Ecological paints and criteria for awarding the European eco-label

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Abstract

Due to the fact that the Republic of Moldova does not have a transparent regulation that would contain the criteria and the admissible quantities for some substances included in the production of ecological paints and varnishes, the author has decided that it will be an actual research in the field. The purpose of this paper is to determine the criteria for awarding the eco-label to paints. The objectives of the paper include the determination of the chemical substances present in the paint and the diseases they cause to the human body, the life cycle of the film-forming products, the determination of the ecological markings found on the market of film-forming products, the criteria for awarding the eco-label for paints and varnishes, the mention of ecological local paints and/or varnishes, the presumption of eco-labels and mandatory information to be indicated for consumers. This research can serve as a basis for the elaboration of norms/regulations useful for the verification of ecological paints and varnishes by the accreditation bodies and by the laboratories in the Republic of Moldova, as well as for the awarding of the national label. The research method for the elaboration of this paper was case study and document analysis.

Keywords: paints, varnishes, eco-label, regulation, VOC, VAH.

1. Introducere

The market of finishing materials is a large one, offering products from major foreign and local manufacturers. The market of the Republic of Moldova is flooded with finishing materials imported from Romania, Poland, Germany, Italy, Bulgaria, Ukraine, etc. marketed by national dealers. The major local manufacturer of the Republic of Moldova is JSC SUPRATEN, which offers on the market emulsions, special and decorative paints, varnishes for concrete, brick and wood. The problem addressed in the paper comes down to identify the criteria for awarding the eco-label for paints and varnishes.

2. Ecological paints on the European market and their content

According to European regulations, the products imported from third countries are accepted on the Community market provided that the manufacturer was inspected by a control body or by a control authority recognized by the European Union Commission and that all requirements regarding the obtaining of ecologic products have been met.

For now, the Republic of Moldova cannot export products whose label states that the product is ecological. The certificates issued in this respect by national authorities are not recognized by the EU, even if the law provides that each agricultural product should be labelled according to the methods by which it was obtained.

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The goods shall be considered as ecologic only when: on the label, on advertising material or on commercial documents, the product, its ingredients or raw materials are described in terms that suggest to the purchaser that they have been obtained in accordance with ecological rules. The term used on the label, in commercial documents or on advertising materials of agri-foodstuffs obtained according to the requirements of the law is "ecologic". This term is synonymous with "biologic" and "organic" as well as with their abbreviations "bio" and "eco".

Thus, on the market of finishing materials, it appeared a tendency to produce environmentally friendly paints. The chemicals in wall paints can cause health problems both to those who apply them and to those who live in the house. The dyers are the persons who first inhale toxic vapours. They have a 20% higher risk of having cancer, especially lung cancer. Moreover, they may have fertility problems (according to a study of Manchester University). The paints may contain the following chemicals that can cause diseases and dysfunctions of the body:

- **Formaldehyde**: (carcinogen, can increase the risk of developing cancerous tumours);
- **Organic solvents**: styrene (poison), ethylbenzene (affects the central nervous system, mucous membranes, activity of muscles), kerosene (capable of causing various intoxications), etc.;
- **Phthalate**: (can damage endocrine and reproductive systems);
- **Increased VOC concentration**: Dangerous to inhalation (for example: they are contained in solvents);
- **Heavy metals**: in high concentrations are dangerous not only for humans but also for the environment.

The paints have chemicals that can be harmful, such as solvents and volatile organic compounds. From the moment the paint dries, the VOCs evaporate, being inhaled by the people who provide the painting services. The vapours released by chemicals can aggravate the asthma and the sinusitis. At the same time, if the paint touches the skin, it can irritate it.

At the same time, the solvents can cause headaches and dizziness because they are inhaled by the lungs and then flow into the bloodstream, and VOCs can cause irritation of the nose, throat and eyes. Some studies on animals have demonstrated the links between the inhalation of large amounts of solvents and birth defects, cancer and central nervous system problems.

Table 1. Chemicals recovered in inhalants

Solvents	
Diluent for paints	Toluene, methylene chloride, methanol
Aerosols	
Spray with paint	Butane, propane, fluorocarbon, hydrocarbons, toluene

Source: Elaborated by the author based on: European eco-label for indoor paints and varnishes. http://apmdj-old.anpm.ro/upload/9034_vopsele_lacuri.pdf [Visited on 14.03.2018]

Two types of paints are known: water based and oil based. Water-based paints are used for walls, and oil-based ones give a glossy finish to surfaces. Oil-based paints are much more harmful than water-based paints. And natural paints, or so-called eco, do not contain solvents or VOCs, so they do not release toxic vapours and have no odour. The author states that JSC SUPRATEN does not produce oil based paints and does not plan to do it.

About two decades ago the lead was removed from the composition of paint due to toxicity. It can accumulate in the body and is associated with a decrease in the level of intelligence and with behavioural problems in children.

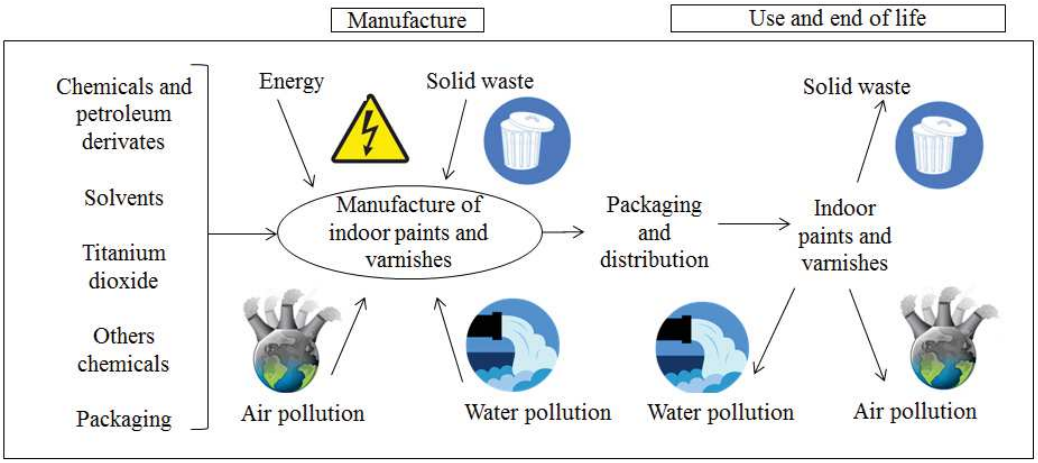
Commission Decision no. 739/2002/EC establishes the criteria for the award of the European eco-label to the paint and varnish product group. The European eco-label is awarded to products that comply with certain ecological criteria established by the European Union. These criteria have been identified on the basis of some complete scientific studies on the aspects of entire life cycle of products and are valid for 3-5 years being regularly reviewed to take account of technical progress.

The European eco-label is a graphic symbol accompanied by a short descriptive text applied to the product, packaging, in a brochure or other informative document accompanying the product and providing information on at least one and at maximum three types of environmental impact.

Products targeted:

- *paints and varnishes for indoor use;*
- *decorative paints and varnishes;*
- *varnishes for wood protection and other similar products;*
- *varnishes and paints for floor;*
- *colourful/nuanced products by distributors at the request of amateur or professional users;*
- *liquid decorative paints or pastes manufactured or processed by manufacturers to meet the needs of consumers;*
- *primers and other products used under the paint protective coating.*

Figure 1. The life cycle of indoor paints and varnishes



Source: Translated and elaborated by author based on: European eco-label for paints and varnishes for indoor use. http://apmdj-old.anpm.ro/upload/9034_vopsele_lacuri.pdf [Visited on 14.03.2018]

The criteria for awarding the European eco-label provided for paints and varnishes are aimed at:

- efficient use of the product and reduction of waste;
- reducing the risk related to environmental protection, ozone layer and other risks by reducing solvent emissions;
- reducing the discharge of toxic or polluting substances into water.

The European eco-label applied to paints and varnishes used for indoor surfaces provides the presumption that these products have a low level of VOCs and VAHs, and also do not contain heavy metals and substances dangerous to human health and the environment.

Here are the main labels that are found in shops for eco paints:

- ***Vitality Leaf***
- ***Blue Angel***

- ***EU Ecolabel***
- ***Nordic Swan***

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These signs ensure the fact that paint manufacturers fully comply with ecological requirements. At the same time, the signs suggest that all the restrictions on the content of the noxious substances have been observed in the paint structure. Also, the certification bodies verify the production every year, so product quality is kept at the corresponding level. Certified producers are required to comply with environmental legislation in their own country, to reduce the amount of resources used, to properly store the waste, to inform the consumers on the correct and harmless use of paints and varnishes.

Table 2. Criteria for awarding the European eco-label for paints and varnishes

Ecological Criteria	Limitations/ Discounts/ Other
Limiting the substances hazardous for the environment and health:	Content in white pigments less than or equal to 38 g/m2 of dry film, rate of opacity = 98%.
Reducing air pollution	***Emissions from production of titanium dioxide pigment:*** SOx <300 mg /m2 of dry film, with a 98% rate of opacity
Reducing production of hazardous waste	***If the white pigment is titanium dioxide (TiO2):*** *- waste containing sulphates <20 g/m2 of dry film with 98% rate of opacity.* *- wastes containing chlorides*: < 5 g/m2 of dry film, 98% rate of opacity for tiles made from natural products. < 9 g/m2 of dry film, 98% rate of opacity for tiles made of synthetic materials. < 18 g/m2 of dry film, 98% rate of opacity for slag.
Limiting air pollution with solvents	***VOC:*** < 30 g/l - without water – for wall paints. < 250 g/l – without water – for other types of paint with hiding power> 15 m2/l and 98% spreading rate. <180 g/l – without water – all other products
VAH	<0.15% of the product for wall paints. <0.4% of the product for all other products
Limiting the use of substances hazardous for the environment and health	The product should not be classified as very toxic or toxic, environmentally hazardous, carcinogenic, toxic for reproduction or mutagenic.
The ingredients used must not contain:	- heavy metals or their compounds: cadmium, lead, chromium VI, mercury, arsenic. - alkylphenol ethoxylates (AFE) - diethylene glycol methyl ether (DEGME) - substances and preparations considered to be highly toxic, toxic, carcinogenic, teratogenic or mutagenic
The following substances are limited:	-active ingredients used as preservatives that may be assigned certain risk phases when using <0.1% of the total paint composition - ingredients which may be very toxic, toxic, harmful and which may have long-term adverse effects in the aquatic environment
The sum of the quantities of all the ingredients that, at the time of use, may be assigned certain risk phases must not exceed 5% of the weight of the product.	- isothiazolinone compounds <500 ppm (parts/mln) - free formaldehyde <10 mg/kg of product

Criteria, regarding the rate of suitability for use	- hiding power - resistance to wet rubbing - waterproof - adhesion - abrasion
Information for consumers	***The product packaging should include information about:*** - the use, the support surface, the conditions of use of the product, including instructions on how to prepare the support surface; - the recommendations on product cleaning and appropriate waste management; - the instructions on storage conditions of the product, including safety measures; - the recommendations on preventive protection measures for the user.
	In order to inform consumers, the following visible text should be written next to the eco-label: - good performance when used indoor; - limited use of hazardous substances; - low solvent content.

Source: Elaborated by author based on: European eco-label for paints and varnishes for indoor use. http://apmdj-old.anpm.ro/upload/9034_vopsele_lacuri.pdf [Visited on 14.03.2018]

The local manufacturer JSC SUPRATEN produces ecological paint: Baby Smile. This is certified by the National Public Health Centre and is intended for the use in children's rooms, kindergartens, schools and other institutions for children. It is used for painting walls and ceilings with a normal and high level of humidity, as well as for surfaces requiring frequent washing. It is ideal for painting any mineral surfaces (concrete, cement plaster or plaster, drywall panels) as well as all types of wallpaper. It contains nano biocides, which give the paint additional antibacterial properties. It is hypoallergenic, has a high hiding power, is simple in application, resistant to wear through wet rubbing, and does not contain VOCs. It's odourless. It forms a film resistant to fungus and bacterial contamination. Its price is 33.57 MDL/1l.

Table 3. Criteria for Baby Smile paint

Criteria	**Baby Smile-SUPRATEN**
Price/1l	33.57 MDL
Composition	Acrylic emulsion, pigments, ecological additives, nano biocides.
Packaging	Buckets of 1.4 L, 4.2 L, 7 L, 14 L.
Normal consumption of a single layer L/m^2	1 L/4.54 m^2
Drying time	After 30 min (first layer) 4h – after repainting
Drying temperature	Between +5...+25^{o}C
Shelf life	18 months

Source: Elaborated by author based on: Baby Smile, http://supraten.md/ro/catalog/otdelocinie-materiali/kraski/136039/default.aspx [Visited on 14.03.2018]

The local manufacturer JSC SUPRATEN undertakes to declare only 4 ingredients of the Baby-Smile paint. It does not list its ecological additives. The paint costs 33.75 MDL/l. It is considered that the price dictates the quality, although it is not a set in stone rule, but it is worth mentioning that the eco paint that passed the EN 71-3 chemical test is LAKELAND, by an English producer and costs up to 665.12 MDL/l. This fact enhances the paint content, the

production time, and the quality level. The EN 71-3 test is a presumption that the product meets the new chemical requirements for the safety of EU toys in accordance with the European standard EN71. LAKELAND paint, made in UK is the only one that does not contain solvents, VOCs, pesticides, herbicides, toxins, and it is water-based, believed to be 7000 times purer than regular paints. 1 L of LAKELAND paint covers 13m^2, and 1L of Baby Smile covers about 5m^2. The difference is about 8m^2. The drying time also differs, so the author states that LAKELAND dries a little slower for the first layer, compared to Baby Smile. However, this is not a proof of quality, but only of the composition held.

The LAKELAND paint may be used at both cold temperatures and heat, while Baby Smile is limited to positive temperatures but not to heat. The shelf life is a convincing element for the eco composition of the product. The natural ingredients of any product will shorten the shelf life, and vice versa, their replacement will prolong the shelf life. The difference between the shelf life between LAKELAND and Baby Smile is 6 months, to the detriment of the local manufacturer, which has a longer shelf life.

In the near future, the demand for ecologic paints will increase, because there is indeed a need to apply VOCs-free and HAVs-free products both for workers and the environment and for people living in the premises processed. The local production must review the European conditions and limits for eco products, so they will face competition from abroad as well as from the country in comparison with importers.

3. Conclusions.

The tendency to produce, to market and to consume ecological products is on the rise. For this reason it is very important for manufacturers to use ecological criteria established by the competent bodies, whether they will be taken over and translated from the European Union, or that they will be developed at national level. It is also important for consumers to have true information in this area. Due to the lack of transparency, consumers can be misled to eat ecologic products which do not meet the requirements, but manufacturers can also take advantage of the lack of a mandatory regulation in the field of ecological paints and varnishes, and they can also use, without complying with the rules, the presumption of the eco-label. It is necessary for the Republic of Moldova to develop such a regulation in the production of ecological paints and varnishes and to declare it obligatory at national level.

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