Impact of Research Regarding the Processing of organic waste resulted from food industry in the North - East , South-East and Center Regions of Romania in Particular, in Relation to Consumer and Environmental Protection

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Abstract

The paper aimed to estimate the social impact on the quality of the environment, with the presentation of the advantages that we envisage for the population of the North-East , South-East and Central Regions of Romania.This research was regarding the regeneration of organic waste from the food processing. The study has followed the dynamics of organic waste during the period 2011-2014, waste management at the level of the communities and the transformation efficiency of Regional organic waste into useful materials.

To investigate the effectiveness change of waste food we study the communities in Iasi, Suceava, Neamt, Vaslui, Bacau, Botosani, and same communities in Constanta, Tulcea, Buzău, and the communities in Alba Iulia watching: data recorded by the Agency of Environmental Protection.

Calculation of indicators: level of air contamination, level of CO_2 and anothers, level of water contamination and soil in the Regions of Romania and the efficiency of the regenation.

Key words: organic waste, food processing, household consumption, public nutrition
J.E.L. classification: L 66, Q13.

1. Introduction

Between 2009-2014 Consumer Protection Association from Romania has setting as main directions of interest, carrying out activities in the following areas: collective actions, contracts made by consumers, digital rights, food and food safety, health, financial services, energy sustainability. Furthermore, consumers in Romania can be found in the situation as a population less than informed, least protected as a result of lack of Consumer Protection Association from Romania and the National Authority for Protection of Consumers, the National Institute of Public Health to reduce risk factors relating to environmental quality, affecting the health status of the population.(for example: comtamination of air, water and soil with organic waste and hazardous waste which are easily perishable). (A.N.P.C., 2014)

2.Experimental

So that, we analyzed the current stage of the resulting waste in food, nutrition, health and domestic consumption of the population between 2009-2013, as well as the influence of the pollutants. We followed the study directed through monitoring of organic waste and monitoring of

the contamination of air and water with harmful substances. Synthesis and correlation parameters monitoring aimed at highlighting the impact that these indicators influence the quality of life of consumers, who make up the population of North-East Region of Romania, compared to South-East Region and Center Region. The proposed research is justified by the fact that the activities carried out at the National Institute of Public Health at the level of the years 2011-2014 covers the following aspects: they prevented diseases associated with risk factors of living environment, identified new risk factors from the environment and proposed preventive measures by means of research, benefits and public health services. Also, they are implemented programs of intercomparare laboratories for the quality of the drinking water and development of normative documents in specific areas of responsibility harmonization with European legislation in this field. In this work we studied the achieved quality of life indicators and improving their efficiency in economically and socially terms. This objective will have a major impact on the health status of the population, meeting the needs of people's consumption and redusing of risk factors for the health of the population.

Romania shall ensure compliance with the requirements of Directive 98/83/EC, with the interim objectives set out in the Accession Treaty. The data presented refer to drinking water, atmospheric air and regeneration of organic waste from the food processing industry. Thus, the parameters monitored according to law 458/2002 and republished under no.974 H.G.R./2004, in major counties were the following: coliforms, Escherichia Coli, Enterococci, Clostridium Perfringens, total Cyanide, total Cr, Cu, Fe, Ni, Nitrates, Nitrites at treatment station, Nitrites in the distribution network, (NO2-NO3), Pb, Al, NH4,, Chlorides, conductivity, taste, smell, colony count 22 ° C and 37 ° C, pH, turbidity, oxidability. (Degeratu and al., 2014; Codreanu and al., 2014)

3. Results and discussions

Water pollution. Figure 1. Drinking water taken into the study had not-conformity of microbiological standards and it noted that the level of contamination with Escherichia Coli reached high values in the Brăila County, followed by 0,76 Botosani 0.42, while the level of contamination with Enterobacter is greater for Constanta 0,92, Botosani 0.5 0.58 and Alba.

Figure no.1. Contamination of water between 2011- 2014 with Escherichia Coli, Enterocochs and Coliforms non-complinat samples
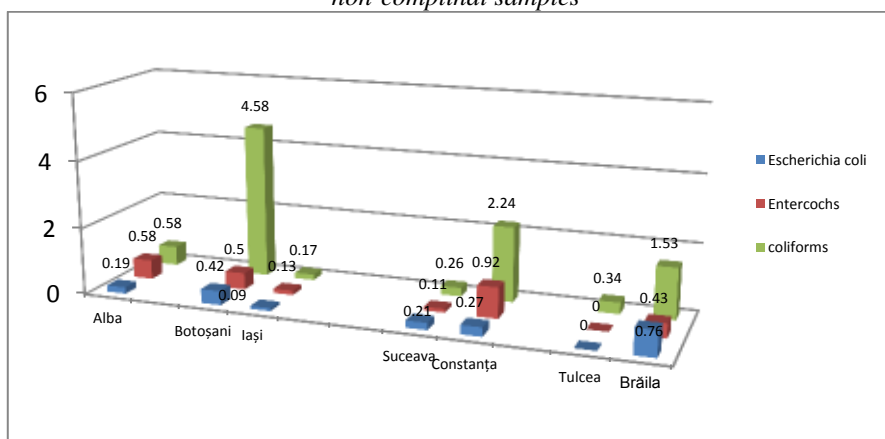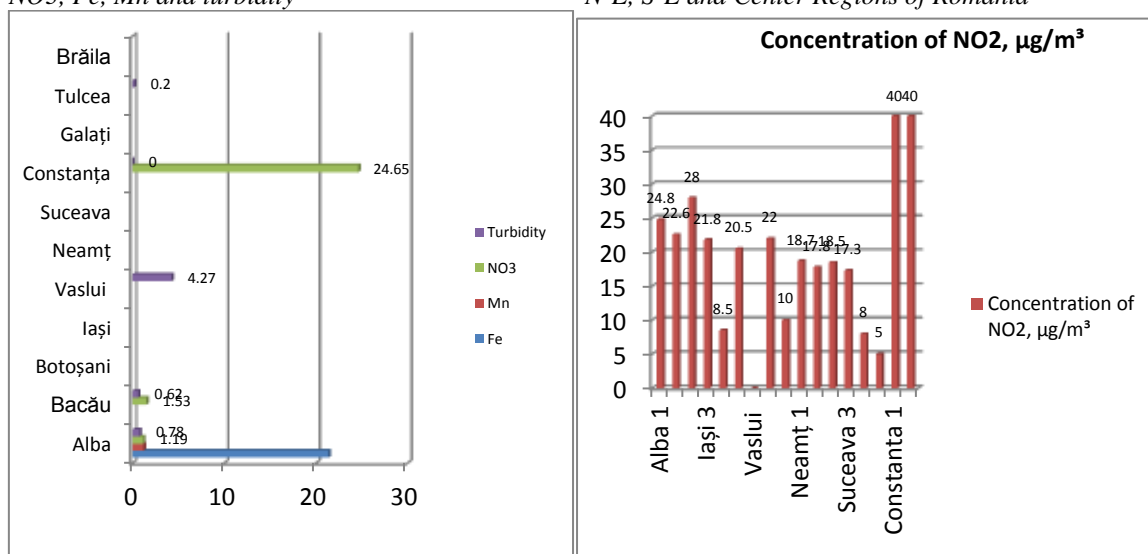

Source: National Reports Regarding the Environmental in Romania 2011-2014

If the level of contamination by coliforms have been on the first place in Botosani 4,58, the second placed by Constanta 2.24, and the third place by Brăila 1,53. The contamination of water with the highest level of nitrites can be observed in Constanta 24,65%, Fe and Mn contamination is at the maximum level at Alba (Fe -21,38% and Mn-1.24%) and the maximum turbidity is registrated from Vaslui of 4,27%.(3) (Figures 2,3). So, the contamination of drinking water with household waste in the three regions of Romania, North-East Region, South-East and Center show that the water contamination exceeds the limits specified in the standards of quality of microbiological contamination(4) with either by Escherichia Coli, Enterococcus, fecal coliforms

(Botosani, Brăila, Constanta), and the limits of contamination with metals Mn, Fe, and nitrites (Constanta, Alba, Vaslui).

Figure no.2. Levels of contamination water with Figure no.3.Average concentration ofNO2 in
NO3, Fe, Mn and turbidity   N-E, S-E and Center Regions of Romania

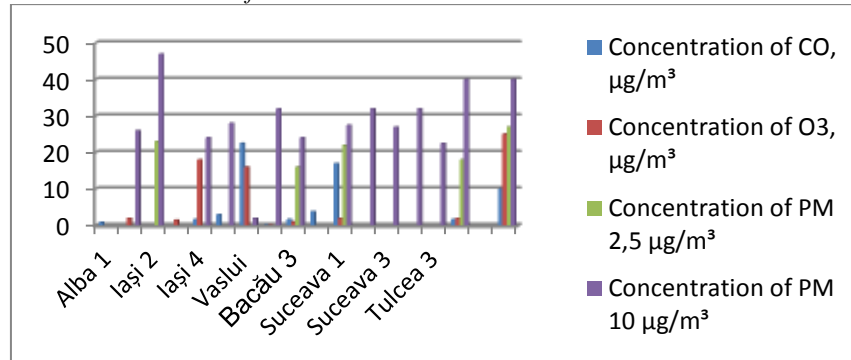*Source:* National Reports Regarding the Environmental in Romania 2011-2014

The supply of drinking water from individual sources is presented in more than half of the sample which represent a percentage of 51,3%. of the total number of 639 people who have their own source of water fountain, 237 water consumed directly from the fountain of 37.1%, more a number of 368 people who consume well water but have its own plant with water pump and distribution drinking water through the faucet. The correct disposal of household waste water is an important condition of environmental sanitation, protecting the soil and surface water sources from pollution caused by toxic risk with detergents, disinfectants, insecticides as well as pathogens the most part of intestinal origin. The presence of a septic tank for domestic waste water collection occurs in a number of 431 people, or 34,6% representing housing from residents included in the sample. Water pollution is a process of deterioration of the quality of physical, chemical or biological harmful substances, produced by a human activity, the waters become unfit for use. (Mali and Shumka, 2013) The biggest impact of surface waters, particularly in regards to pollution by organic substances and nutrients (nitrogen and phosphorus) are the 22 human agglomerations in Romania, with a population of more than 150,000 inhabitants equivalent (l.e.). (A.N.P.M., 2011-2014)

Air pollution is generated by the atmospheric pollutants which in the assessment of ambient air quality are: sulphur dioxide (SO2), nitrogen dioxide (NO2) and oxides of nitrogen (NOx), total suspended particulates (PM10 and PM2,5), Lead (Pb), Benzene (C6H6), Carbon monoxide (CO), Ozone (O3), Arsen (As), Cadmium (Cd), Nickel (Ni), polycyclic aromatic hydrocarbons (PAHs)/Benzo (a) pyrene (BaP), Mercury (Hg). In 2012, the assessment of ambient air quality in Romania registered permanent through 138 stops automatic forming part of the national network of air quality Monitoring (R.N.M.C.A.) and distributed throughout the country.

A more ambitious commitment to reduce emissions of greenhouse gases by 30% (5) can be assumed condition, in 2020, the conditionality linked to the conclusion of a comprehensive and global agreement for the post 2012 period, through which other actors will assume comparable commitments and will coverage of the necessary costs for the less developed Member States (including Romania) of European funding. The starting point for determining the target on the reduction of GHG emissions by 2020 was the study on the development of national and sectoral forecast emissions of sulphur dioxide, nitrogen oxides, volatile organic compounds, ammonia, dust and greenhouse gases in the years 2010, 2012, 2015, 2020. The energy Sector has been estimated at a rate of 39% of the total emissions of CH4. The waste sector contributed with 22% and the agriculture sector with 39%. (I.S.P.E., 2011)

Between 2012-2030 these proportions are almost constant. Therefore, these sectors are subject for the measures to reduce the emissions of CH4. Contamination of atmospheric air with harmful substances affected the human health as follows: maximum concentration of N2O Tulcea station 3, average concentrations at Iasi stations 3, Alba 1 and 3, followed by Bacău, Suceava, 1 si 3, which do not exceed the permissible annual limit. (Figure 3)

Figure 4 - Average concentration of CO, O3, PM2,5, PM 10 in N-E, S-E and Center Regions of Romania between 2011-2014

Source: National Reports Regarding the Environmental in Romania 2011-2014

Figure 4 shows us that the values of CO in atmospheric air are exceeding the permissible maximum at Vaslui by 22,56 µg/m3, after that all values are lower and acceptable compare to standards. O3 concentration reached highest level in Iasi and Vaslui station 4, but the concentration does not exceed the permissible annual limit of 25 µg/m3. If suspended particulates PM2.5 the highest value was recorded at station 2 from Iasi, followed by Constanta station 1, but has not exceeded the permissible of 27µg/M3. Contamination by particles PM 10 suspended indicates that at the Iasi, Constanta was exceeded the limit accepted annually. In Alba county does not recorded other non-compliant situations. Agriculture is the main source of NO2 emissions (approximately 70% from total NO2 emissions), followed by industrial processes (approximately 20%). In Romania, the main air pollutants are particulates of nitrogen, oxides and sulphur dioxide. Particulates of small size (less than 10 microns) are the fractions that may have an impact on the population's health, in particular at the level of the upper airway, while those under 2.5 microns in size (breathable). Those can penetrate the pulmonary alveol to level up with irreversible effects both locally and systemically, depending on other pollutants that can be adsorbed on their surface.

Between 1997-2008 13-62% of Europe's urban population has been exposed to concentrations of suspended particulates (PM10) in ambient air which have exceeded the limit values for the protection of human health laid down in European legislation.(N.I.H.P.R., 2011-2014)

Figure no.5.Indicators of waste generation in people in the most importantRomania between
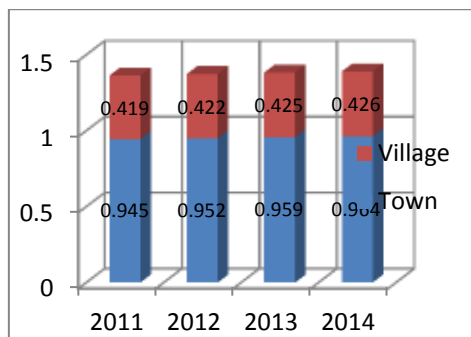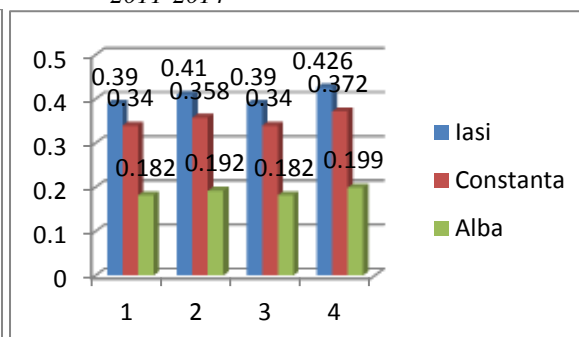
Figure no.6. Quantity of waste generated -tones/head village from N-E, S-E and Center Regions of Romania 2011-2014

Source: National Reports Regarding the Environmental in Romania 2011-2014

The health indicators have given us the monitoring of the cardio-vascular, respiratory diseases and mortality of the people. (Moga and al., 2013) In Figure 5 the development of organic waste generation in the urban environment shows that their level is between 0,945 (2011) until 0,964 (2014) being greater with 55,66% to 55,80% from rural area. (Directive 86-278 CEE)

Figure 6 shows the quantities of waste generated per capita in most major cities in the three regions, noting the change in descending from a higher share in Iasi, compare to Alba. The quantity of waste results in those 4 years was registered an increasing.

Figure 7- Impact indicators of the health of methemoglobinemy cases between 2011-2014
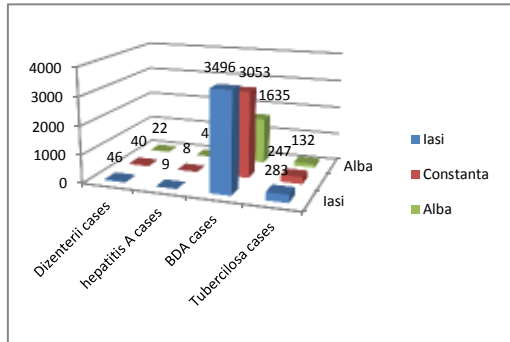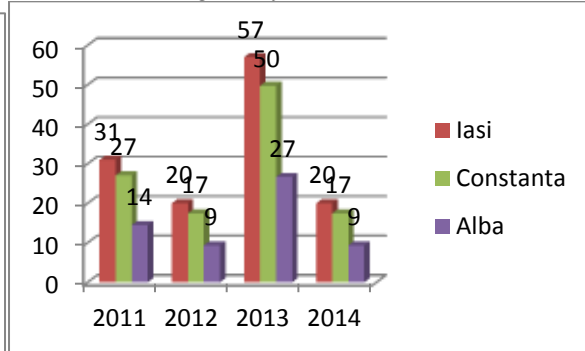
Figure 8- The evolution of Peoplein the North-East, South-East and Center Regions of Romanian between 2011-2014

Source: National Reports Regarding the Environmental in Romania 2011 -2014

Figure 7 illustrates the impact of the health indicators of the population during 2011-2014, which is maximum in the case of BDA, the dysentery and hepatitis A. Cases of methemoglobinimy (Figure 8) is seen an increasing until 2013 where records highest level and then a sudden drop in 2014 and an increasing, too in 2011. (A.E.P. Iasi, 2012) Figure 9. Specific morbidity in Romania between 2010-2014 is accented for BDA type diseases, hepatitis A, dysentery, giardiosis and non-existent for leptospirosis, and trichinosis.

Figure 9 -Specific morbidity in Romania between 2011- 2014
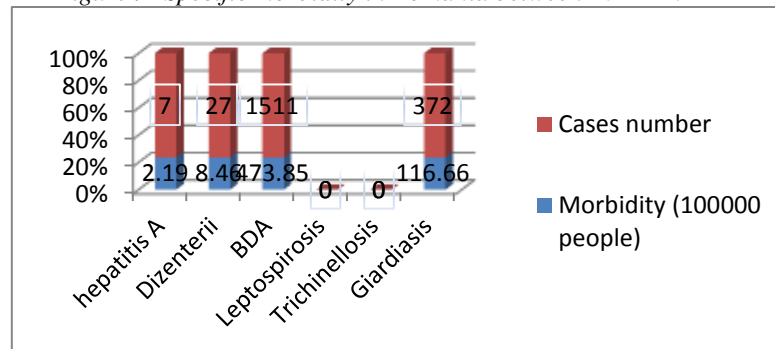
Source: National Reports Regarding the Environmental in Romania2011 -2014

4. Conclusions

In conclusion the evaluation of the quality of the environment and the possible influence on population health identified four priorities: climate change, nature and biodiversity, waste, natural resources and environment, health and quality of life. All environmental facts determinants and their changes will be reflected in the health of the people and thus in quality of life.

✓ Level of contamination with Escherichia Coli reached higher values in the Brăila, followed by Botosani, while the level of contamination with Enterobacter is greater for Constanta, Botosani, and Alba. Level of contamination by coliforms ranks firstly in Botosani, secondly at Constance and thirdly position in Brăila.

✓ The contamination of water with nitrites can be observed at the highest level in Constanta, Fe and Mn contamination was the maximum at Alba and the highest turbidity was in Vaslui.

✓ Contamination of drinking water with household waste in those three regions North-East, South-East and Center from Romania shows that the water contamination exceeds the limits specified in the quality standards of microbiological characteristics with either by Escherichia Coli, Enterococcus, Coliforms in Botosani, Brăila, Constanta and the limits of contamination with metals Mn, Fe, and nitrites in Constanta, Alba, Vaslui.

- ✓ Contamination of atmospheric air with harmful substances affected the human health as the follows: maximum concentration of N2O in Tulcea 3, average concentrations at Iasi station 3, Alba stations 1 and 3, followed by Bacău, Suceava stations 1 and 3, which do not exceed the permissible annual limits. (Figure 3)
- ✓ The values of CO in atmospheric air are exceeding the permissible maximum at Vaslui 22,56 µg/m3, after that all values are lower and acceptable by characteristic of standards. O3 concentration reached highest level in Iasi and Vaslui, but the concentration does not exceed the permissible annual limit of 25 µg/m3. If suspended particulates PM 2.5 the highest value was recorded at Iasi station 2, followed by Constanta, but has not exceeded the permissible 27µg/M3. Contamination by particles PM 10 suspended indicates that at the Iasi, Constanta stations 1and 2 exceeds the limit accepted annually; Alba county do not recorded another non-compliant situations.
- ✓ Between 2011-2014 impact of the population health indicators have had maximum level in the cases of BDA, dysentery and hepatitis A (figure 7). Cases of methemoglobinemy (Figure 8) is seen an increasing until 2013 where record highest level and then a descending level in 2014 up to the year 2011. In Romania, between 2011-2014, specific morbidity is accented for BDA type diseases, hepatitis A, dysentery, giardiosis and non-existent for leptospirosis and trichinosis.
- ✓ Prezently, in Romania health indicators didn't told us more about the health safety of the inhabitans. So that, it is neccesary to make in the future an advanced research about the corellation of registered medical data from the health system and the data from the parameters monitoring of the environmental.

5. References

1. Codreanu, M.D., Popa, D., Codreanu, I., Turcitu, M., 2014. Study Concerning the Ecotoxicological Impact of Nitrates-Nitrites Fertilisers on Animal Health, www.Content Jepe-journal.htm, No.1, p.116
2. Degeratu, M., Georgescu, A. M., Bandoc, G., Alboiu, N.I., Cosoiu, N.I., Golumbeanu, M., 2014. Atmospheric Boundary Layer Modeling as Mean Velocity Profile Used for Wind Tunnel Tests on Contaminant Dispersion in the Atmosphere, Journal of Environmental Protection and Ecology vol.14, No.1, p.22., www.Content Jepe-journal.htm
3. Feroze, N., Kazil, M., Iqbal, W., Muhammad, S., 2014. Adsorption of Toxic Heavy Metal on Waste Tire Crumb, www. Journal of Environmental Protection and Ecology vol.14, No.1, p.85
4. Karaslavova, E., Dimitrova, T., Donchev, N., Teneva, B., 2013. Influence of Some Meteorological Factors on Mortality from Cardio-vascular Diseases in the City and in the Region of Plovdiv, www.Content Jepe-journal.htm vol.13, No.3, p.323
5. Mali, S., Shumka, S., 2013. Possible Management of Fecal Coliform Pollution in the Shkumbini Basin Following the WFD Guidelines, *Journal of Environmental Protection and Ecology,* vol.13, No.3, p.1289
6. Moga, M., Vasile, I., Bigiu, N., 2013. Pregnancy Outcome and Maternal Methemoglob in Levels, www.Content Jepe-journal.htm vol.13, No.3, p.341
7. Prada, F., Brata, S., Tudor, D.F., Popescu, D.E., 2013. Reducing of Gas Emissions according to the EU Energy Policy Targets, www.Content Jepe-journal.htm, vol.13, No.3, p.209
8. Agency of Environment Protection (A.E.P.) Iasi, 2012. Data collection regarding municipal waste in 2011, 2012, 2013, 2014. Iasi: www. Agency of Environment Protection.
9. A.N.P.C., 2014. www.Asociatia_Nationala_de_protectia_consumatorului,ro
10. Annual reports of National Institute of Health Public in Romania (N.H.P.R.) 2011, 2012, 2013, 2014 Bucharest;
11. Council Directive of 12 June 1986 on environmental protection, in particular of the soil, when sewage sludge is used in agriculture (86/278/EEC) www.Directiva 86-278 CEE
12. Institute of Studies and Power Engineering (I.S.P.E.), 2011. Study to analyze the actual situation of the effects of sewage sludge use in agriculture. [pdf] Bucharest: Institute of Studies and Power Engineering;
13. National Report Regarding the Environmental in Romania (A.N.P.M.), 2011-2014: www. Agency of Environment Protection