Are locally finite MV-algebras a variety?

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We answer Mundici's problem number 3 (*Advanced Łukasiewicz calculus*, page 235): Is the category of locally finite MV-algebras equivalent to an equational class? We prove:

1. The category of locally finite MV-algebras is not equivalent to any finitary variety of algebras. More is true: the category of locally finite MV-algebras is not equivalent to any finitely-sorted finitary quasi-variety of algebras.

2. The category of locally finite MV-algebras is equivalent to a variety of infinitary algebras (with operations of countable arity).

3. The category of locally finite MV-algebras is equivalent to a countably-sorted variety of finitary algebras.

Our proofs rest upon the duality between locally finite MV-algebras and the category of multisets by Cignoli, Dubuc and Mundici, and categorical characterisations of varieties and quasi-varieties proved by Lawvere, Duskin and others.