

Spinning Disc Reactor – A novel processing machine for the food and chemical industry

- 1) An SDR is, quote – basically, a rotating disc, that can be heated or cooled, and is fed with one or more liquids at its center- unquote. What makes it attractive to food processing is its ability to efficiently mix materials, transfer heat, and transfer mass.
- 2) According to the presenter, SDR's have the ability to, quote – very rapidly heat and cool fluids – unquote.
- 3) They are also able to perform pasteurization, fine crystal formation, and are easy to clean.
- 4) Additionally, their, quote – unique combination of shear and draw gives opportunities for structure manipulation – unquote.
- 5) The technology is also scalable, allows for catalyst introduction, and residence times are controllable.
- 6) Water was successfully removed from oil by heating the disc, cooling the walls, and allowing gas flow through the chamber.
- 7) The oil and water mixture had 1,000 ppm water to start and only 25 ppm water after SDR processing.
- 8) Leeds University tested four following food processes using the SDR: Mayonnaise production, Emulsification, Ice Cream production, and Fruit Juice pasteurization.
- 9) Mixing the ingredients for mayonnaise then passing them through an SDR at temperatures up to 58C produces a, quote – smooth and homogeneous mayonnaise – unquote, devoid of salmonella.
- 10) Further analysis indicated that the, quote – SDR mayonnaise was more consistent, smoother and softer than Hellmann's real mayonnaise – unquote.
- 11) The SDR was also used to produce a water-in-oil-in-water multiple emulsion.
- 12) In the production of ice cream, an SDR can be used to homogenize and pasteurize the ingredient mixture. Additionally, much of the ageing time required in standard production can be avoided.
- 13) As a test, E. coli K-12 was introduced to a sample of ice cream base which was then processed using an SDR at 90C. Results, quote – indicated that sufficient heat was applied to achieve a reduction in microbial loading associated with a safe product – unquote.
- 14) The SDR produced ice cream was then analyzed qualitatively by a panel of taste testers. In the categories of smoothness, stickiness, meltability, and coldness, the SDR ice cream performed as well or better in most areas.
- 15) Processing fruit juice with an SDR at 90C showed effective pasteurization.
- 16) SDR pasteurized fruit juice was then qualitatively judged by a panel of tasters who deemed it, quote – preferable to the commercial sample – unquote.
- 17) This presentation concludes that the use of an SDR as a food processor has the ability to improve the efficiency of many current processes as well as offer the ability to introduce new products.

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