Project Information Sheet

Design and construction of a bentonites recycling line for the production of a heavy metal adsorbent (BENTOMET)

Programme area:	CIP-EIP-2013.10.06-Recycling
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Partners:	Ingeniería Navarra Mecánica (Spain) Coolrec BV (Netherlands) Machinefabriek Otto Schouten (Netherlands)
Website:	http://bentomet.eu/
Benefits (max. 150 characters incl. space):	Production of an added value product line, consisting of the modification and conditioning of bentonites giving rise to a heavy metal adsorbent
Keywords:	Recycling, bentonites, heavy metals removal
Sector:	Recyling
Type of solution	Product and process
Duration:	01/07/2014 – 30/06/2017
Budget:	€ 948.529 (EU contribution: 50%)
Contract number:	ECO/13/630345-BENTOMET

Summary

The main objective of the Project BENTOMET is the design and construction of a recycling line for waste bentonites used during clarification processes in wineries, with a production capacity of 50kg/day, in order to be used as adsorbent of heavy metals in waste water treatments.

The designed treatment line is constituted by two modules: the first one for the purification and chemical modification of the raw material (bentonites coming from wineries), and the second one, for the conditioning of the product through drying and milling processes. The final product will be a bentonite-Fe_3O_4-PEI complex which removes heavy metals from waste water.

The project will suppose a new way for a waste that nowadays is discharged in landfills or collected by alcohol-producing plants; it is expected to develop an industrial line for the recycling of bentonites, a product generated in great amounts in the region of development of the project, taking into account that La Rioja is one of the European regions with major production of wine. Furthermore, the developed solution will be applied to remove heavy metals from waste waters from different industrial sectors, reducing a very important environmental problem. An additional advantage will be that, due to the presence of a magnetic particle in the complex, the withdrawal of the adsorbent once the removal of toxic elements has finished can be easily carried out by means of a magnet.

Expected and/or achieved results

The main product to be obtained during the project execution is an industrial plant for the recycling of waste bentonites. Modified bentonites resulting from the constructed plant will be incorporated into different treatment systems (such as resins and membranes) able to be implemented into several industrial lines with the aim of removing the contained heavy metals. As a last stage, a simple industrial line including some of the developed systems and easy to be implemented into real industrial processes will be designed and manufactured. So, a range of solutions for the treatment of waste water will be developed during this project, thus giving rise to a range of likely marketable products.

As summary, during the first 19 months of the project implementation, a deep effort was accomplished with the aim of getting the best design and selection of the equipment for the recycling line in order to obtain the best conditions for the process of purification and modification of bentonites, as well as its conditioning through the drying and milling, concluding in the selection of the most suitable ones for the project purpose: the recycling and conditioning of bentonites to be used as adsorbent material.

At the moment, the different equipment of each Module is pending of being assembled, started up and tested. This activity is the final task to have finished the Module I and the Module II individually, which is expected to be concluded in the following two months. After the assembly of each module, the Module I will be assembled to Module II and automation of the bentonites recycling plant will be accomplished while parallel activities related to the definition of the applications of recycled bentonites, will be tackled, including identification of key industrial sectors, evaluation of different wastewater treatment systems which enable the incorporation of the modified bentonites into them and, finally design and construction of the most suitable system. Finally, in the last period pending to finish the project, demonstration of use on two different scenarios will be done and techno-economic analysis as well as the environmental analysis of processes and products developed will be carried out.

Regarding dissemination activities, the website of the project has been regularly updated, posters and brochures were presented in the previous report, two workshops has been attended in Lurederra facilities and the project has been presented in a public event organized by AEAS (Asociación Española de Abastecimientos de Agua y Saneamientos - Spanish association of water supply and sanitation).

In addition, also the market study drawn up initially is being updated, finding potential clients of the product obtained in the recycling line: companies which could have problems with the treatment of their waste water rich in heavy metals. In addition, a comparison between main techniques currently used for removing heavy metals and possible competitors of the BENTOMET technology has been done.

Summarizing, the following results have been achieved:

- The design of the two modules has been completed successfully.
- The whole recycling line has been designed and the equipment has been constructed and adapted.
- A market study has been done, contacting with several sectors that could be interested in the product obtained in the recycling line.
- Several dissemination activities have been carried out: project website and its regularly update, workshops attendance, brochures and posters making and participation on public events.