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Experimental and numerical investigation of the performance of retail refrigerated display cabinets

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1 **Experimental and numerical investigation of the performance of retail** 2 **refrigerated display cabinets**

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9 **Abstract**

10 *Background*

11 Refrigerated display cabinets are widely used to preserve chilled and frozen food products in retail
12 food stores. Storage temperatures must be efficiently controlled to ensure that the product temperature
13 is maintained below the recommended value. Numerous surveys have demonstrated that refrigerated
14 display cabinets, seem to be a weak link in the food cold chain, and household practices also constitute
15 weak links. A great deal of effort has been devoted to the investigation and improvement of the
16 performance of cabinets in terms of both temperature homogeneity and energy efficiency.

17 *Scope and Approach*

18 In this review article, an investigation of refrigerated display cabinet performance, from basic
19 experimental field and laboratory studies to advanced numerical simulation, is presented. Field
20 investigation enables knowledge of real-use conditions to be acquired and identifies problems
21 encountered during food storage. However, such investigation is usually costly and time-consuming.
22 The Computational Fluid Dynamics (CFD) approach is becoming a promising alternative used to
23 study the influence of various design parameters and operating conditions on the cabinet performance.

24 *Key findings and Conclusions*

25 Ambient air infiltration across air curtains is the most significant factor indicating the performance
26 of open display cabinets. This issue is still problematic in many research and development contexts.

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