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Contamination of Fruits, Soil Water Due to The Use of Agrochemicals in (*Passiflora Ligularis*), Oxapampa-Peru

Benito Filemón Buendía Quispe[1]*, Guillermo Gomer Cotrina Cabello[2], Bernal Marcelo Alfredo Rubén[3], María Soledad Aliaga Huaman[4], Carlos Jesús Yupanqui Villanueva[5], López Robles Zenón Manuel[6] Peña Carmelo Ulises[7] De La Cruz Saravia Jorge Luis[8]

[1*,2,3,4,5,,7,8]*Universidad Nacional Daniel Alcides Carrion- Filial – Oxapampa - De Cerro De Pasco.*
[1]*Email: bbuendiaq@Undac.Edu.Pe, Orcid: 0000-0002-2921-6847.*
[2]*Email: gcotrinac@Undac.Edu.Pe, Orcid: 0000-0003-2367-2240.*
[3]*Email: abernalm@Undac.Edu.Pe, Orcid: 0000-0002-3767-600x.*
[4]*Email: Maliagahu@Gmail.Com, Orcid: 0009-0005-0885-8989.*
[5]*Email: cyupanquiv@Undac.Edu.Pe, Orcid 0000 – 0002-8982-6858,*
[6]*Email: d.zlopez@upla.Edu.Pe. Orcid: 0000-0003-0744-6075.*
[7]*Email: d.zlopez@upla.edu.pe. Orcid:0000-0003-0744-6075*
[8]*Email: jorge.delacruz1@unica.edu.pe. Orcid:0000-0002-3973-3397*
***Corresponding author:** Benito Filemón Buendia Quispe*

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Abstract

The conventional agriculture allowed the farmers being dependent to the mass and frequent use of pesticides, originating contamination of fruits, ground, water of escorrentía. Objective was To Determine the concentration of metals weighed in Passiflora's fruits ligularis produced at grounds and escorrentía's water with remains of metals weighed by intensive agroquímicos's use at Oxapampa's district. Himself I utilize the Experimental Comparative Design No. Determined him Arsénico's concentration, Mercury, Plomo, Cadmio, Cobre in signs collected of fields of production of three (ABC) previous groups you poll farmers. Results: You met the. Arsenic 0.004mg/Kg (Ch1Af), mercury 0,002 mg/Kg (Ab1Af, Ab2Af), lead 0,005 mg/Kg (Ab1Af), cadmium 0,004 mg/Kg (Ab1Af, Ch1Af, PaCf), copper 0,5 mg/Kg (Ch2Af). Ground Arsénico Ch1As, ARP3Cs 0,08 mg/Kg, mercury Ch1As, ARP3Cs, SA2Cs, PaCs 0,08 mg/Kg; I seal with lead Ch1As, ARP2Cs, Ch2As, AcAs, PaCs 0,08 mg/Kg, cadmium Acuzazú AcAs, 0,3 mg/Kg, copper Ab2Bs, Ch1As 30 mg/Kg. Water down of escorrentia; Arsenic SA2Ca 0.005mg/Kg, mercury Ch2Aa 0,008 mg/Kg, lead CaBa, QllAa, Ch3Ba 0,005 mg/Kg, cadmium Ab2Ba, AcAa, SA1Ba 0,004 mg/Kg, copper SA1Ba 1,5 mg/Kg. Conclusion: You had loud moral values of concentration of metals weighed at ground, water, fruits passing the maximum permissible limit.

***Keyword:** Heavy metals, grounds, water, Passiflora, contamination.*

Introduction

The physical knowledge of phenomenon caused by the man leads to go into our reality, in that we are fastened of continuous interaction. Like the agroquímicos's use that they are taken by the producers in cultivation of little pomegranate (*Passiflora ligularis*), contaminating the ambient midway and degrading the biological component of the system of agricultural produce, this lives together to him at Oxapampa's district, having the concentration of metals weighed in *Passiflora's* fruits *ligularis* that you represent a risk in the human health, These are produced at grounds and escorrentía's water, contaminated for frequent farmers' use in the Peru. The heavy metals constitute a serious environmental problem for their toxicity and their physiological repercussions to the living beings, (Contreras Pérez, Mendoza and Gómez, 2004). They find once the little pomegranate's fruits were contaminated, ground and water that utilizes the plants for his physiological shows,

the metals weighed by his character not biodegradable and the toxicity that they exercise in different cultivations and his biodisponibilidad prove to be dangerous (Méndez et to the., 2009). The height was hard to do of production decrease the quality of the fruits, that decreases the profitability, having the risk to future to lose the markets that affect adversely the consumer. Presents in foodstuff with toxic metals find this (Moralses, 2017). The concentration of metals weighed in the fruits was left once high frequency was checked against by the use of pesticides, they were identified during the study applied by the farmers when they accomplished the pest control, diseases and underbrushes daily, being a risk to the population in general, fruits are daily source in nutrition and they develop themselves in good environmental conditions (Rodríguez 2016). Exists contamination of the ground and water with toxic substances, derivatives of anthropocentric actions, like the heavy metals (López, 2017). Realized studies to know the heavy metals exist; Cadmium, Nickel, Lead, Iron, Copper, Zinc, Manganese. It has been proven that in the study the agroecosistemas in the agriculture of irresponsible way are contaminated the objective matched. Determining the concentration of metals weighed in *Passiflora's* fruits *ligularis* produced at grounds and escorrentía's water with remains of metals weighed by intensive agroquímicos's use at Oxapampa's district. The obtained results matched he; Arsenic 0.004mg/Kg (Ch1Af), mercury 0,002 mg/Kg, Ab1Af and Ab2Af), I seal 0,005 mg/Kg with lead, (Ab1Af), cadmium 0,004 mg/Kg (Ab1Af, Ch1Af, PaCf), and collect 0,5 mg/Kg in (Ch2Af), stops examined they utilized the espectrofotómetro of atomic absorption at the laboratory of San Marcos's National Bigger University of Lima. Achieving determining the quantities of heavy metals that are above the Límites Maximum Permisibles, exposing the danger of the health of the consumers of the product.

MATERIALS And METHODS

Oxapampa's district because it is framed within **basic research,** accomplished the work itself metallic elements in the fruits, ground, escorrentía's water were examined. The evaluation of contamination operated itself in dimensions of selected groups, agroquímicos's use they were intervention antrópica how influence the contamination of the fruit of the little pomegranate for interaction of the ground and water. The population went from the finite type that was in conformed for little pomegranate fields of cultivation (*Pasiflora ligularis*) complete production of Oxapampa's district, with 1463 Ha.

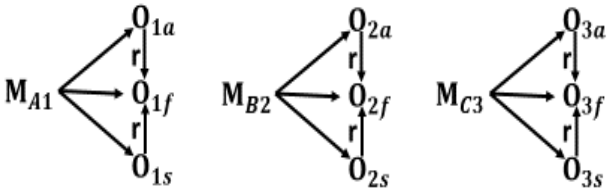
The size of sign was constituted for 55 Ha of little pomegranate in production that went determining by means of the statistical formula:

$$n = \frac{Z^2 pqN}{E^2(N-1) + Z^2 pq}$$

Where:
Z confidence level 1,65,
P Probabilidad in favor 0,70
Q Probabilidad against 0,30
So big a n of sign 1463
And error of esteem 0,10

The 55 little pomegranate Ha of cultivation of production, distributed at different plots of land with various extensions, geographically they were identified at the rural sectors within Oxapampa's district, like music: Loudly I Laugh Conceited, Pipe Fitter, Leaf, Shakos, St. Albert, Acuzazú, Quillazú, Paradise. The fields of production evaluated at random at each sector a questionnaire accomplished to each intervening proprietor an opinion poll, information was picked up: Little pomegranate surface of fields of production, agroquímicos's types that they use generally and how frequently are applicable during the year of handling of cultivation. Next you were selected and grouped in three groups according to the intensity of application of the agroquímicos per year: The group they are applicable to with high frequency, the group B the ones that are applicable with medium frequency and a group C that they apply with low frequency. They took the signs at different sectors classified properly encoded by area of production of the groups; The random sampling catching 6 fruits like sign; Homogenizando extracted to 20 cm of depth of the topsoil signs of ground of the same field in points at random in scheme of zigzag, obtained him sub-signs a very sign with 0,5 Kg's quantity. Escorrentías's signs

of water took of the field of production de1litro last sign was to elaborate manifolds with holes prepared on the lot's surfaces, covered in the base or bottom with plastic to insure the accumulation of the water for escorrentía in days of rain. The area's under consideration points were the period of extraction and transportation of the signs from the field to the laboratory during 02 days, the waters recollected themselves in polyethylene flask of white color with capability of 1litro like representative sign, the signs of fruits and of ground were poured into hermetic polyethylene bags for the appropriate capability, next they were packed boxed of cardboard with orifices to the sides for better ventilation and transportation by distance. All this opinion took protocol of chemical analysis in her laboratory; You prove to examine her 15 signs came from fruits, 15 signs of ground, 15 signs of water, that were recollected of dimension of lots in sampling. The kind of utilized design was experimental Comparative Design No. (Sampieri 2010) you manifest than you determine the grade of existent relation between two or more variables of concern in an or more sign in this design, making a comparison between the obtained observations and examining the inferences between two or more different populations, whose scheme is the following:



$$O_{i-3a} \underset{\neq}{=} O_{i-3f} \underset{\neq}{=} O_{i-3s}$$

DESCRIPCION:

M_{A1}= Muestra de áreas con baja aplicación de pesticidas

M_{B2}= Muestra de áreas con media aplicación de pesticidas

M_{C3}= Muestra de áreas con alta aplicación de pesticidas

O_{i-3a} = Observación de variables metales del agua contaminada

O_{i-3s} = Observación de variables metales del suelo contaminada

O_{i-3f} = Observación de variables metales de los frutos de granadilla contaminada

r = Relación entre variables ($O_{i-3a} - O_{i-3f}$) y ($O_{i-3s} - O_{i-3f}$)

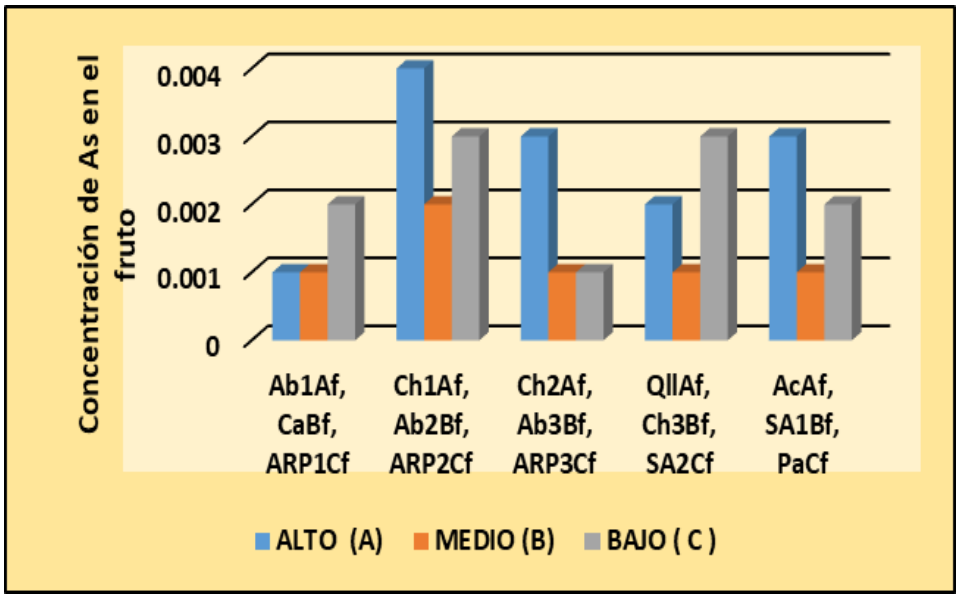
=, ≠ : Comparaciones entre muestras de las variables entre 3 poblaciones diferentes

(a= agua, s=suelo, f=frutos)

The techniques utilized during investigation matched: Identification, observation, I pick up of data and you show in phase field and laboratory. The technique of the interview was utilized for the social component and I dialogue. For the assessment of the heavy metals: Arsenio, Plomo, Mercurio, Cadmio and Cobre, the signs it was worked up with protocol recommended for the analysis of laboratory, by means of the use of Absorción's Espectrofotómetro Atomic, results were measured in mg/Kg. For 05 metals weighed under consideration. The utilized instruments went: Pre-designed formats, questionnaires, in order to register the data obtained during the evaluation. The questionnaire of interview validated by experts in investigation in the social area. The utilized method was the one belonging to DELPHI, method of structuring of process of effective communication to allow individuals' group to treat a complex problem (Landeta, 1999). The data obtained at survey area were processed in cabinet, a software utilized SPSS and the Excel, the descriptive statistics and inferencial, ANOVA for the comparison between stockings itself and Student for the proof tries it of t of only signs of the prosecuted data the analysis and interpretation, discussion and findings were made.

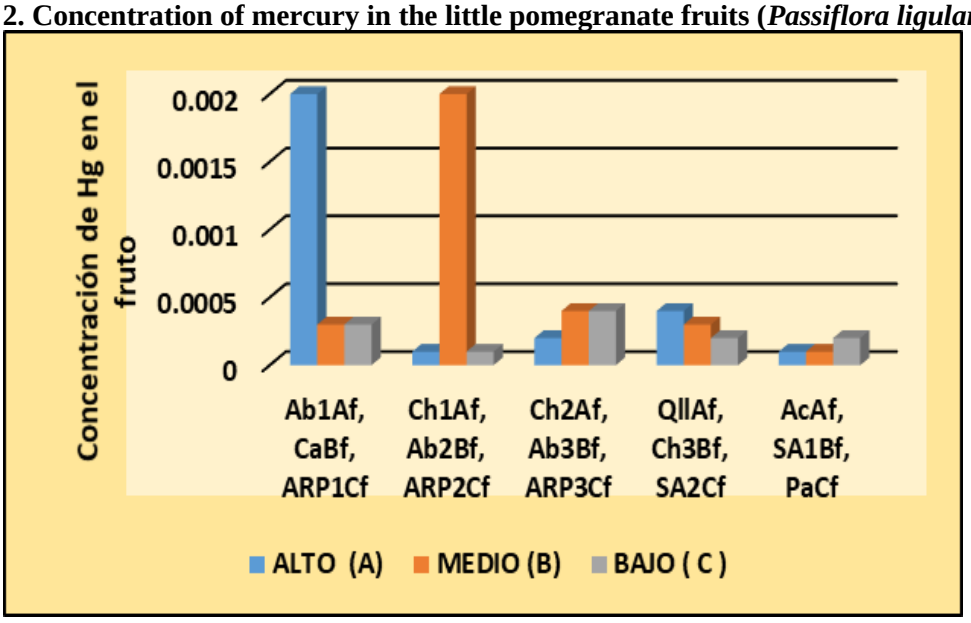
Result and Discussion

1 takes part. Concentration of metals weighed in the fruits: Arsenio, Mercury, Lead, Cadmium and Copper



As shown in the figure 1; Concentration of arsenic in the little pomegranate fruits (*Passiflora ligularis)* mg/Kg. They have loud moral values in the contents of arsenic at Chacos's sectors (Ch1Af), with 0,004 mg/Kg, with mean values of 0,002 mg/Kg at the sectors with low moral values (ARP1Cf, Ab2Bf, QllAf and PaCf) and of 0,001 at the sectors (Ab1Af, CaBf, Ab3Bf, ARP3Cf, Ch3Bf and SA1Bf). Another moral values I eat of 0,003 mg/Kg for the sectors (ARP2Cf, Ch2Af, SA2Cf and AcAf). Adminiculate (Kabata and Pendias, 2001) when the fact that plants absorb more trace elements and the concentration of these in the vegetable textiles often is related to his abundance at the land directly mention, specifically in the humid conditions of the place

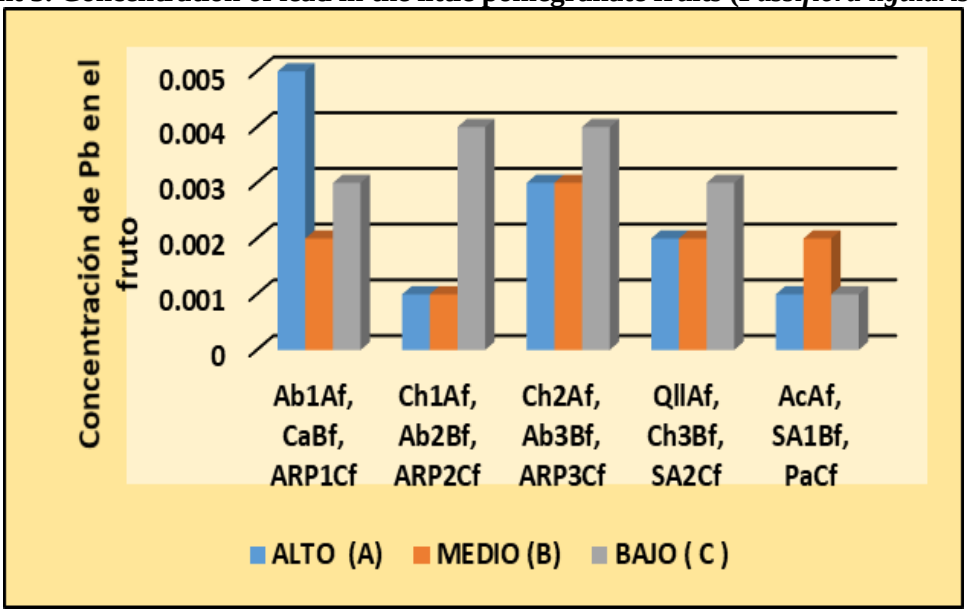
Represent 2. Concentration of mercury in the little pomegranate fruits (*Passiflora ligularis*) mg/Kg



As shown in the figure *2;* Concentration of mercury in the little pomegranate fruits (*Passiflora ligularis*) mg/Kg. They found fruits with loud moral values of contents of mercury at the sectors of (Ab1Af and Ab2Af) with 0,002 mg/Kg, a mean value of 0,0004 mg/Kg at the sectors (ARP3Cf, Ab3Bf, QllAf) and low moral values like 0,0001 mg/Kg at the sectors (ARP2Cf, Ch1Af, SA1Bf, PaCf). Adminiculate (Kabata and Pendias, 2001) when the fact that plants absorb more trace elements and the concentration of these in the vegetable

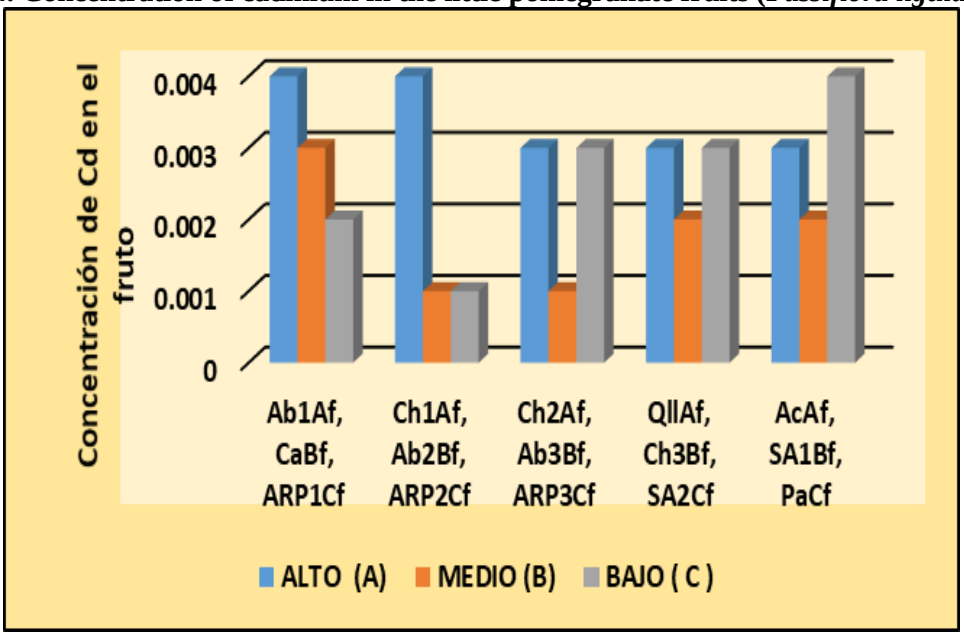
textiles often is related to his abundance at the land directly mention, specifically in the humid conditions of the place

Represent 3. Concentration of lead in the little pomegranate fruits (*Passiflora ligularis*) mg/Kg



You show up in the figure 3. Concentration of lead in the little pomegranate fruits (*Passiflora ligularis*) mg/Kg. They have loud moral values in the contents of lead at the sector of the Sheltered Bay (Ab1Af) with 0,005 mg/Kg, with mean values of 0,004 mg/Kg at the sectors with low moral values (ARP2Cf, ARP3Cf) and of 0,001 mg/Kg at the sectors (Ch1Af, Ab2Bf, SA1Cf, PaCf). With regard to this matter (Fashionable Young Man and Romero, 2008) you mention than the bigger habitual concentrations of them (anomalies) and in general you have an adverse effect on living organisms

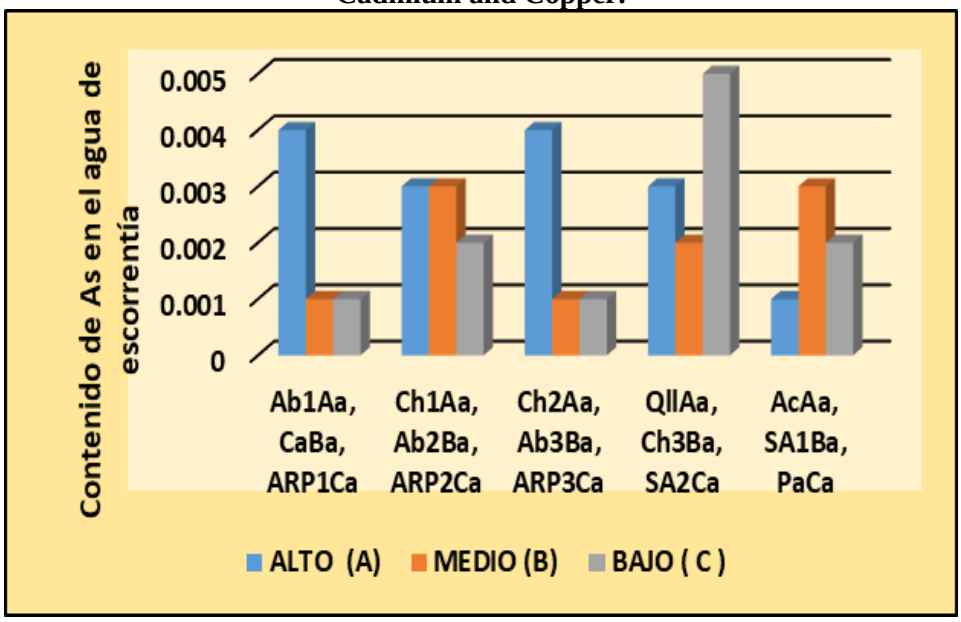
Represent 4. Concentration of cadmium in the little pomegranate fruits (*Passiflora ligularis*) mg/Kg.



As you indicate in the figure 4; Concentration of cadmium in the little pomegranate fruits (*Passiflora ligularis*) mg/Kg. They have loud moral values in the contents of **cadmium** at the sectors of (Ab1Af, Ch1Af, PaCf) with 0,004 mg/Kg, with 0,003 mg/Kg's mean values of the sectors (CaBf, Ch2Bf, ARP3Cf, QllAf, SA2f, AcAf) and 0,001 mg/Kg's low moral values of the sectors (Ab2Bf, ARP2Cf, Ab3Bf). They tend to

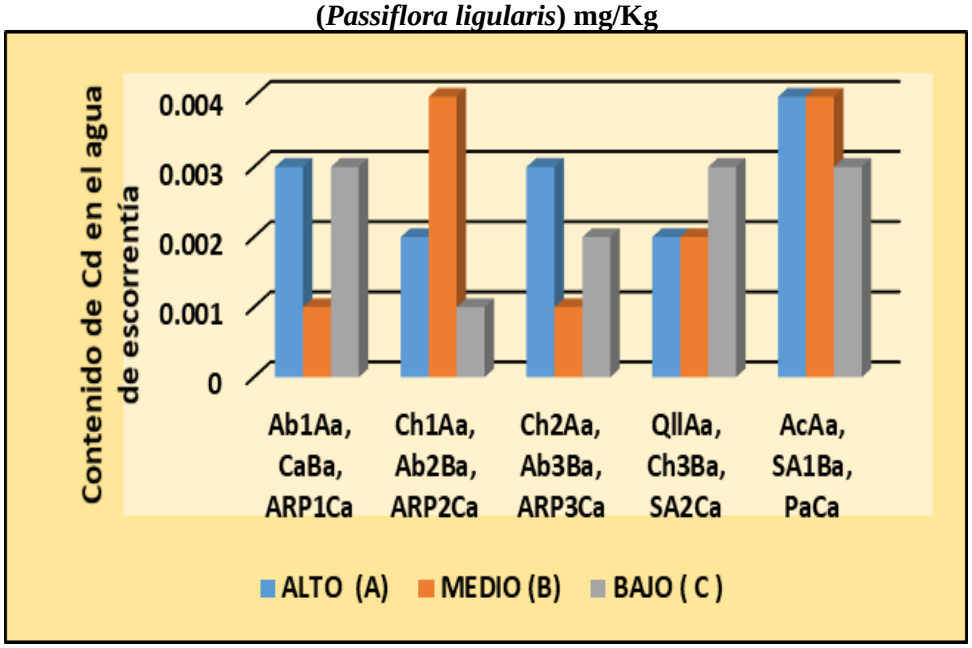
accumulate on the surface of the ground that is accessible to the consumption of the roots of the cultivations according to (Baird, 1999) these metals.

Represent 5. Contents of metals weighed in escorrentías's water of: Arsenio, Mercury, Lead, Cadmium and Copper.



As shown in the figure 5. Contents of arsenic in escorrentía's water of the cultivation of little pomegranate (*Passiflora ligularis*) mg/Kg. You found a loud value of contents of **arsenic** at the sector of (SA2Ca) with 0,005 mg/Kg, with 0,003 mg/Kg's mean values at the sectors (Ch1Aa, Ab2Ba, QllAa, SA1Ba) and with low moral values at the sectors of (CaBa, ARP1Ca, Ab3Ba, ARP3Ca, AcAa) with 0,001 mg/Kg. According to (García and Dorronsoro, 2005). Fundamentally the contamination of grounds and plants for presence of nonessential or toxic metals for cultivations has his origins in the activities antropogénicas

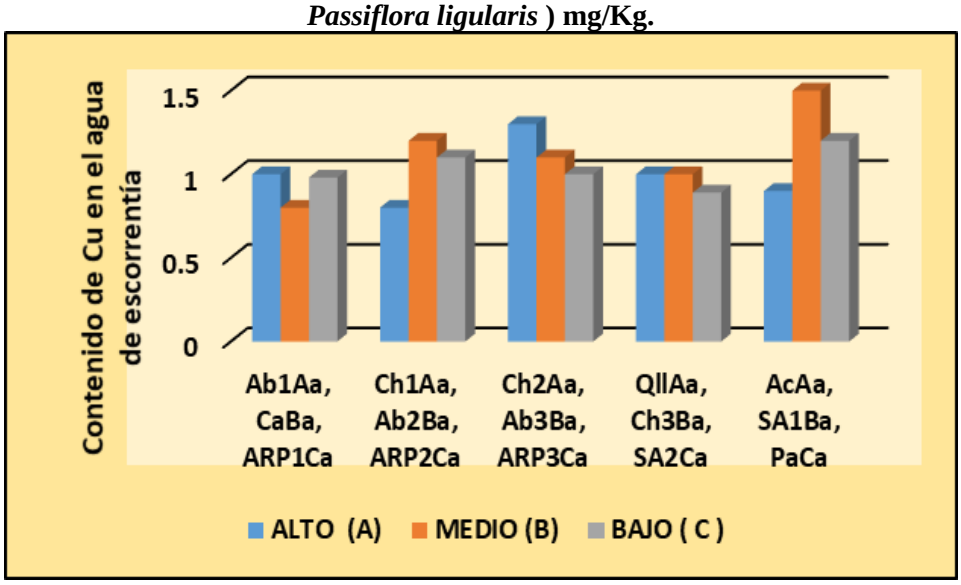
Represent 6. Contents of cadmium in escorrentía's water of the cultivation of little pomegranate (*Passiflora ligularis*) mg/Kg



As you indicate in the figure 6, Contents of cadmium in escorrentía's water of the cultivation of little pomegranate (*Passiflora ligularis*) mg/Kg. They found loud moral values of contents of **cadmium** at the sectors of (Ab2Ba, AcAa, SA1Ba) with 0,004 mg/Kg, with 0,002 mg/Kg's mean values at the sectors (Ch1Aa, ARP3Ca, QllAa, Ch3Ba) and with low moral values at the sectors of (CaBa, ARP2Ca, Ab3Ba) with 0,001

mg/Kg. All music take them associated inside the accumulative symbol and bioacumulativo as well as biodegradable no of the same according to mention (Ávila 2009)

Represent 7. Contents of copper in escorrentía's water of the cultivation of little pomegranate (*Passiflora ligularis*) mg/Kg.



As you indicate in the figure 7; Contents of copper in escorrentía's water of the cultivation of little pomegranate (*Passiflora ligularis*) mg/Kg. You found a loud value of contents of copper at the sector of (SA1Ba) with 1,5 mg/Kg, with 1,1 mg/Kg's mean values at the sectors (ARP2Ca, Ab3Ba) and with low moral values at the sectors of (CaBa, Ch1Aa) with 0,08 mg/Kg. With regard to this matter (Gonzales, et to the., 2010) they obtained metals weighed in aggregate concentrations that they were more than the maximum permissible levels established by the Mexican Legislation

Concentration of arsenic, mercury, lead, cadmium and copper in the little pomegranate fruits *Passiflora ligularis* (mg/Kg)

Proposal of the statistical hypotheses

H_0; $\mu \leq$ al LMP de 0.2 mg/Kg (As), H_1; $\mu >$ al LMP de 0.2 mg/Kg, α =0.05
H_0; $\mu \leq$ al LMP de 0.02 mg/Kg (Hg), H_1; $\mu >$ al LMP de 0.02 mg/Kg, α =0.05
H_0; $\mu \leq$ al LMP de 0.1 mg/Kg (Pb), H_1; $\mu >$ al LMP de 0.1 mg/Kg, α =0.05
H_0; $\mu \leq$ al LMP de 0.05 mg/Kg (Ca), H_1; $\mu >$ al LMP de 0.05 mg/Kg, α =0.05
H_0; $\mu \leq$ al LMP de 0.2 mg/Kg (Cu), H_1; $\mu >$ al LMP de 0.2 mg/Kg, α =0.05

Board N 01.

You try of t for only sign that you determine As's superiority of concentration, Mercurio, Plomo, AC and Cobre in relation to the value of The Maximum Permissible limit of consumption of fresh fruits.

Put them snobs into the fruits	Value of proof = 0.05					
	t	Gl	Bilateral. Sig.	Tell aparto f stockings	95% of confidence Interval of difference	
					Inferior	Superior
Arsenic	-185,9	14	,000	-.0480	-.048554	-.047446
Mercury	-304,6	14	,000	-.0495	-.049875	-.049178
Lead	-147,7	14	,000	-.0475	-.04822	-.04684
Cadmium	-173,9	14	,000	-.0474	-.04798	-.04682
Collect	9,121	14	,000	.2700	.207	.333

Source: Analysis of chemistry laboratory National Older Universidad of St. Marcos Lima Peru (2019)

In the proof of t for only sign in relation to the moral values of the heavy metals, the value of significance is observed for all you come from 0,0001, originating result of the comparison of data of Arsenio's concentration, Mercury, Lead, Calcium and Copper in the fruits within the three groups under consideration (ABC) selected according to agroquímicos's intensity of use,, he is the moral values younger to á's significancia 0,05, therefore the statistical decision, Accepting the alternating hypothesis, in consequence the null hypothesis is refused for all. The existing Conclucion evidences enough to affirm that the contents of arsenic, mercury, lead, cadmium and copper finds itself on top of Maximum Permissible Límite's moral values (0,2 As's mg/Kg) (0,02 Hg's mg/Kg), (0,1 Pb's mg/Kg), (0,05 Ca's mg/Kg) and (0,2 Cu's mg/Kg) respectively in the fruits, with different agroquímicos's intensity of use with the 95 %'s confidence level. What adminiculates that risk in the human health for the consumption of the low little pomegranate would have these conditions of chemical contamination.

Declaration OF CONFLICT OF interest:

The symbolic investigating authors of the present I articulate with Docente's position of the National University Daniel alcides Carrión of hill of Pasco, I declare that I do not have a conflictive situation of real interest, potential or evident, relating to the elaboration of the scientific article. I commit myself in front of the ethical Scientific Committee of place (s) to communicate them of immediate way, if for some reason I face a conflict of interest, that you may affect the development of my investigations.

References

1. Ávila, H, Quintero., N, Cardinal Red C, Araujo M, Moralses N, and Tight M. «Determination of metals weighed in superficial coastal sediments of Maracaibo's System Lago, Venezuela». Multiciencias. 2014; 10(14):1-4 http://www.redalyc.org/resumen.oaGo 90430816005.
2. Baird, C. (1999). Environmental chemistry. 2nd Ed. W.H. Freman and Company
3. Contreras Pérez, Mendoza, and And Gómez. Determination of metals weighed in waters and the Río Haina's sediments. Science and Society. 2004;6(29):1-33 http://www.redalyc.org/resumen.oaGo 87029103
4. García, I, and Dorronsoro, C. Contamination for heavy metals. In Technology of Grounds. University of Pomegranate. Apartment of Pedology and Chemistry Agrícola.2005;33(56):70-89
5. González. Employer of use and sale of pesticides in Nayarit, Mexico. Scielo.2010;221(228):131-22.
6. Kabata, To, and You Hung, H. Draw elements in soils and plants CRC. Press. Florida.2001;22(120):11-1
7. Landeta, Jon. The method Delphi. A Technique of foresight for uncertainty. Ariel. Barcelona.1999; 56(99):65-34
8. López. EA. Quantification of metals weighed in the cultivation of the strawberry (Fragaria Xananassa Duch. Var. Festival) En Tenancingo and Martial Been Villa De México.2017;55(17):20-32
9. Méndez, EA. (2017) Contaminación and fitotoxicidad in plants for heavy originating metals of grounds and water down,2017;17(98):56
10. Moralses, Maura Garrison Cap Fiallos. Quantification of heavy metals and microbiological quality of fruits and vegetables that expend themselves in the wholesale market of Ambat.2017's city;61(20):19-25.
11. Rodríguez. Determination of heavy metals (lead and arsenic) and trace elements (iron, copper and zinc) IN SHEETS OF Crotalaria longirostrata (CHIPILIN) FOR THE Method OF ATOMIC absorption»,2016;(279):79-98
12. Sampieri, R, Hill, C, and Baptist, L. Methodology of investigation. Mexico: McGraw Hill Interamericana. 2010;16(120):88-150