EFFECTS OF FOOD CONTAMINATION WITH DIOXIN ON THE ROMANIAN MILK MARKET

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Milk products contaminated with dioxin scandal is an example of how the milk market may be substantially affected by intense rumour in the media broadcast. Although the crisis was recorded at a multinational company, the lack of maturity of the local market and improper management led to significant loss in image, lower consumer confidence and substantial decrease in sales. The positive effects are increased consumer focus on buying, check the information contained on the label, check demanding products for children.

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Jel code: M16, M21

Introduction

The term *dioxin* contains a group of over one hundred substances having close chemical structure and biological effects. The substances generically called *dioxins* are potentially toxic, teratogenic and carcinogenic. The most toxic dioxin is *2,3,7,8 tetrachlorodibenzo – p - dioxin* (TCDD) - Orange Agent, a defoliant herbicide used by USA in Vietnam war for the destruction of vegetation in the jungle. The International Agency for Research in Cancer (IARC) classified the compound TCDD in Group 1 (carcinogenic for people) and the other dioxins in Group 3 (unclassifiable as carcinogenic for people). Polychlorinated biphenyls PCBs as a group are classified in group 2A (probably carcinogenic for people). Moreover, IARC has recently classified the compounds 2,3,4,7,8- pentachlorodibenzofuran and 3,3′,4,4′,5-pentachlorobiphenyl in Group 1. It is considered that these substances are carcinogenic, but not genotoxic. In nature dioxins exist in reduced quantities, following combustion processes or by natural way, by degradation of household wastes (all the products from the range of plastic materials, rubber products etc.) and fuels. In normal conditions the concentration of dioxins in air is low and does not present a major risk by direct inhaling. In environmental air it is estimated an average level of 0.1 pg/cubic meters for dioxins and furans, which can lead to a contribution of about 0,03 pg/kg/day of body weight *(Monbiot, 2013*)

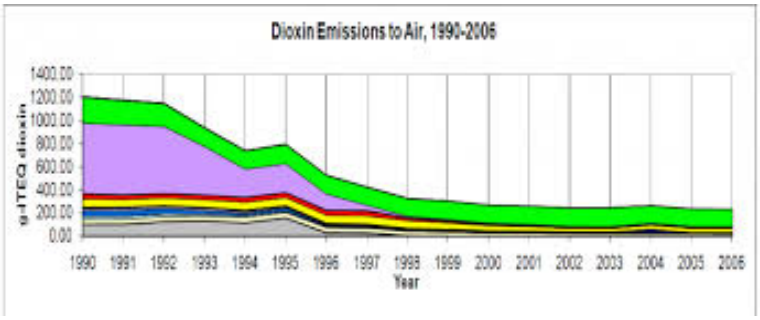

Figure 1. Dioxin emission to air, UK, 1990 -2006 (*http://www.monbiot.com/2013*)

These values can significantly vary depending on the environmental pollution, it can reach a level 20 times higher in industrial and urban areas. Even at these concentrations in the air it does not present risk for health by direct inhalation, but these concentrations can increase in environment by bioaccumulation processes. The concentration of these compounds in water/their contribution to drinking water is very low, being hardly soluble in water. The presence of these compounds in water must not be neglected, because they can accumulate in sediments.

During the last 15 years, WHO, through the International Programme on Chemical Safety (IPCS), has established and regularly re-evaluated toxic equivalency factors (TEFs) for dioxins and related compounds through expert consultations.

A series of industrial processes can lead to the appearance of this pollutant – the production of PVC and organ-chlorinated substances (pesticides), paper whitening at paper factories etc.
The substances from this category can concentrate in the food chain. The animals, which are at the top of food chain, can contain by bioaccumulation concentrations of hundreds and thousand times higher than plants, water or soil. The main source of dioxins for people is food. Dioxins can get to plants from the air, water and soil, and from there directly to people, either indirectly by using plants as fodder for animals.

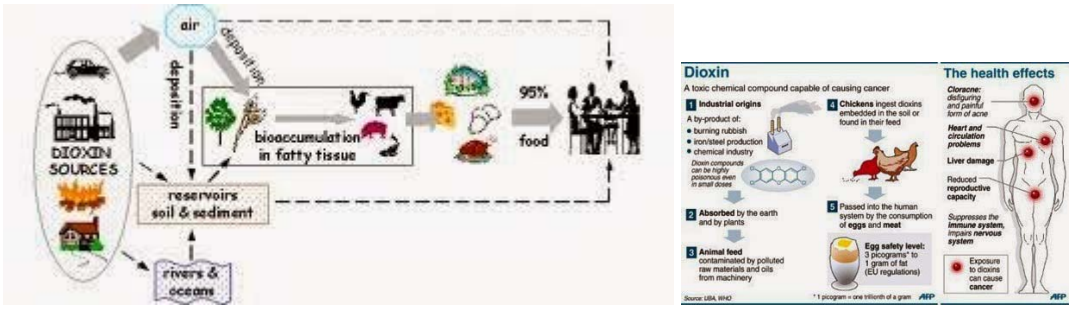

Figure 1. Sources of dioxin contamination and the health effects *(http://1.bp.blogspot.com, 2013)*

The food products of natural animal origin (fish, game) can contain a high level of dioxins because of bioaccumulation and bioconcentration processes from environment and ingested food, especially in case of predators. Higher concentrations of dioxins are encountered in products of animal origin, especially meat, dairy, fish, molusk, persisting in fat human tissues because of solvency in fats, with half time in people of 7 years. Calculated as toxic equivalent, the contribution of dioxins in European countries is 1,5-2 pg/kg weight/day. If we take into account the PCBs type dioxin, this contribution is 2-6 pg/kg weight/day. This contribution is significantly higher in case of large populations consumers of animal food (fishermen from Baltic Sea, Inuits from Antartics).

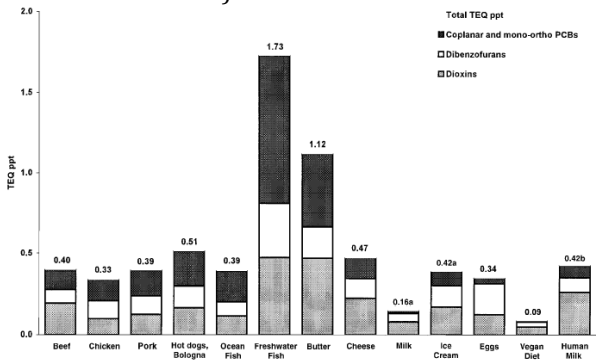

Figure 2. Levels of Dioxin in U.S. Food Supply (1995) (*Chart by Schecter et. al., 2001)*

The identification and quantification of dioxins imply sophisticated methods of analysis. The main methods of analysis used so far are: Gas chromatography with high resolution mass spectrometry (GC-HRMS) is the most precise method, with high sensitivity and specificity, being the accepted method of confirmation of the level of dioxins in food, according to EU Norms.

Tandem mass spectrometry (GC-MS/MS) with capture of ions is a less expensive procedure than the previous one, but with a lower sensitivity (at least 30 times), which can be used only for analysis from environments in which higher concentrations are expected and the applicable limits are also higher;

Gas chromatography with high resolution mass spectrometry (GC-MS) can be used only for compounds and for environments where higher concentrations are expected and where the applicable limits are also higher.

Bio-tests (CALUX, EROD, Ah immunotest, enzyme immunotest) determine globally and directly the toxicity of compounds, but cannot determine the compounds and their concentration in a differentiated way.

In Germany a scandal broke out because of polluted nutritional products for animals. By the end of the year, it was noted an unacceptable increase in the content of dioxin in some German food products of meat, milk, eggs offered for consumption, caused by German nutritional products for animals. The nutritional products came from two factories from the land Northern Rhenania - Westphalia, closed down by the authorities after the scandal.

Milk sector in Romania

Being estimated at about 800 million euro, the milk market in Romania is dominated by Danone, followed by LaDorna, Friesland, Albalact, Brailact and Covalact and a series of small and regional players, with very low market shares.

Danone is present on local market with the ranges of products Activia, Nutriday, Actimel, Frutissima, Danonino, Danette, Casa Bună, Cremoso and traditional range Danone Sana, Danon butter milk, Danone, Sour Cream and Danone Fresh Milk, and the company is planning to launch new products which diversify the range already held at local level, following the current trends of consumption directed especially toward ranges of products as varied as possible and with higher added value.

According to the company, Romanians consume 1,300,000 units of products Danone every day, made in a production centre from Bucharest. The factory Danone was opened in 1998 and processes every day the milk of 200 collection centers, all over the country. Danone also holds one of the two factories of Romania which own a EU certificate, which allows exporting the milk in countries such as Croatia, Serbia, Moldova, Albania or Bulgaria. The main player on milk market in Romania dealt in 2007 with a strong scandal, mainly mediatic scandal, in relation to the possibility that some of the products made in the factory from Romania may be unsuitable for human consumption.

On 18th August 2007 two batches from the range Delicios – yoghourt with sour cherries and blueberries respectively are suspected of infestation with dioxin, being withdrawn from the market for the performance of analyses.

The pollutant came from the additive E 412, guar gum, potentially contaminated with dioxin. Guar is a tropical plant from the family of leguminous plants, which grows in Africa, India and Brasil. Guar gum is sanitary checked and approved, being used to obtain the creamy consistency of yoghourt. The plant itself is not harmful to the human body, the traces of dioxin coming from the production line of an additive produced in India, which was not properly sanitized after being used in the making of colouring agents.

At the end of July, the company UNIPELTIM, producer of additives was internationally warned to withdraw from the market a part of the products, after their contamination with dioxin was discovered. The source of contamination was the company Indiaglycols. The contamination was produced because the production line of the additive E 412 was not sanitized after it had been previously used in the production of colouring agents. The additive E 412 is a stabilizer used in the increase of consistency of foods (dairy products, icecreams and sauces). Warnings regarding the existence of this additive in the food products were sent to France, Belgium, Great Britain, Finland, Spain, Turkey and Hungary.

The media took the information triggering the mass media attack against the company.

In the first part of the image crisis of the company (22nd August), the most extensively propagated through the media subjects were:

- „Products Danone withdrawn from the market" (1.000 appearances)
- „Suspicions of contamination of yoghourts with dioxin" (1.000 appearances).
- „Dioxin is below the maximum allowed limit" – approached in over 4.000 materials in the last wave of scandal, after 30th August (sursa xa.yimg.com)

The accusations were related to the delay of the contamination alert (the company had suspicions related to the presence of the pollutant), lack of analyses at all incriminated batches (only for the batch expiring on 1st September, but not for the batch with deadline of consumption 20th September), the continuous use of guar gum in manufacturing process, although there were suspicions regarding contamination.

On 20th August 2007 the National Sanitary Veterinarian Authority sent a press release to the great chains of stores in which it informed that the batches with expiry deadlines 11th and 20th September 2007 were suspect and required their removal from sale. Danone company waited for the results of the expert report, made public on 28th August 2007. The accredited laboratory from Budapest confirmed that the products Danone were safe for human consumption, having the quality parameters in compliance with the food standards.

The CEO Danone in Romania declared that an additional set of 2 analyses were performed in his own laboratories on the batches with expiry dates 22, 23 and 26th September 2007, and the results confirmed that the products fulfilled the conditions of safety of consumption.

Effects of scandal on the company

During the scandal, the fruit yoghourts Danone were boycotted by consumers, the stocks increased, and the sales collapsed. The only unaffected range for Danone was Actimel, for which the

company intensified the TV commercials. The measures taken by the company to fight the negative effects targeted:

- Invitations for journalists to visit the production facilities, to convince themselves of the degree of food safety they assure,
- Bought wide spaces in the main newspapers, where they explained what had happened,
- Broadcast special TV spots.
- The sales teams directly informed the customers, with the hope of recovering the lost ground,
- Posters were posted and handouts were given with information in the points of sales
- PR campaign intensified.

In spite of all the measures taken, the consumers suspected the company for a long time, the confidence in the company being strongly shattered, which led to a dramatic fall of demand for Danone products.

The dioxin scandal has managed to collapse the sales of the company and revealed information which Danone representatives would not be made public.

Accused in the past that it uses powder milk in the manufacturing process (an important element in the increase of guarantee period of youghourt), Danone denied it repeatedly. In full scandal with dioxin the recognition of using powder milk was considered a lesser evil.

Another interesting aspect was the withdrawal of batches from shops and their destruction. The company communicated that "Danone could not control the observance of the right temperature of preservation for the products withdrawn from the market, so it decided not to resend them to shops for sale". The company admits the destruction of products, which could have been considered as evidence. The massive withdrawls from the commercial network destroyed any variant of optimal storage and resale.

Economic losses suffered by Danone following scandal:

- Before the scandal with the existence of dioxin in its products, Danone had about 50 % of milk market in Romania.
- The decrease of production and the reduction of the display space given in the big stores represented indicators of decrease in the market share of Danone after dioxin scandal.
- Tnuva company, recently appeared on Romanian market, which managed to occupy a part of the segment lost by Danone.
- Decrease in production, announced by the company, by about 15 %.
- Danone sold by 20-25 % less products in two weeks after the withdrawal from the market of 700 kilograms of fruit yoghourt, suspected of infestation with dioxin. The reaction of consumers of not buying yoghourts, especially fruits, even after the results of analyses turned out negative, was felt on the entire market. The company comes back on the increase after four months of intense efforts.
- During the period August-Septembrie 2007, the sales of yoghourts decreased by 8% compared to June-July 2007 (*www.ziare.com/articole/studiu nielsen consumatori*)

According to the declarations of company management, there were decreases of sales for 3 months, from August to October 2007, but the final balance indicated a plus of over 20 % to the turnover and of over 30 % to net profit compared to 2006 *(http://www.ziare.com/economie*)

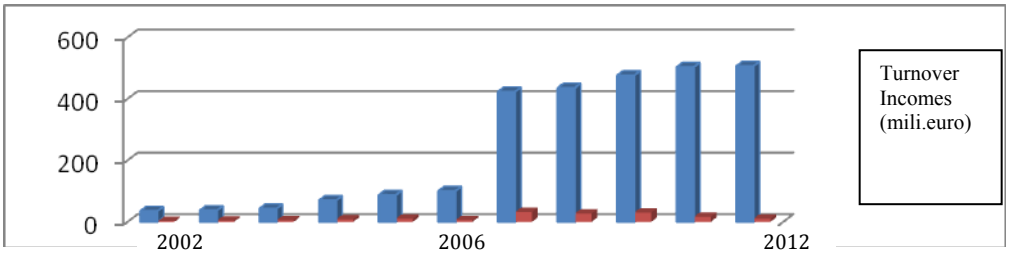

Figure 3. Evolution of turnover Danone Romania (2002-2012) (*from http://www.zfr.ro*)

In order to give back the confidence of consumers in Danone, the company tried to overcome the crisis by campaigns of promotion of products safety. Although Danone representatives were reserved about the budgets spent for promotion, the market monitoring shows that the investments in promotion were in 2007 over 6,7 times higher than those of the leader of the local dairy market, Friesland, which sells the brands Milli and Napolact. (www. AlfaCont.ro). Danone had in 2007 a promotion budget of over

130 million euro, over 35 million euro higher than in the previous year. In the months after the triggering of the dioxin scandal, the promotion budget of the greatest player on yoghourt market in Romania was by 3-4 million euro higher than the previous period (*http://www.zf.ro*)

According to the growth pace estimated by Danone, the producer ended the year 2007 with businesses of over 100 million euro, in spite of the events which affected the production and sales of the company in the second half of the year. The market share of Danone on the segment of yoghourts got to 60 % by the end of the year 2007, compared to 50% in 2006.

The dioxin scandal can demonstrate how a focused rumour directed at certain areas of mass media can destroy a powerful company. Danone company has applied a policy not suitable to the situation, being partially guilty for the evolution of events. Although it had answers to all the questions, Danone company suffered significant losses regarding the image capital, the confidence of consumers and turnover.

The consumers were the main winners, being careful to the products they buy, especially those for children, and reading very carefully the labels. Danone scandal has opened a new age of the more informed and more careful customer.

Social corporate responsibility actions carried out by Danone

Big companies from Romania have tripled their budgets allotted to social corporate responsibility (SCR) in 2007. Thus, the company Danone Romania allotted 420,000 euro for SCR activities, amount which represents donations made to hospitals, children and old people homes, foundations and humanitarian organizations, but also actions initiated and funded in full by Danone, as well as actions for the support of underprivileged children. The budget allotted to SCR actions doubled in 2007 compared to 2006, when Danone allotted 200.000 euro to social responsibility.

Conclusions

An inadequate public relations policy can seriously affect the image of companies, regardless of size and position on the market. In most situations, regardless of the size of allotted budget, it is difficult to completely regain the consumer's confidence. The big companies have understood the role and importance of social corporate responsibility actions, by reconsidering the policy applied in Romania and by allotting funds in this direction. The contamination with dioxin represents an episode which, unfortunately was followed by other incidents in the trade and production of food in Romania. The food consumer of Romania has learned, based on information from mass media but also on unpleasant experiences that the decision of selection of food products must not be based only on the visible properties of the product, on the attractive aspect of packaging or on the advertising made by the producer/trader, but it must be especially based on the specifications on the label. The incident demonstrated the usefulness of alert systems at European and national level, respectively the impact of information from mass media on the consumer and companies from the sphere of trade in food.

Bibliography

Monbiot, G, 2013, A Festival of Toxic Waste, published on the Guardian's website 5th November 2013
Schecter, A., Cramer, P.,, Boggess, K., Stanley,J., Päpke, O., Olson,J., Silver, A,. Schmitz, M., 2001, Intake Of Dioxins and Related Compounds from Food in the U.S. Population, Journal of Toxicology and Environmental Health, Part A: Current Issues, Volume 63, Issue 1
**** Review and Update of the UK Source Inventories of Dioxins, Dioxin-Like Polychlorinated Biphenyls and Hexachlorobenzene for Emissions to Air, Water and Land, 2010, Report to the Department for Environment Food and Rural Affairs,*
**** WHO Headquarters,Dioxins and their effects on human health, http://www.who.int, accessed in April 2014*
http://www.vadscorner.com/dioxin.html
http://1.bp.blogspot.co, accessed in April 2014
http://www.wall-street.ro/articol/Companii/32636/ Html, accessed in April 2014
http://www.wall-street.ro/articol/Companii/34564/Scandalul-dioxinei-a-ras-aproape-un-sfert-din-vanzarile-Danone.html, accessed in April 2014
http://www.wall-street.ro/articol/Companii/32366/Iaurtul-Danone-suspect-de-contaminare-cu-dioxina - retras-din-31-de-judete. Html, accessed in April 2014
http://www.standard.ro/articol_15282/scandalul__dioxina__a_scazut_vanzarile_Danone_cu_15. Html, accessed in April 2014
http://www.wall-street.ro/articol/Companii/32611/Scandalul-dioxinei-scade-vanzarile-Danone.
http://www.zf.ro/articol_158725/ce_efecte_a_avut_asupra_businessului_Danone_scandalul_dioxinei _din_iaurturi_din_2007 . html- accessed in April 2014
http://opiniamea-vinti.blogspot.com/2007/10/scandalul-Danone. html- accessed in April 2014

http://www.ecomagazin.ro/marile-companii-din-romania-si-au-triplat-bugetele-de-csr-in-anul-2007, accessed in April 2014
http://www.moneyline.ro/articol_10901/mari_companii_din_romania_si_au_dublat_sau_chiar_si_au_triplat_bugetele_de_csr_in_anul_2007, accessed in April 2014
http://www dictionar.romedic.ro/dioxina. html , accessed in April 2014
http://www.europarl.europa.eu/sides/getDoc.