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Artículos Científicos

Qué sabe el consumidor del daño ambiental provocado por el vaso desechable y la necesidad de sustituirlo

What does the consumer know about the environmental damage caused by the disposable cup and the need to replace it

O que o consumidor sabe sobre os danos ambientais causados pelo copo descartável e a necessidade de substituí-lo

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Resumen

El objetivo del presente trabajo fue conocer la cantidad y la frecuencia con que las personas de Arandas en la región de los Altos de Jalisco emplean los vasos desechables para luego saber qué tan dispuestas están en utilizar vasos comestibles elaborados con gelatina natural. Al respecto, vale comentar que estos no solo pueden ser nutritivos para quienes los consuman (pues la gelatina es un nutriente fortificante creada a partir de la piel y el hueso de cerdos y vacas), sino que también se podrían degradar en pocos días o ser ingeridos por los animales. Para recabar la información se empleó una encuesta constituida por seis interrogantes, la cual fue aplicada a 31 personas por vía telefónica y a otras 345 de manera personal (en ambos casos se aplicaron a jóvenes y adultos). Los resultados demuestran que los pobladores de esa localidad usan considerablemente vasos de plásticos en los distintos eventos que se realizan

cada semana, los cuales son más numerosos en las fiestas patronales o de fin de año. Aun así, estas personas estarían dispuestas a cambiar estos hábitos, aunque para ello se deben tomar medidas que no afecten a las empresas de esa zona, las cuales trabajan principalmente con plásticos y generan un alto porcentajes de empleos.

Palabras clave: contaminación, desechables, gelatina, medio ambiente, plástico, unicel.

Abstract

The objective of this work was to know the amount and frequency with which the people of Arandas in the Altos de Jalisco region use disposable cups and then know how willing they are to use edible cups made with natural gelatin. In this regard, it is worth commenting that these can not only be nutritious for those who consume them (since gelatin is a fortifying nutrient created from the skin and bone of pigs and cows), but they could also be degraded in a few days or be ingested by animals. To collect the information, a survey consisting of six questions was used, which was applied to 31 people by telephone and another 345 personally (in both cases they were applied to young people and adults). The results show that the residents of that town considerably use plastic cups in the different events that take place each week, which are more numerous during the patron saint festivities or at the end of the year. Even so, these people would be willing to change these habits, although for this, measures must be taken that do not affect the companies in that area, which work mainly with plastics and generate a high percentage of jobs.

Keywords: Pollution, disposable, gelatin, environment, plastic, styrofoam.

Resumo

O objetivo deste trabalho foi conhecer a quantidade e a frequência com que os arandas da região dos Altos de Jalisco usam os copos descartáveis e a disposição para usar os copos comestíveis feitos com gelatina natural. Nesse sentido, vale comentar que estes não só podem ser nutritivos para quem os consome (já que a gelatina é um nutriente fortificante criado a partir da pele e do osso de porcos e vacas), mas também podem se degradar em poucos dias ou ser. ingerido por animais. Para a recolha das informações, foi utilizado um inquérito composto por seis questões, que foi aplicado a 31 pessoas por telefone e outras 345 pessoalmente (em ambos os casos foram aplicados a jovens e adultos). Os resultados

mostram que os moradores daquela cidade usam bastante os copos plásticos nos diversos eventos que acontecem a cada semana, sendo mais numerosos durante as festas da padroeira ou no final do ano. Mesmo assim, essas pessoas estariam dispostas a mudar esses hábitos, mas para isso devem ser tomadas medidas que não afetem as empresas da área, que trabalham principalmente com plásticos e geram um alto percentual de empregos.

Palavras-chave: poluição, descartáveis, gelatina, meio ambiente, plástico, isopor.

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Introduction

When the production of petroleum products began, it was sought to facilitate human activities. However, this initiative was never expected to cause such serious side effects or even put life on the planet at risk. Many of these products have been widely accepted and are present in all activities carried out by human beings. Unfortunately, when they are discarded, they reach lakes, rivers and seas, and affect aquatic ecosystems and their species. Plastic waste (bags, straws, bottles, etc.) (General Directorate of Documentation, Information and Analysis Services, 2019) thrown into the sea has formed a floating island of approximately 1.6 million km2, that is, three times the size from France (Lebreton, 2019). In fact, on land it is common to find organic waste mixed with bags, straws, household and industrial disposable containers, furniture, moldings, among others. In addition, and because they are not biodegradable, they have become a worldwide problem directly related to global warming and the deterioration of the environment and ecosystems.

On the other hand, many disposable manufacturing companies that use petroleum derivatives as raw materials have been establishing themselves in smaller and smaller towns, hence these localities depend on them. Likewise, it is necessary to say that due to the cost of these products, its inhabitants are excellent consumers. Due to this widespread use, every time they use a product (glass, container, molding, etc.), throw it on the ground or place it in bags mixed with household organic waste, they end up in the open-air dumps of the towns. This happens because the consumer is never explained the proper way to dispose of the plastics that have been used, which has caused great problems on the planet that are difficult to combat and even more difficult to reverse.

Although humans have always affected ecosystems, with the arrival of the disposable this process accelerated, which is evidenced in the emergence of new natural events, such as

the “boy and girl phenomena” (Vásquez, Dorado and Rosales, 1996), the inexplicable absence or abundance of rains or the red tide. All of the above has increased the danger of extinction of many species, as well as the increase in temperature, the emission of gases into the atmosphere by polluting processes in industries and vehicles, the "organic waste" that produces enormous amounts of methane and the " inorganic garbage ”of difficult degradation.

These pollutants, logically, can be seen in rural areas, fields, rivers, beaches, seas, urban areas, streets, landfills, drainage systems and water tables, which are saturated by leachates that escape from plastic cans and plasticized cardboard. To reverse these effects, new generations must be educated, who must change their habits in terms of classifying and separating garbage, recycling it and selecting cleaning and transport products that are friendly to the environment. Likewise, projects should be devised that allow finding new raw materials to replace oil derivatives.

Therefore, the objective of the present work was to know the amount and frequency with which the people of Arandas in the Altos de Jalisco region use disposable cups and then know how willing they are to use edible cups made with natural gelatin. In this regard, it is worth commenting that these can not only be nutritious for those who consume them (since gelatin is a fortifying nutrient created from the skin and bone of pigs and cows) (OKDiario, December 12, 2016), but They could also degrade in a few days or be ingested by animals.

Theoretical framework

Products that use petroleum derivatives as raw material for their production are extremely common in the lives of human beings (office, workshop, home, clothing, etc.). These were originally created to facilitate various activities, although many are used only once, so they quickly become non-reusable garbage. The international agreements promoted by the Organization for Economic Cooperation and Development (OECD) (Bremer, 2018) to avoid the use of polluting materials in the environment have been signed by Mexico, which has forced the nation to enact laws to mitigate the side effects of these products (Directorate General for Documentation, Information and Analysis Services, 2018). Those laws prohibit the use of petroleum-derived raw materials for the manufacture of Styrofoam food packages, straws and plastic bags, hence the choice for biodegradable materials.

On the other hand, the OECD establishes that in Mexico - of the total waste generated - only 9.6% are recycled, which is due to the low awareness of people to care for and improve the environment (Muñoz, 2019). For this reason, this project seeks to raise awareness about this reality in inhabitants of the town of Arandas in the Altos de Jalisco region, since its economy is based on the production of disposable products, which are distributed to others. places in the country and even to some Central American nations.

Indeed, although Arandas is characterized by its production of tequila, dairy products, carnitas and furniture, it is also true that this town currently has 20 manufacturing companies of plastic products, which have been in the region for more than 30 years and currently they generate 6000 direct jobs and 2000 indirect ones. According to the president of the National Association of Plastic Industries (ANIPAC), José Anguiano, 90% of the plastic-producing factories have the capacity and infrastructure to produce recycled plastic as raw material, but the products that serve for food containers and drinks for human consumption have to be made with virgin raw material (Ramírez Gallo, 25 de agosto de 2018).

Jalisco in the quest to ban the use of plastic containers

In 2018, the Jalisco Congress met with the purpose of analyzing and approving a bill to prohibit disposable products made with Styrofoam or plastic. The fact that the state is one of the main producers of plastic and disposable containers in the country was taken into consideration. In fact, it was foreseen that if the initiative presented by the councilor Juan José Cuevas in the municipality of Puerto Vallarta (and later the deputies of Movimiento Ciudadano, Verónica Jiménez and Lourdes Martínez) were approved, reforms to the State Law of the Ecological Balance and Environmental Protection, and the Law of Comprehensive Waste Management. This, however, would directly impact some 40,000 jobs in the sector, who could see their sources of work at risk.

For this reason, economic analysis is extremely important, since these laws affect employers, workers and families. In this type of analysis, therefore, it must be considered that with the prohibition, the companies would be affected by their contracts for the acquisition of supplies, machinery and face their debts, which would cause bankruptcy, as stated by Arturo Álvarez, president of the Plastics section of the Regional Chamber of the Transformation Industry (Careintra). According to Careintra, the municipality of Arandas in the Los Altos area is where more plastics are produced on a national scale, while Jalisco is

the main exporter of containers, packaging, packaging and disposable plastic products for the Pacific region (Romo, 31 July 2018).

The head of the Ministry of the Environment and Territorial Development, Sergio Humberto Graf Montero, endorsed the measure, but requested that a diagnosis and an action plan be prepared beforehand. To do this, one could start with straws and then continue with plastic disposable bags and disposables used in certain places (such as supermarkets) (Romo, July 31, 2018).

It is worth noting that these laws do not seek to stop economic activity, but rather to promote the generation of products using other ecological alternatives (Blanco, July 13, 2018). The objective is to ensure that entrepreneurs do not abandon the state or their economic activities, but become the first industrialists to invest in the transformation of their equipment to adapt them to new requirements.

One option, therefore, would be to use raw materials that would be used to produce "edible cups", since the current ones cannot be reused. In principle, the proposal would focus on the manufacture of gelatin cups, which can be edible or used as compost for highly organic compost.

Disposition

One of the most important information regarding the provisions on the use of plastic bags comes from the municipality of Pachuca (Mota, March 9, 2018), where the Regulation on Environmental Protection and Climate Change prohibits establishments from providing plastic bags to carry products in shops. The Pachuca delegation of the National Chamber of Commerce, Services and Tourism (Canaco Servytur) has 20,000 registered establishments which were informed that they must comply with this provision.

For its part, in Jalisco law initiatives were made to prohibit the use of plastics in the state from 2020. Before the State Congress, and due to the tons of fish and birds that die daily victims of pollution generated by plastic and polyethylene —mainly in the tourist areas of Puerto Vallarta—, deputies Verónica Magdalena Jiménez Vázquez and María Lourdes Martínez Pizano will present an initiative to gradually ban the use and manufacture of products made with plastic and Styrofoam, both derived from petroleum.

At a press conference, the deputies in the company of the councilor of the municipality of Puerto Vallarta, Juan José Cuevas García, announced that in plenary session

they would present the initiative because the use of plastic has been causing irreparable damage to the planet and the problem worsens, since More than 300 million tons of plastic are produced annually, which end up contaminating lake bodies, mainly rivers and seas.

With this proposal, it is intended to reform the State Law of Ecological Balance and Environmental Protection and the Law of Comprehensive Waste Management in order to apply it to the 125 municipalities of the state. The initiative proposes changing the use of plastics for reusable substitutes, as well as promoting the use of suitable containers and containers to avoid buying drinks and food in plastic, Styrofoam or bag; in addition, reduce the purchase of bottled water and encourage the use of water filters and improve the management of recycling from businesses and homes.

Likewise, it is expected that the beach service providers will make producers and users aware of changing plastic and Styrofoam for raw material such as gelatin; With this, the first step will be taken for its use, and later this type of products will be sought and demanded in their places of origin.

It should be noted that this initiative was expected to enter into force as of January 1, 2020. In addition, the legislators stated that industrialists will be given opportunities to make their “edible” products using biodegradable raw materials, such as corn starch.

Information processing

To collect the information, a survey consisting of six questions was used, which was applied to 31 people by telephone and another 345 personally (in both cases they were applied to young people and adults).

The first question (in both surveys) allowed establishing the number of cups that respondents use per week, since the accumulation of non-degradable garbage depends on them (Table 1).

Tabla 1. Respuestas a la pregunta número 1 (cantidad de vasos usados por semana)

# vasos	*# personas (encuesta 1)*	*# personas (encuesta 2)*
0	**7**	**19**
1-3	**16**	**150**
4-10	**7**	**26**
Más de 10	**1**	**127**

Fuente: Elaboración propia

Taking into account the figures offered in table 1, and if it is taken into account that Arandas has a population of 84,966 inhabitants "according to a population estimate of the Intercensal Survey for 2019" (IIEG, 2019), it could be said that per year in that locality an average of between 13254696 and 2'2091160 plastic disposable cups could be used. Now, according to the latest PlasticsEurope report, Plastics the facts 2018, world plastics production in 2017 reached 348 million tons (MundoPLAST, 2017). That means that the Arandas region would be participating with .0051% of world plastics production in 2017, only taking into consideration the consumption of disposable plastic cups.

On the other hand, in the second question posed to the people, they were asked about the type of material with which the glasses they use each week in different events are made (Table 2).

Tabla 2. Respuestas a la pregunta número 2 (material de los vasos usados por semana en eventos)

Tipo de producto	*# personas (encuesta 1)*	*# personas (encuesta 2)*
Desechables de plástico	**20**	**289**
Vidrio	**4**	**20**
Plástico	**7**	**36**

Fuente: Elaboración propia

The data in Table 2 indicate that the majority of the population of Arandas uses disposable plastic cups to hold their events. In this regard, it is worth noting that in this town between 5 and 10 massive events are held per week, which more than 100 people attend. These figures, however, can increase significantly in the months when, for example, the management holidays or the end of the year are held.

In question number 3 it was sought to know whether or not they knew about the damage caused to the environment by plastics that are thrown in the garbage. The results were quite encouraging, since Table 3 shows that a large number of people know what happens with the use of plastic containers.

Tabla 3. Respuestas a la pregunta número 3 (conocimiento sobre la contaminación que provocan los plásticos)

Respuesta	***# personas (encuesta 1)***	***# personas (encuesta 2)***
Sí	**29**	**327**
No	**2**	**18**

Fuente: Elaboración propia

In table 3 it can be seen that people are aware of the environmental deterioration caused by inorganic waste; The problem, however, is that even knowing this situation, it seems that in everyday life they do not apply that knowledge. This shows that the campaigns carried out through traditional or digital communication media are insufficient. Therefore, a special contribution from the school, the companies that generate this waste and the family is necessary to change these pollution habits.

In question number 4, the interviewees were asked if they would be willing to use edible cups made with environmentally friendly materials on a recurring basis. Table 4 shows that the majority are willing to make the change.

Tabla 4. Respuestas a la pregunta número 4 (disposición para utilizar productos que sustituyan a los vasos comestibles)

Respuesta	***# personas (encuesta 1)***	***# personas (encuesta 2)***
Sí	**30**	**329**
No	**1**	**16**

Fuente: Elaboración propia

Regarding the previous question, it is worth noting that many producers of biodegradable groceries use more environmentally friendly materials (BBC Mundo, December 18, 2013), some of which are mentioned below:

- Plastic "grown" from fungi: Material mixed with agricultural residues.
- Shrimp and silk disposable cups: It is a biokinetic material that takes the design and components of the shrimp shell and the silk proteins.
- Potatoes to produce plastic: It is basically a composite resin that when compressed from heat and pressure looks like plastic.
- Gelatin that is extracted from bones and skin of animals.

In question number 5, the most interesting data were obtained regarding the number of people who know the time in which a disposable plastic cup can degrade (table 5).

Tabla 5. Respuestas a la pregunta número 5 (conocimiento del tiempo en que tarda en degradarse un vaso plástico desechable)

Tiempo para que se degrade el plástico	*# personas (encuesta 1)*	*# personas (encuesta 2)*
No sé	**5**	**75**
Desconozco el dato	**2**	**53**
Depende del polímero	**1**	**2**
1 año	**1**	**10**
5 años	**1**	**1**
Más de 10 años	**1**	**1**
50 años	**2**	**1**
100 años	**6**	**1**
150 años	**3**	**1**
150-400 años	**1**	**1**
250 años	**1**	**1**
500 años	**2**	**98**
1000 años	**3**	**5**

Nota: En la encuesta telefónica contestaron 29 personas, y en la encuesta personal 250.

Fuente: Elaboración propia

In relation to the previous table, it can be said that Earthgonomic México AC (January 9, 2017) indicates that Styrofoam cups, ceramic-coated cardboard thermal cups and plastic containers made with PET have an average life span for its degradation of approximately 1000 years, while natural materials made with the banana peel can do the same process in a time of 5 to 10 days.

Finally, question number 6 focused on knowing whether people knew how difficult-to-break inorganic wastes such as plastic should be treated (table 6).

Tabla 6. Respuestas a la pregunta número 6 (conocimiento sobre el tratamiento de los vasos desechables)

Destino del vaso que se ha utilizado	*# personas (encuesta 1)*	*# personas (encuesta 2)*
Se colocan separados con todo el plástico	**20**	**240**
Se colocan en la basura mezclada con la basura orgánica	**9**	**72**
Se arrojan en cualquier lugar	**2**	**33**

Fuente: Elaboración propia

Based on the data collected in the previous question, it can be said, in general, that the younger generations who attend universities are more aware of the way in which plastic cups made with petroleum derivatives should be disposed of. While it is true that metropolitan areas there is a regulation regarding the separation of garbage by type, most people who live in other areas do not perform this classification.

Discussion

One of the main problems worldwide is the high impact of the use of materials made with plastic, especially those that are used only once. This is evident in the garbage island located in the Pacific Ocean, which is three times the size of France. For this reason, actions must be taken to change this reality, for which it is essential that biodegradable products begin to be used.

Although in many cities there are programs that promote the separation of garbage according to its type, reality shows that these recommendations are not followed in most localities. Furthermore, in many cases when waste that has already been classified by people reaches garbage trucks or landfills, it is again regrouped without following any differentiation criteria.

In summary, it can be stated that in our country people must be reeducated, for which the strategy of making them see that many of these wastes can generate income due to the possibilities of being reused either as raw material for other products or as compost or part of animal feed (in the case of biodegradable waste).

Conclusions

Due to the increase in polluting materials, different environmental programs have been established. In this research, it was very clearly established that people are willing to change their habits to adapt to the new demands of a more habitable world. To do this, one option would be the use of edible cups made with gelatin, but this initiative must be accompanied by policies and financing that help industries adopt these methods.

Likewise, courses and workshops should be promoted to educate people about the serious problem that inorganic waste is generating, which will probably cause damage that may be irreversible in a few years. With this training for the general public, they will be complying with the programs that the UN started to raise awareness among nations about the causes of climate change.

In this sense, agreements will have to be established with supermarkets, convenience stores and groceries so that they avoid selling products made from petroleum derivatives, and begin to replace them with others that are more environmentally friendly.

Of course, in the specific case of Arandas —which is located in the Altos de Jalisco region—, it must be taken into consideration that in this locality there are a large number of manufacturing plants for disposable products, which generate a large percentage of jobs.

Therefore, strenuous work must be done that, at the suggestion of some interviewees, has to be led by specialists from universities, since they are the ones who have the necessary knowledge to reverse the damage caused to the environment.

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