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# Waste Management at the Federal Institute of *Sertão* Pernambucano/Brazil: Environmental Education as a tool for environmental conservation

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***Abstract*** *— Among the products that can generate consequences to the environment is the residues of vegetable oils, generated daily in the preparation (fried) of food. The lack of information and knowledge on the part of establishments, industries and people, causes many to dispose improperly. Starting from the initial assumptions, this research originated from the discussions in the discipline of waste management of the higher course of food Technology of the Federal Institute of Sertão Pernambucano – Petrolina campus, and had as objective to make a brief Analysis, on how is the knowledge of the employees of the institution about the themes "waste management", "recycling" and "environmental conservation" and the real importance of formal and non-formal environmental education, aiming to bring sensitization Environment for the internal sectors of the Higher Education Institution (HEI), enabling a prior knowledge of the risks caused to nature and humanity, with actions inadequate to the environmental. This is an applied, quantitative-qualitative, exploratory and field nature, where data collection was obtained from the on-site visit, questionnaire application and systematic observation. Therefore, the results of the research showed that in the sectors surveyed people are aware of the consequences caused by oil residues, where they affirm that they give the correct destination in the form of waste recycling.*
***Keywords*** *— **Vegetable oil residue, environmental education, recycling, sensitization.***

## I. INTRODUCTION

Throughout history man has always used resources through the environment to meet his needs, with this situation the environment remained balanced, because it was only removed what really needed for survival. With the passing of time, the habits were changing, as well as the environment too, the technology and needs were rapidly modifying, reflecting directly in people's way of life and in the form of exploitation of natural resources (WILDNER; HILLIG, 2012).

One of the major problems for planetary society is knowing what to do with the large amount of waste that is produced in the social environment, such as the oil of vegetable or animal origin that has always been used (SEGATTO, 2013).

In this sense, the present study aimed to quantify the waste oil generated in IF *Sertão*-PE Campus Petrolina, verifying the knowledge of those involved on the subject in theory, seeking to strengthen social awareness regarding environmental responsibility.

This is an applied research of quantitative and qualitative nature, exploratory and field, where data collection was obtained from the on-site visit, questionnaire application and systematic observation.

Therefore, the research findings indicated that in the sectors surveyed, people are aware of the problems caused by waste oils, having the means to dispose of them properly and giving the correct destination in the form of waste recycling. Thus, environmental education plays an important role in raising awareness among IF *Sertão* Pernambucano - Petrolina campus, as expected by the researchers.

## II. THEORETICAL REVIEW

The waste of cooking oil generated daily in homes, industrial and establishments of the country, due to the

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lack of information of the population, ends up being dumped directly into the waters, such as rivers and streams or simply to sinks and toilets, ending up in the water systems. sewage, causing damage to the clogging of the pipes and the increase of the processes of the treatment plants, in addition to causing pollution of the aquatic environment, or even in the domestic waste, contributing to the increase of the landfill areas (CASTELLANELLI et al., 2007).

There are four usual destinations for used oils and fats: sewage, soil, water bodies and landfills. Even the most controlled form of landfill, they are improper in different degrees and factors, causing damage to human settlements, the people who live in them, the forms of governments that control them and the environment that supports them (BRAZIL, 2011). Cooking oil, when disposed of incorrectly, has great damage as a consequence, but there are still people who experience these habits and have little knowledge of such a relevant subject.

Waste, currently better called waste, is the major cause of environmental degradation and research indicates that each human being produces on average little more than one (1) kilogram of waste per day. This leads to serious environmental problems that are clearly visible in society, whether through changes in the landscape or climate around us, or through the media that daily bombards us with reports of local and global disasters and disasters (WILDNER; HILLIG, 2012).

Humberto (2007) reports in his research and points out that Brazilians consume approximately 03 (three) billion liters of cooking oil per year. In Espírito Santo, this consumption is approximately 150 (one hundred and fifty) million. Once used, some of this oil is discharged into the rainwater drainage and sewage system. This increases the cost of treating these networks by up to 45% and also causes clogging of the pipes.

The environment is already quite degraded by social development, which calls for acts that seek its preservation. Aiming to alleviate the ecological impact created by the expansion of consumption, as well as develop as economic activities arise the reverse channels. Such activities as training, conversations for awareness, recycling of waste obtained, among others, is one of the alternatives where it is possible to sensitize the population and modify the attitude of people before a highly polluting society.

For Costa Neto et. al. (1999), waste recycling is gaining increasing space, not simply because waste represents low-cost raw materials, but mainly because the effects of environmental degradation due to industrial and urban activities are reaching ever higher levels. alarming. Materials that pose a risk of environmental pollution and therefore deserve special attention include vegetable oils used in dipping frying processes.

Environmental issues are currently the subject of debate and concern in communities, as there is awareness that the fragility of nature endangers human survival. Therefore, it is necessary nowadays, the elaboration of sustainable alternatives, in order to sensitize the population about the incorrect disposal of waste oil, through environmental education.

According to Dias (2006), this is a set of activities that seek to inform and sensitize people about this complex theme, encouraging involvement in actions that promote sustainable habits of natural resource use, as well as providing reflections on the relationships of the human being. human-environment.

In this sense, it was important the development of research on environmental education and recycling of frying oil to verify and be able to sensitize the people who work daily with this product generating waste, so that they acquire knowledge regarding the proper/ inappropriate disposal, as well as the benefits/harms that can bring to the environment.

## III. MATERIAL AND METHODS

### 3.1 LOCATION OF THE RESEARCH

The research was conducted at the Petrolina campus of the Federal Institute of Education, Science and Technology of *Sertão* Pernambucano (IF Sertão-PE), from August to December 2018, targeting servers located in the sectors surveyed. IF *Sertão*-PE is located in the city of Petrolina, State of Pernambuco/Brazil.


*Map 1 – Geographic Location of the community Wall*

Source: Institutional Site (2019)

The Federal Institute of Education, Science and Technology of Sertão Pernambucano (IF SERTÃO-PE), created under the terms of Law No. 11.892 of December 29, 2008, is a specialized, pluricurricular and multicampi

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higher education institution. providing vocational and technological education in different teaching modalities, based on the combination of technical and technological knowledge with their pedagogical practices, which aims to improve the systemic action of education, internalize and socialize knowledge, popularize science and technology, developing local social and cultural productive arrangements, focusing on reducing inter and intra-regional social inequalities (LETTER OF SERVICE/IF SERTÃO-PE, 2015).

### 3.2 METHODS AND MATERIALS

This article deals with the environmental consequences of improper disposal of vegetable oil residues generated daily in the preparation (frying) of foods. This is a quantitative and qualitative research, exploratory and field, where the instrument used in data collection was the form with closed questions, as well as the method of observation and recording from photographs. Furthermore, such research is essentially based on method of Discourse Analysis and of Content of Bardin (2009).

In order to verify the environmental sensitivity and responsibility at the Federal Institute of Sertão Pernambucano - Petrolina campus, as well as to check the knowledge of those involved in the disposal, recycling and final destination of cooking oil waste, an on-site survey was conducted. investigated directly with those responsible for the respective sectors that produce the waste.

The work was divided into stages, from which a survey was first made of the sectors that produce the waste at the Institute. Soon after this verification, the interviewees were presented with an Informed Consent Form - ICF, this term is necessary for the interview participants and/or legal guardian to be sufficiently informed of all benefits, risks and procedures relevant to the research, protecting both the participant as well as the researcher.

After signing the consent form, the interview was held containing 10 (ten) questions pertinent to the theme. The questionnaires were applied as a data collection instrument in the following sectors: Internal canteen, external canteen, Institute cafeteria, LEA (Experimental Food Laboratory) and Chemistry Laboratory, the latter is responsible for collecting, treating and recycling waste. produced on campus, and also collects this waste at establishments outside the Institute.

After collecting the data, they were analyzed and discussed based on the literature relevant to the theme, besides having been presented in the classroom, in the Waste Management discipline, the results found in the field research. The results show that the institution is still far from achieving environmental sustainability with regard to the disposal of oils, however, there are already isolated actions and great impact.

## IV. RESULTS AND DISCUSSIONS

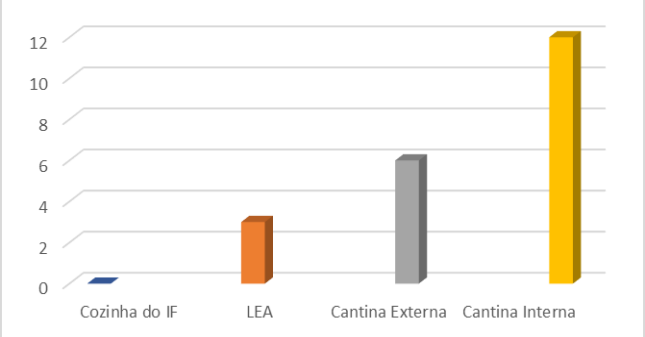
The present work was structured in two moments. Initially a survey was conducted in relation to the sectors that would be applied to the interview. In a second moment, the intention of the research along with the Informed Consent Form (ICF) was presented and afterwards, the questionnaire was applied.

The sectors have an average of 05 (five) employees, with an average age between 30 and 55 years, where all divided the daily activities. It was noted that the level of education varies depending on the position and requirement for admission. Employees in only one sector have elementary and secondary education. Employees in other sectors have higher education, specialization and masters, which shows that most of the group has a higher degree of education.

The forms in question had 10 (ten) questions, with the purpose of obtaining information on the level of awareness of the local employees regarding the destination of the waste generated from the sectors, as well as the process of separation and disposal.

Graph 1 shows the sectors that participated in the field interview and which of these generate the most waste monthly.

*Graph 1 - Sectors that participated in the survey*




Source: Authors (2018)

The second question was related to waste management, segregation and packaging, where it was verified that all sectors carry out this activity and store the waste in polyethylene and ethylene terephthalate, thus leaving it reserved in their own places and in visible spaces.

According to Felizardo (2003) this practice of disposing the oils used in a plastic bottle is a very simple alternative to be performed, regardless of whether it is

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recycled waste or for disposal, the organic waste is betrayed, and the bottles will be opened and leaked to a suitable location rather than being discharged into the sewers, thus avoiding unnecessary wastewater treatment at sewage plants.

The third question of the questionnaire was about the identification of packaging with waste, and unfortunately it was realized that there is no knowledge on the part of employees about this importance. In none of the sectors were the packages packed in the places identified.

Accordingly, in August 2005, the Federal Senate Gazette published Bill nº. 296, authored by Senator Valmir Amaral, which "provides for the obligation to include on the label of edible oil packaging a warning about the correct destination of product after use" (BRAZIL, 2005). Said Law decrees that the label of edible oil packaging shall contain a legible and visible explanatory note about the convenience of packaging the product, after use, in closed plastic bottles, as well as for organic waste such as avoid contamination of water resources.

In addition, the aforementioned Bill serves as a warning for companies and establishments to prepare themselves with correct habits, where there is a high probability that they will have to take responsibility for their products during all phases of their life cycle, including disposal.

Regarding the fourth question, you asked yourself whether or not there is any treatment for the oil, either for recycling or for disposal. Two sectors interviewed showed that the treatment that the waste receives is the removal that materials generated from frying by food, that is, are removed by filtration, but neither a standardized procedure, the other sectors simply segregate and store without any treatment.

However, the standardized process does not happen for a variety of internal reasons, but not for lack of current legislation addressing the issue. An example is the so-called "Waste Law" Law nº. 12.305/2010, which establishes the National Solid Waste Policy (PNRS). In practice the law states that all waste, domestic or industrial, must be properly processed before final disposal, ie needs treatment. Also, that cannot be used after the treatment or recycling process are called tailings, and should go to landfills, co-processing, incineration, etc. (BRAZIL/PNRS, 2010).

Since waste is not treated properly through composting and recycling, the waste accumulated loses characteristics that could be harnessed for energy production or reapplication. For example, waste can become proven organic fertilizers for use in agriculture. Energy can also be produced through waste treatment, gas to supply homes, among other potentials lost by not reusing the waste.

The next question, fifth, was related to the person responsible for the collection of the waste, where it was verified that there is no collection by the public sector in the institution, and how the waste is recycled, a collaborator responsible for the "Chemical Laboratory" sector collects this waste from sectors: IF Kitchen, LEA (Experimental Food Laboratory) and Internal Canteen. This gathering is held weekly, as the students in the area of Chemistry Degree develop projects aimed at recycling vegetable oil residues, producing bar soap and also in liquid, with various pleasant odors, thus drawing the attention of other students regarding awareness about recycling and proper disposal of waste.

According to Alberici and Pontes (2004) and Almeida (2002), if the waste is not disposed of properly and done in the sewage collection system, the oil accumulates in the pipes forming a crust, contributing to its obstruction, and consequently, damage to society and especially to the environment.

For the removal of oil or unclogging of the pipes, which must be performed periodically, toxic chemicals such as caustic soda are used. Such measures increase the cost of sewage treatment, as well as contribute to the occurrence of floods and disease proliferation, if the clearing of the pipe does not occur in a timely manner. The presence of oil in treatment plants impairs the biological secondary treatment of sewage, as it impairs the biological processes.

Having all this information, it was clear, in some sectors, that there is a need for clarification on the environmental pollution questions caused by improperly discarded oil, since the consequences of this action may not yet be known.

Thus, the idea was passed that recycling alone cannot be considered the solution, but that changing habits and attitudes can lead society to take more comprehensive and responsible measures, with actions that minimize the amount of waste. in the generating source itself, recycling and reusing the surplus oil, hoping to contribute to the improvement in the handling and less polluting destination of this waste.

## V. CONSIDERAÇÕES FINAIS

According to Boff (2004) Environmental Education has become essential for the population as it claims and prepares citizens to demand social justice, national and planetary citizenship, self-management and ethics in social relations and with nature.

Embasada nessa premissa, constatou-se que nos

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setores pesquisados as pessoas estão conscientes dos problemas causados pelos resíduos de óleos, possuindo meios para descartá-los adequadamente e dando a destinação correta na forma de reciclagem dos resíduos. Sendo assim, a educação ambiental tem um papel importante na sensibilização por parte do IF Sertão Pernambucano – campus Petrolina, como era esperado pelos pesquisadores.

Entretanto a comunidade acadêmica pode ampliar esse conhecimento sobre a educação ambiental sensibilizando, não só a comunidade interna, mas também as comunidades circunvizinhas, que além de aprender a conservar o meio em que vivem, podem adquirir uma forma de obter uma renda extra através da produção do sabão/detergente, além destes, o óleo usado pode ser transformado em biodiesel após um longo tratamento, ser aproveitado para fazer tinta e ração para animais.

Other incentives and awareness-raising should be developed in this regard, as cooking oil waste from various sectors of society is an extremely polluting product when improperly disposed of. Therefore, solutions are needed to enable their recycling, ensure environmental conservation and, as a consequence, promote economic and social development.

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