GRAPHITE-BASED HEAT EXCHANGERS FOR FOULING CONTROL IN DAIRY INDUSTRY

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Fouling of heat exchangers is a major problem in the dairy industry. Deposits indeed produce a thermally insulating layer over the surface of the heat exchanger that decreases the heat transfer toward fluids and increases the pressure drop. Additionally, fouling can seriously affect the quality of food products by favoring the development of harmful bacteria, and thus increase the costs and environmental impacts because thorough cleaning procedures have to be used. In this context, fouling control solutions are thus required.

One remedy to these problems might be the replacement of stainless-steel equipment by other materials. Out of all materials used for heat exchangers, artificial graphite (AG) is among the most interesting ones due to its high thermal conductivity and excellent corrosion resistance, chemical inertness, low coefficient of thermal expansion and competitive cost.

The present work thus aims at applying AG-based materials to heat exchangers for the dairy industry. The fouling behavior was analyzed for four commercial extruded or isostatic graphite plates, impregnated or not, and submitted to pasteurization conditions in a pilot pasteurizer. The thermal and surface properties were characterized by hot disk analyzer, drop shape analysis, contact profilometry and optical microscopy. This work establishes the potential of graphite for the management of fouling in dairy heat exchangers.

Preferred participation: Poster presentation