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HYGIENIC ECO-DESIGN

Posted on 19 March 2014



Roberto Ortuño, Technical Support and Analytical Services Director at Spanish research and development centre AINIA – considers the Eco-Dhybat project, which eco-hygienic design in the food industry.

Meeting required hygiene standards is essential for the food industry.

Food companies, therefore, devote considerable time and resources to achieving and maintaining safe standards. They undertake frequent cleaning and disinfection of installations and equipment coming into contact with food products, to the considerable benefit of human health.

However, cleaning activities consume large amounts of water and chemicals, including alkalis, acids and disinfection agents. This generates large amount of contaminated wastewater and organic waste. Cleaning is also one of the most energy-consuming operations in the food industry, generating climate change inducing greenhouse gases, including from fuel combustion for steam production and high temperature processes. In both dairy and fish processing sectors – both represented by a company in the project consortium – cleaning and disinfection is considered to be the main source of environmental impacts.

Reduce environmental impact

Eco-Dhybat (Life +) project aims to demonstrate eco-hygienic design of equipment and installations as a preventive economically viable technique to reduce the environmental impact of cleaning and disinfection operations of food industry equipment and installation.

Studies based on lifecycle analysis methodology (LCA) indicate that cleaning and disinfection operations in food processing equipment and installations, are strongly intensive in energy and water consumption (related also with CO2 emissions and wastewater generation) and in the use of chemicals. Optimizing this processes may be consider as one of the main challenges in the minimization of the environmental impact of food processes.

On the other hand, cleaning and disinfection of equipment and facilities in food industry are critical for food security and quality. Thus, frequency and intensity of these operations depend on the hygiene requirements, the efficiency of the cleaning processes and on the design of the equipment and facilities too.

Preventive strategy

Eco-hygienic design of equipment and installations may be considered a preventive strategy to reduce the environmental impact of cleaning and disinfection operations.

Main objective of the hygienic design is to improve the cleanability of equipment and facilities, by avoiding critical points and dead-zones where the product may be retained and can not be removed properly using a standard process of cleaning and disinfection. The hygienic design of equipment and facilities is also related to a reduction of the environmental impact generated during cleaning and disinfecting operations, requiring a lower input of water, energy and chemicals to achieve the same level of hygiene.

Currently in the EU, the European Hygienic Engineering and Design Group (EHEDG) has developed a methodology of assessment and certification of hygienic design that has been applied over the past 10 years.

Is eco-hygienic design a BAT (best available techniques)?

Despite the environmental relevance of the cleaning and disinfection operations in the overall environmental impact of food industries, the Reference Document on Best Available Techniques for the food, drink and milk industry (FDM BREF) contains also a little information about these operations in terms of water and energy consumption.

ECO-DHYBAT aims to demonstrate that eco-hygienic design of equipment and installations is a preventive economically viable technique to reduce the environmental impact of cleaning and disinfection operations in food industry, while maintaining or improving current hygienic standards. Demonstration tests shall be done in two representative food sectors (dairy products and transformation of sea products).

The results obtained will allow proposing eco-hygienic design for best available technique, capable to be included as a new item in the next revision of BREF reference document for the food & beverage industry.

The project

The project is promoted and coordinated by AINIA, with the participation of the Multisectorial Association of Machinery Manufacturers Companies (AMEC) (exporting machinery manufacturers), the Grupo Leche Pascual (dairy industry) and FRINOVA (transformation of sea products). The project will have a total duration of 36 months and has a budget of €921.738, co-financed at 50% by the EU LIFE + programme.

It has five main stages:

1. A hygienic and environmental diagnosis of the production lines and the cleaning and disinfection operations in the facilities of Leche Pascual and Frinova selected for the study
2. Analysis of the State of the art and identification of available equipment with certified hygienic design and data collection of potential suppliers list
3. Identification of opportunities to improve eco-hygienic design and recommended changes in equipment and selected installations
4. Tests of cleanability of the modified equipment (according to environmental and hygienic criteria)
5. Environmental and economic evaluation of the new technique using the life cycle assessment methodologies. Evaluation as a best available technique.



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Expected results: reduction of 20-30% in terms of water consumption and 10-20% in terms of energy needs.

ECO-DHYBAT results will allow food companies to reduce expenses on water, energy and chemicals used for cleaning and disinfection operations, as well as the environmental costs derived from the generation of waste and wastewater. Expected results are a reduction of 20-30% in terms of water consumption and 10-20% in terms of energy needs (for the processes that will be evaluated).

From the machinery manufacturers point of view the incorporation of eco-hygienic design criteria will allow them to add value to their equipment and improve their business opportunities. Recognition of eco-hygienic design as a BAT, will mean a competitive advantage.

Machinery manufacturers

Food machinery manufacturers for fish or dairy products with some hygienic design certification may participate in the project providing its certificated equipment and constituting a base for the proposed improvements.

Machinery manufacturers of other transformation processes (different than fish or dairy products) with some hygienic design certification will participate including its equipment in the study of available certificated equipment.

In general, all manufacturers of equipment and food industries will have the opportunity to participate in workshops that will be organized in the framework of the project.

Ainia

Ainia is a technology centre that works to promote the competitiveness of companies through innovation. With over 700 member companies and 1,200 clients, is one of Europe's technology centres with a largest business social base. Its mission is to give value to companies by leading innovation in a responsible and committed way.

With 13,000 m2 of facilities, Ainia has 10 pilot plants, 8 laboratories, 10 classrooms and training rooms, Consumolab (centre for analysis of consumer behavior through sensory analysis) and Altex (high-tech plant to provide a wide range of services based on supercritical CO2 extraction). With a highly qualified team (over 70% of the staff are university graduates and PhD), multidisciplinary, confidentiality and flexibility to develop customized solutions tailored to the needs of each client are different elements of ainia as part of its corporate culture.

Since 1997, AINIA has gained wide experience on Best Available Techniques

(BATs) in the food industry, including in the development of the Food, Drink and

Milk BAT Reference Document (BREF), and national BATs guides for meat, poultry, dairy, fish products, beer and malt. AINIA has assessed more than 100 food companies, looking at the prevention, control and treatment of environmental impacts. It has also assisted more than 400 Spanish food companies in overcoming environmental challenges.

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