

Media sterilisation by direct steam injection: A detailed hydrodynamic study

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The use of live steam for heating food systems have several advantages, amongst which the key ones are: a) high heat transfer coefficients, and b) lack of solid surfaces which make it very attractive for use in fouling systems. The main disadvantages are: steam injection can be noisy; the shock waves caused by collapsing steam bubbles can potentially be damaging to shear sensitive media, as well as to mechanical parts, especially the steam sparger; and hydrodynamic disturbances can make process control difficult.

This presentation will examine hydrodynamic characteristics of steam

injection in water and shear thinning CMC solutions, in batch as well as continuous systems. The experimental studies include visualisation of steam injection regimes, and determination of pressure spectrum profiles and audible noise as a function of steam injector design, injection conditions (steam flow rate and level of sub-cooling), and liquid phase rheology. On the basis of these studies, appropriate regimes for practical operation of steam injection systems will be deduced.