



s.r.l. DEPURAZIONE INDUSTRIALE

SOCIO FONDATORE UNIACQUA



Dasa-Rägister

EN ISO 9001:2008
IQ-0208-04

Via I° Maggio s.n.c. – Tel 055.8303450-8303454 – Fax 055.8303368
50067 ROSANO – RIGNANO SULL' ARNO - FIRENZE
e-mail: Info@cgdepur.it
sito: www.cgdepur.it

Application of Vacuum evaporation in the food industry in Spain: specific case study regarding salt curing of prosciutto hams, with the subsequent recovery of the salt for industrial purposes

INSTALLATION OF C&G VACUUM EVAPORATOR ES - DRY 1000

Vacuum evaporation was originally developed by C&G back in the 1970s to treat wastewaters in the galvanic industries around their factory in Italy. This allowed environmental discharge limits to be respected, while recovering and recycling both the water used and the raw materials present, creating a situation of zero discharge. As environmental restrictions have become tighter worldwide, however, so too has the range of industrial waters treated by vacuum evaporation constantly grown and developed over the past 30 years.

An interesting example of an application of evaporators in the food industry is in Spain at the company Casademont in Catalonia. The company won project approval and financial support from the European Union to help with the development of this innovative process and for the purchasing of the evaporator needed.

Casademont is a Spanish company which produces a variety of cured and cooked pork products, including a range of different sausages, country hams and cold cuts, and is one of the largest producers of sausages, both in Catalonia and at a national level.

The company has its own drying facilities in the factory, used for the production of their products, where the curing and the drying of the meat takes place.

Whole legs of ham are stored in containers, which are placed in layers separated by salt. This drying process lasts for months, during which the legs of ham become completely dehydrated. The parts of the leg in contact with the salt automatically lose water and this produces a saturated salt solution which in the past was discharged into the sewer.

C&G technology has allowed CASADEMONT to eliminate the extremely high wastewater disposal costs they were facing from their daily running expenses. The consequence was that the investment costs of the evaporator were recovered in under a year.

The vacuum evaporator system used, ES DRY 1000, is totally automatic and user-friendly, with no smells or emissions to the atmosphere. This is a horizontal development evaporator containing a heat exchanger outside the boiling chamber constructed with a steel jacket.

The heat which is needed to separate the water from the product to be concentrated is generated by a closed-loop refrigeration circuit based on a heat-pump. The vacuum range is obtained through the use of a specifically designed pump which allows a pressure of $\cong 50$ mbarA to be reached inside the boiler.

At the above pressure the water content boils at comparatively low temperatures such as $\cong 35\div 40^{\circ}\text{C}$, allowing energy consumption to be reduced to a minimum. The wastewater containing the saturated salt solution is channelled into an accumulation deposit, from where it is automatically sucked out as required without the need of a pump.

The input wastewater has two end products after treatment, a pure distillate and dry solid salt. The distillate can either be recycled back into the factory for washing purposes, or discharged to the environment as required. The dry salt is manually discharged from the boiling chamber, stored, to be later sold as industrial salt, in particular for use on the roads in the winter.

Before treatment in the vacuum evaporator the wastewater has a conductivity of over $200.000\ \mu\text{S}/\text{cm}$, and the value of NaCl is 220.000 ppm. After treatment the distillate has a conductivity of less than $150\ \mu\text{S}/\text{cm}$, and the COD has less than 600ppm O_2 .

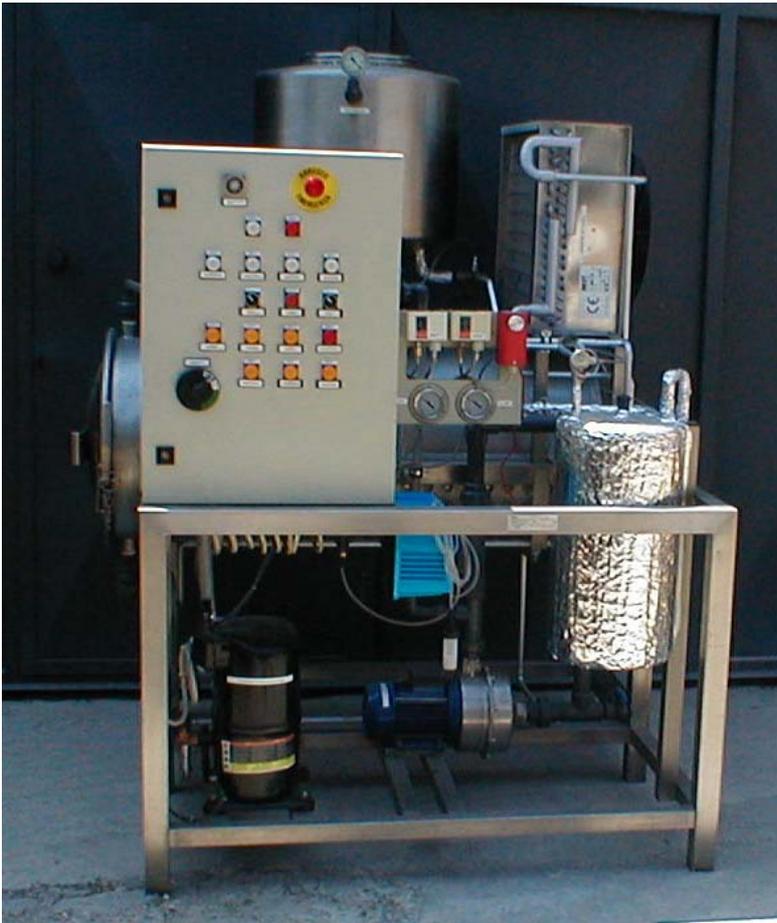
The company has found that the most productive cycle is when 12 hours of automatic non-stop evaporator treatment is followed by 12 hours of drying with one single daily discharge. The product collected from the machine is a dry salt with organic debris.

An alternative to this is batch treatment with non stop evaporator direct drying for 11 hours followed by unloading of the salt, and then another 11 hours of direct drying and salt unloading.

In both these situations approximately 700 kg of waste is treated in 24 h, with a production of 550 litres of distillate and 150 kg of salt.

The application of vacuum evaporation for treating wastewaters from the food industries is particularly interesting, and new potential applications in this field

continue to come forward as restrictions regarding discharge become tighter. It is a technology that allows the current philosophy of zero discharge and total water/raw material recovery to be respected when possible, while the environment is protected for future generations. As natural resources start to decrease and the cost of raw materials increases, the question of water availability and correct management of resources becomes ever more relevant.



VACUUM EVAPORATOR ES - DRY 1000