

Performance analysis of nano particle eco friendly chilling plant for fish processing

■ M. SIVAKUMAR AND MOHAMMAD TANVEER

Received : 28.07.2017; Revised : 23.08.2017; Accepted : 09.09.2017

See end of the Paper for authors' affiliation

Correspondence to :

M. SIVAKUMAR

Department of Basic Engineering, College of Fisheries Engineering, Tamil Nadu Fisheries University, NAGAPATTINAM (T.N.) INDIA
Email : amsivakumar78@gmail.com

■ **ABSTRACT :** In the present work, the feasibility of utilizing R404a as refrigerant along with nano particles (Al_2O_3 , CuO and TiO_2) as additives in nano particle eco friendly chilling plant for fish processing. The performance analysis used three different nano particles each with five combinations for the assessment for R404a. The best performance of the system was identified using the comparison of system parameters like COP, compressor work input, refrigerating effect, compressor suction and discharge pressure and temperature at all the state points of the system. COP analysis of R404a with nano particle of Al_2O_3 , CuO and TiO_2 . Since the emphasis has been laid on COP and evaporating temperature not given primary importance and hence the study concludes that the mixture of R404a offering the COP of 3.97 with 3% CuO having 29.6 kJ/kg-K work input to the compressor along with highest refrigerating effect of 119.40 kJ/kg-K can be used as an alternative refrigerant for nano particle eco friendly chilling plant for fish processing at the temperature range of $-11^\circ C$. The performance characteristics of the system may provide a guideline for the cold chain application in fisheries and its allied applications.

■ **KEY WORDS :** Percentage of nano particle, Eco friendly chilling plant, Refrigeration effect, Co-efficient of performance (COP)

■ **HOW TO CITE THIS PAPER :** Sivakumar, M. and Tanveer, Mohammad (2017). Performance analysis of nano particle eco friendly chilling plant for fish processing. *Internat. J. Agric. Engg.*, 10(2) : 508-515, DOI: 10.15740/HAS/IJAE/10.2/508-515.