the effects of combined exposures can help develop more effective prevention strategies regarding hearing loss[11]. Considering that, this study aims to investigate the effects of pesticide poisoning on the hearing of rural workers.

Methods

Data collection was performed at the Speech-Language Pathology and Audiology Clinic at the Faculdade de Odontologia de Bauru da Universidade de São Paulo. The population was composed of 8 rural workers who use pesticides. Data were collected after approval by the Research Ethics Committee of the Faculdade de Odontologia de Bauru da Universidade de São Paulo, approval No. 39433314.4.00005417.

This study has a convenience sample. Twelve employees of a vegetable cultivation farm were invited, but only eight consented to participate, thus signing the Informed Consent Form (ICF). The researcher herself invited all 12 workers. After the recruited individuals wholeheartedly agreed they were clearly informed about the research details and signed the ICF. Rural workers with at least two years of agricultural experience and over 18 years of age were included, and those with a pre-existing hearing impairment with a previously determined etiology were excluded.

After consenting and signing the ICF, all individuals were submitted to a specific interview designed by the authors. It addressed the population's characteristics and the agricultural work they performed, as well as what the workers knew about pesticides and the use of PPE (Annex 1). Then, they completed the Quality of Worklife Questionnaire (QWLQ-bref), which aims to assess the quality of work life from a personal, health-related, psychological, and professional point of view (Annex 2). Subsequently, a visual inspection of the external auditory canal was performed to check for the presence or absence of any impediment. Afterward, the subjects were asked to enter the acoustic cabin so that a conventional pure-tone (250 to 8,000 Hz) and a high frequency (9,000 to 20,000 Hz) audiometry could be performed to determine their hearing thresholds. A logoaudiometry was also performed to detect the subjects' speech sound perception and recognition. Acoustic immittance testing and ipsilateral and contralateral stapedial muscle reflex testing were performed to complete the assessment. These tests do not require the patient's response and enable professionals to check both the integrity and function of the middle ear.

All data from the interviews, questionnaires, and audiological evaluations were collected and organized in spreadsheets. Afterward, a simple descriptive statistical analysis was performed.

Results

This study invited 12 agricultural workers from the cities of Arealva and Bauru, in the state of São Paulo. However, only eight confirmed their participation and attended the collection site and went through the selected exams. Of those, only six completed all procedures as two participants showed altered tympanic membrane, which prevented them from going through one of the exams.

Most of the study population was male (n=7) with a mean age of 38.75 years. Most participants (n=7) have worked with agriculture for more than 15 years, and only one participant said to have worked for at least ten years. Five workers considered their workplace environment to be quiet, two said they were exposed to noise, and only one reported no noise.

When asked about Personal Protective Equipment (PPE), they stated they had already received some sort of orientation and reported using such equipment. Seven of them reported wearing gloves, a mask, and special clothing for application; five wear boots and goggles, and one wears a cap/hat

as well as hearing protection headphones. The participants reported taking off their clothes for washing separately from other garments after handling the pesticide.

Regarding their opinion on how harming pesticides can be, only one person does not think there are any health hazards, and the vast majority (n=7) stated that pesticides could indeed cause health issues. Among these, they cited cancer (n=3), eye diseases (n=2), poisoning (n=1), headache (N = 2), stomach pain (n=1), burning eyes (n=1), skin diseases (n=1), and lung diseases (n=1). One single worker did not know what health issues pesticides could cause as he reported to believe pesticides were not harmful. As for lunch, six have it at home and two at work (Table 1).

Table 1. Study population

DESCRIPTION	PERCENTAGE
Sex	
Male	87.5%
Female	12.5%
Age	
25–35	25%
35–45	25%
45–55	37.5%
>55	12.5%
Working time in agriculture	
10–15 years	12.5%
More than 15 years	87.5%
Noise at work	
Yes	25%
No	62%
Never noticed	12.5%
EPIs used	
PPE used	87.5%
Gloves, a mask, and special clothing	62.5%
Boots and goggles	12.5%
Cap/hat and hearing protection headphones	
Are pesticides harmful?	
Yes	87.5%
No	12.5%
Health issues reported	
Cancer	37.5%
Eye diseases	25%
Poisoning	12.5%
Headache	25%
Stomach pain	12.5%
Burning eyes	12.5%
Skin diseases	12.5%
Lung diseases	12.5%
Lunch place	
At home	75%
At work	25%

Legend: PPE=Personal protective equipment; %: percentage.

Besides the initial interview questions, the results of which are described in Table 1, the participants also answered the Quality of Worklife Questionnaire (QWLQ-bref) [14]. The QWLQ-bref needed to be subdivided because it has different answer icons for the questions (Table 2).

Table 2. QWLQ-bref Results

QUESTIONS	ANSWERS				
1	**Very low**	**Low**	**Medium**	**Good**	**Very good**
How would you describe your freedom to create new things at work?	-	-	-	50%	50%
How would you describe equality of treatment among employees?	-	-	12.5%	25%	62.5%
2	**Very bad**	**Bad**	**Medium**	**Good**	**Very good**
How would you describe your sleep?	-	-	25%	50%	25%
How would your family describe your job?	-	-	-	37.5%	62.5%
How would you describe the cordiality between employees in your workplace environment?	-	-	-	25%	75%
3	**Very low**	**Low**	**Medium**	**High**	**Very high**
How would you describe your motivation to work?	-	-	25%	75%	-
How would you describe your freedom of expression at work?	-	-	12.5%	50%	37.5%
How proud of your profession are you?	-	-	25%	50%	25%
How would you describe your relationship with your superiors/subordinates?	-	-	12.5%	37.5%	50%
4	**Not at all**	**Very little**	**Somewhat**	**Very much**	**Completely**
Do you feel fulfilled with the work you do?	-	-	25%	25%	50%
How proud are you of the organization you work for?	-	-	-	50%	50%
How satisfied are you with your level of participation in the company's decisions?	-	-	-	12.5%	87.5%
Are you satisfied with your level of responsibility at work?	-	-	12.5%	25%	62.5%
Are you satisfied with the training offered by your organization?	-	12.5%	50%	-	37.5%
How much are you respected by your colleagues and superiors?	-	-	12.5%	12.5%	75%
Are you satisfied with the variety of tasks you perform?	-	-	-	50%	50%
5	**Not at all**	**Very little**	**Somewhat**	**Very**	**Extremely**
Are your basic physiological needs properly met?	-	-	-	50%	50%
How comfortable do you feel in your workplace environment?	-	-	25%	12.5%	62.5%
How satisfied do you feel about your quality of life at work?	-	-	50%	37.5%	12.5%
How much does a sleep problem affect your work?	50%	25%	25%	-	-

Legend: %=percentage.

Regarding the hearing assessment, eight audiometry exams (16 ears) were analyzed; two of the participants had altered meatoscopy changes, such as tympanic membrane perforation (one participant bilateral and another one unilateral), which did not allow their tympanometric evaluation. Six participants underwent immittance testing, thus obtaining middle ear normality and presence of reflexes. However, half of the sample (n=4) had bilateral recruitment (Table 3).

Table 3. Average, median, minimum, and maximum CPTA auditory thresholds

Frequency (Hz)	RIGHT EAR				LEFT EAR			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
250	11	7,5	5	30	12	12,5	0	30
500	13	10	5	35	13	10	10	30
1000	15	15	5	35	15	10	5	35
2000	14	10	5	40	14	10	0	40
3000	15	12,5	5	40	18	15	0	45
4000	15	15	0	40	17	15	0	40
6000	19	10	0	50	21	12,5	5	50
8000	18	12,5	0	45	17	5	5	45

Legend: Hz=hertz.

Cut-off values in dB HL for normality in the high-frequency pure-tone audiometry (HFPTA) were sorted by age group according to Burguetti, Peloggia, and Carvallo (2004)[15] (Table 4).

The results for HFPTA are shown below (Table 5).

Table 4. HFPTA normality values (BURGUETTI; PELOGGIA; CARVALLO, 2004).

Age group	9,000 Hz	10,000 Hz	12500Hz	14000Hz	16,000 Hz	18000Hz	20,000 Hz
20–29 years old	15	15	15	15	30	30	10
30–39 years old	30	30	35	45	35	55	15
≥40 years old	30	35	55	90	60	40	20

Legend: Hz=hertz.

Table 5. Average, median, minimum, and maximum HFPTA auditory thresholds

Frequency (Hz)	RIGHT EAR				LEFT EAR			
	Mean	Median	Minimum	Maximum	Mean	Median	Minimum	Maximum
9,000	25	17,5	5	55	21	15	5	50
10,000	22	12,5	0	55	23	20	0	55
11200	29	17,5	5	60	28	27,5	0	60
12,500	29	15	0	60	30	27,5	0	70
14,000	36	22,5	0	75	38	37,5	0	80
16,000	39	32,5	0	70	39	45	0	70
18,000	23	25	5	30	21	30	0	30
20,000	1	0	0	10	9	15	0	15

Legend: Hz= hertz.

Each participant's average in the 500, 1,000, and 2,000 Hz dB HL frequencies, in both right and left ears, varied from 5 Hz to 37 Hz, with more prevalent averages of 10 and 12 Hz.

Legend: Hz=hertz; dB HL=decibels in hearing level; dB=decibel.

Figure 1. General average of 500, 1,000, and 2,000 Hz in dB HL are shown in dB.

Discussion

In general, the workers in this research are more educated and careful regarding the use and manipulation of pesticides. They were interested in learning more about the precautions they could take to avoid health issues and future hearing loss caused by those chemicals. They all receive regular orientation sessions on cultivation, use of protective equipment, and how to handle poisons, among other orientations reportedly satisfactory, according to the QWLQ-bref[14] questionnaire applied before the audiological tests.

The QWLQ-bref also showed that all workers are somewhat to completely satisfied with the work they do, as well as their way of organizing and living with others. Most of them are over 45 years old and have worked in agriculture for more than 15 years. Maybe all that knowledge is due to years of experience in the same field of work, as well as the importance they give to experts' orientations. It is also important to highlight how most workers consider that there is no noise in their workplace environment, classifying it as quiet.

Regarding the auditory evaluation, normality of the middle ear was found in six of the eight participants, as well as in the external auditory canal by using meatoscopy and immittance testing. Of the six participants who underwent ipsilateral and contralateral reflex testing, three presented the recruitment phenomenon. This phenomenon represents the abnormal or distorted perception of the intensity of loud sounds, which means individuals start to feel uncomfortable in the presence of high sound intensities regardless of hearing loss. This happens because, even though the ear is normal, it operates in a frequency range from a minimum hearing threshold to a maximum threshold, which is uncomfortable. This is called a dynamic field, and therefore recruiters have a reduction in this field, which causes auditory sensitivity [16].

The results of a study conducted in Italy showed altered stapedial acoustic reflex responses, which confirmed that some pesticides might affect the cochlea and central auditory pathways by acting in the regulation of acetylcholine release in the muscle, thereby blocking Ca2 channels, which are directly involved in the protection of the middle ear by the stapedial reflexes[17]. There is a correlation between the use of pesticides and altered stapedial acoustic reflexes. Whether there is a hypersensitive or lack of protection, the cochlea and its hair cells are negatively impacted nonetheless.

From the conventional and high-frequency audiometry, the average hearing thresholds are within the expected normal standards, although some workers have their high-frequency thresholds close to normal limits. The average of 500, 1,000, and 2,000 Hz is related to the ability to hear speech. There are many classifications to categorize the degree of loss, but they all use the average airway thresholds for some frequencies. However, there

is still controversy as to which classification to use. Nevertheless, the most used is the average frequency mentioned above. The hearing thresholds classified according to the type of loss are referred to as conductive, sensorineural, or sensorineural and mixed hearing loss[18]. The World Health Organization establishes the degrees of hearing loss[19] as mild (26–40 dB), moderate (41–60 dB), severe (61–80 dB), and profound (above 80 dB).

Through conventional audiometry and average thresholds, normality was observed in the values resulting from the mean of 500, 1,000, and 2,000 Hz, since only thresholds starting from 26 dB HL are considered a hearing loss. The logoaudiometry showed normal results in all participants in the Speech Recognition Percentage Index (SRPI) and values of Speech Reception Threshold (SRT), even in those with a tympanic membrane perforation. The higher values found in the CPTA are present in the 6,000 and 8,000 Hz frequencies with a maximum of 50 and 45 dB HL, as well as averages of 17 to 21 dB HL at those same frequencies. Studies have shown that hearing loss due to ototoxic drugs is generally symmetrical irreversible bilateral sensorineural hearing loss in the frequencies from 3 kHz to 6 kHz due to cochlear hair cell lesion[20].

The HFPTA evaluation also obtained normal findings in comparison with the classification by Burguetti, Peloggia, and Carvallo (2004). Still, the participants were instructed to undergo a periodic evaluation as their averages are very close to the normal limit, which means there is already a loss of hair cells responsible for the high frequencies, and it is known that they are located at the base of the cochlea. That poses a risk of loss of cells that are posterior to them, which may damage them, causing a loss in the other frequencies. High-frequency pure-tone audiometry contributes significantly to the early findings of auditory changes, enabling individuals to receive effective intervention and allowing a positive prognosis[21].

A study performed discovered that 57.14% of 98 workers who were continuously exposed to pesticides in the city of Pernambuco, Brazil showed signs of hearing loss at high frequencies[22], that is, more than half of them had that region altered, which should be a red flag to this population and for researchers to continue their studies in that field.

The literature points to evidence of occupational exposure to pesticides for human health, showing impairment throughout the auditory system. Considering that, there is an increasing concern among health care and safety professionals since it is a public health problem. Thus, considering the literature and the results obtained, the rational use of these agents is essential so that the health risk can be minimized. Finally, it is important to use hearing assessment protocols that allow investigating the entire auditory system, as well as inspecting a rational use of pesticides and individual and collective protective equipment to keep workers healthy.

Conclusion

The results suggest that constant exposure to pesticides can cause changes in the peripheral auditory system even when there is no noise in the workplace environment. This and many other studies propose data that corroborate the importance of prevention programs for workers' exposure to pesticides, implementing pesticide control and surveillance. Other studies with a more robust population should be developed to expose the evidence of peripheral impairment.

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ANNEXES

Annex 1. Specific Interview

Questionnaire – Pesticides

1-What is your sex?
( ) M ( ) F

2-How old are you?
( ) 18–25 ( ) 25–35 ( ) 35–45 ( ) 45–55 ( ) Older than 55

3-How long have you been working in the field?
( ) Less than a year ( ) 1–5 years ( ) 5–10 years
( ) 10–15 years ( ) More than 15 years

4-How many hours do you work a day?
5-How long do you take to apply the insecticide or pesticide?
( ) less than 30 minutes ( ) 30 minutes–1 hour
( ) 1–2 hours ( ) More than 2 hours

6-How many applications are performed throughout the day?
7-Is there a rest break between applications?
8-Where do you have lunch?
9-Do you think pesticides are pesticides harmful?
10-If you answered yes to question 9, what health issues?
11-What do you do with the clothes you use during the pesticide application?
12-Have you been instructed on the use of personal protective equipment (PPE)?
13-If you answered yes to question 12, which personal protective equipment (PPE) were indicated?
14-Do you use personal protective equipment (PPE)?
15-Your workplace environment is:
( ) Noisy ( ) Quiet ( ) Never paid attention

Annex 2. Quality of Worklife Questionnaire

Questionário de avaliação da qualidade de vida no trabalho – QWLQ-bref

Este questionário tem como objetivo avaliar a qualidade de vida no trabalho, sob o ponto de vista pessoal, de saúde, psicológico e profissional.

Por favor, responda todas as questões. Caso não tenha certeza sobre qual resposta dar, sugiro escolher entre as alternativas a que lhe parece ser a mais adequada, sendo normalmente esta a primeira escolha.

Por favor, tenha em mente as **duas últimas semanas** para responder as questões.

Exemplo:

Quanto você se preocupa com dores ou desconfortos no trabalho?				
nada	muito pouco	mais ou menos	bastante	extremamente
1	2	3	4	5

Você deve circular o número que melhor corresponde a sua realidade, relembrando, pensando apenas nas últimas duas semanas.

1

Como você avalia a sua liberdade para criar coisas novas no trabalho?				
Muito baixa	Baixa	Média	Boa	Muito boa
1	2	3	4	5

2

Em que medida você avalia sua motivação para trabalhar?				
Muito baixa	Baixa	Média	Alta	Muito alta
1	2	3	4	5

3

Como você avalia a igualdade de tratamento entre os funcionários?				
Muito baixa	Baixa	Média	Boa	Muito boa
1	2	3	4	5

4

Em que medida você avalia o seu sono?				
Muito ruim	Ruim	Média	Bom	Muito bom
1	2	3	4	5

5

Como você avalia sua liberdade de expressão no seu trabalho?				
Muito baixa	Baixa	Média	Alta	Muito alta
1	2	3	4	5

6

Você se sente realizado com o trabalho que faz?				
Nada	Muito pouco	Médio	Muito	Completamente
1	2	3	4	5

7

Em que medida você possui orgulho da organização na qual trabalha?				
Muito pouco	Pouco	Médio	Muito	Completamente
1	2	3	4	5

8

Em que medida algum problema com o sono prejudica seu trabalho?				
Nada	Muito pouco	Mais ou menos	Bastante	Extremamente
1	2	3	4	5

9	**Em que medida você avalia o orgulho pela sua profissão?**				
	Muito baixa	Baixa	Média	Alta	Muito alta
	1	2	3	4	5
10	**Como você avalia a qualidade da sua relação com seus superiores e/ou subordinados?**				
	Muito baixa	Baixa	Média	Alta	Muito alta
	1	2	3	4	5
11	**Em que medida sua família avalia o seu trabalho?**				
	Muito ruim	Ruim	Médio	Bom	Muito bom
	1	2	3	4	5
12	**Em que medida você está satisfeito com o seu nível de participação nas decisões da empresa?**				
	Muito pouco	Pouco	Médio	Muito	Completamente
	1	2	3	4	5
13	**Você está satisfeito com o seu nível de responsabilidade no trabalho ?**				
	Nada	Pouco	Médio	Bastante	Completamente
	1	2	3	4	5
14	**Você se sente satisfeito com os treinamentos dados pela organização?**				
	Nada	Pouco	Médio	Bastante	Completamente
	1	2	3	4	5
15	**Em que medida você é respeitado pelos seus colegas e superiores?**				
	Nada	Muito pouco	Médio	Muito	Completamente
	1	2	3	4	5
16	**Você se sente satisfeito com a variedade das tarefas que realiza?**				
	Nada	Pouco	Médio	Bastante	Completamente
	1	2	3	4	5
17	**Suas necessidades fisiológicas básicas são satisfeitas adequadamente?**				
	Nada	Muito pouco	Mais ou menos	Bastante	Extremamente
	1	2	3	4	5
18	**Como você avalia o espírito de camaradagem no seu trabalho?**				
	Muito ruim	Ruim	Médio	Bom	Muito bom
	1	2	3	4	5
19	**Em que medida você se sente confortável no ambiente de trabalho?**				
	Nada	Muito pouco	Mais ou menos	Bastante	Extremamente
	1	2	3	4	5
20	**O quanto você está satisfeito com a sua qualidade de vida no trabalho?**				
	Nada	Pouco	Médio	Bastante	Extremamente
	1	2	3	4	5