Vegetable and Mineral Oil Oleogels Developed at different Monoglyceride to Lecithin Molar Ratios

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Abstract

We studied the thermomechanical and microstructural properties of oleogels developed with 2.1 to 15.7 Moles of monoglycerides/Mole of lecithin (MG/LC). The oleogels were developed (15°C) in vegetable (VO) and mineral (MO) oils using at each MG/LC 2% or 4% total mass of gelator. During oleogelation a synergistic MG-LC interaction existed deriving in the development of MG-LC cocrystals even below the gelators' minimum gelling concentration. The cocrystals delayed the Lα-b polymorphic transition and worked as an active filler of the oleogels' crystal network. In the VO, the oil with the highest relative polarity, the oleogels were structured by a network of β crystals where the cocrystals acted as an active filler. In the MO, the oil with the lowest relative polarity, the cocrystals' development was favored while the Lα-b transition occurred just in the 15.7 MG/LC oleogels. Then, at all MG/LC the VO oleogels with 2% or 4% total gelator concentration achieved higher G' than MO oleogels. However, the presence of β crystals will produce deleterious effects in shorter time in the VO oleogels than in the MO oleogels. In both oils the oleogels with the highest G' and gel-like rheological behavior were achieved at 8.1 MG/LC, particularly at 4% total gelator concentration. Under these conditions the β polymorph was limited developed in the VO oleogels and completely absent in the MO oleogels. Then, we might tailoring the rheology of MG-LC oleogels with storage stability using as design variables the MG/LC, the total gelator concentration, and the polarity of the oil.

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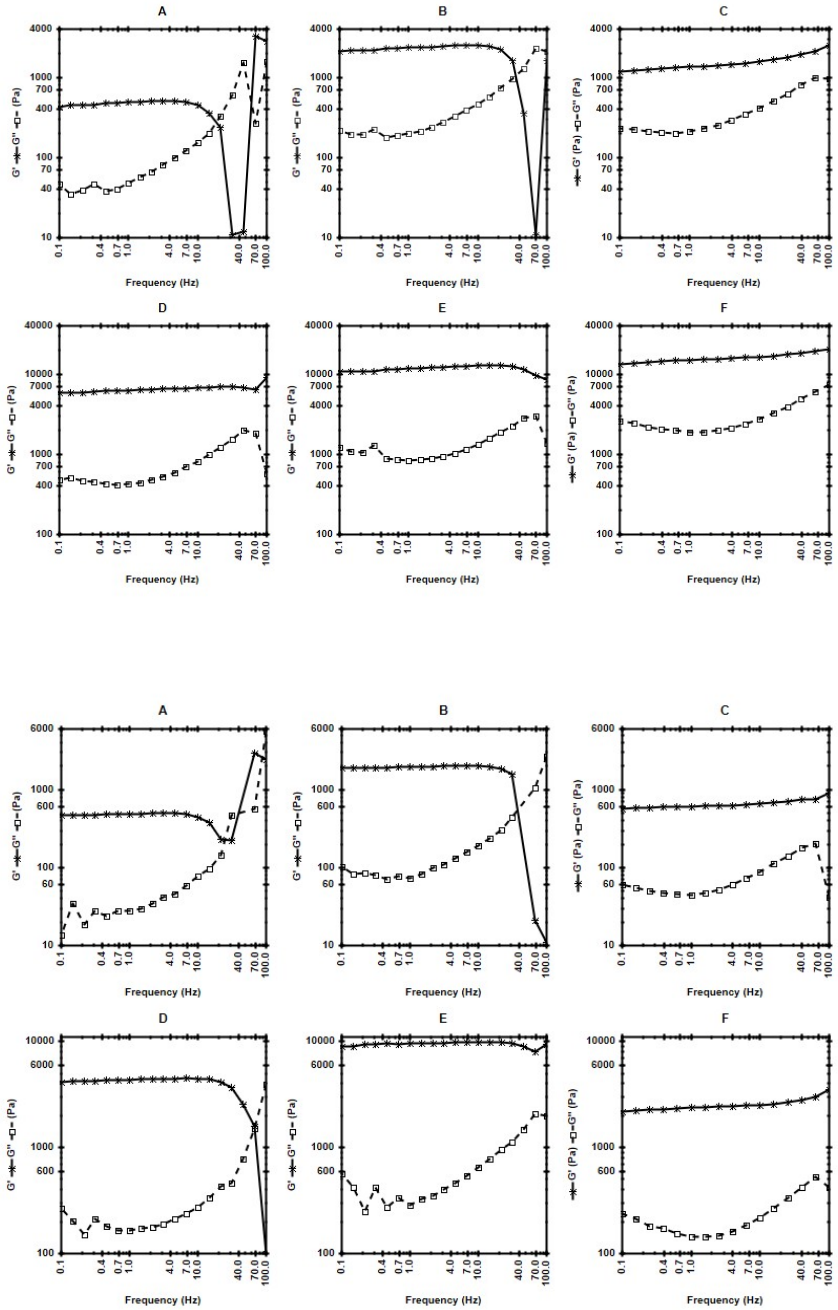

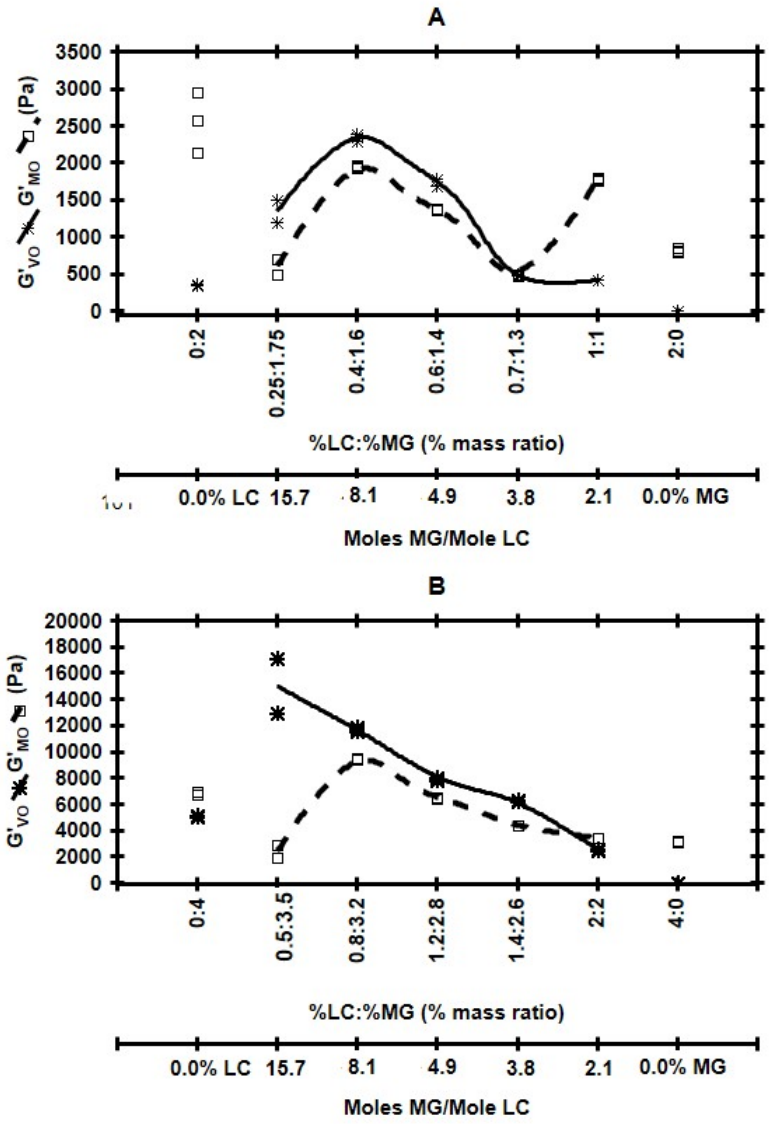

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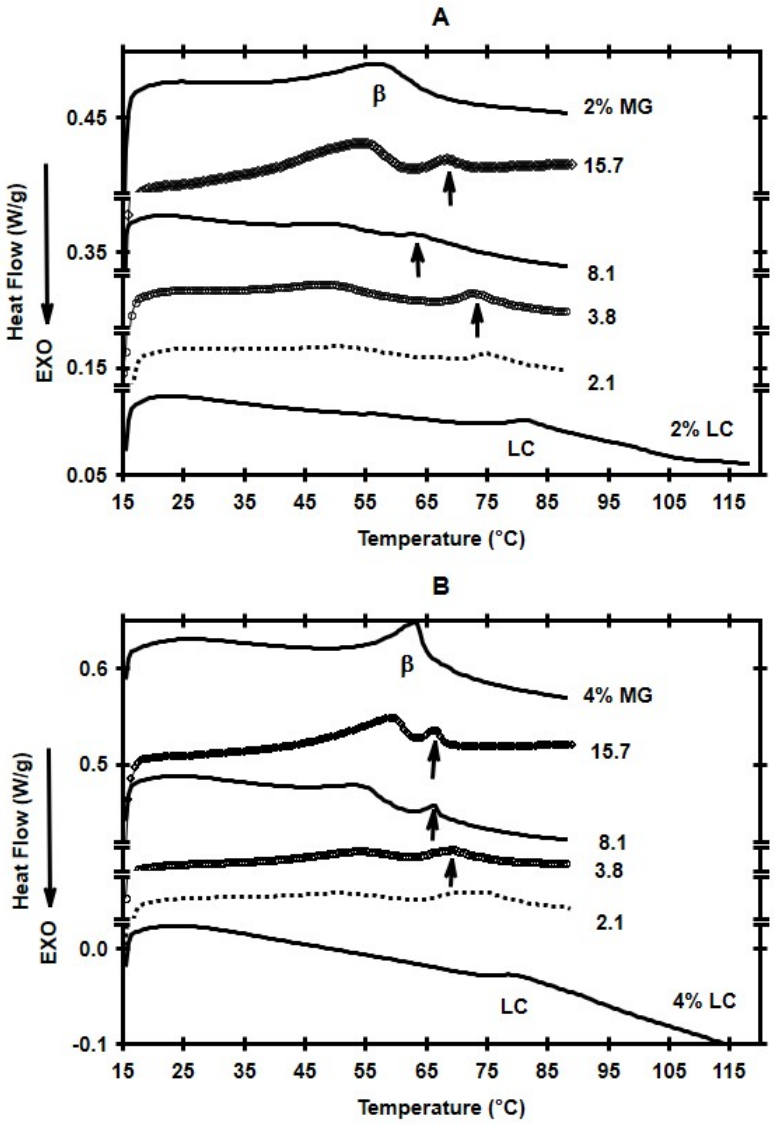

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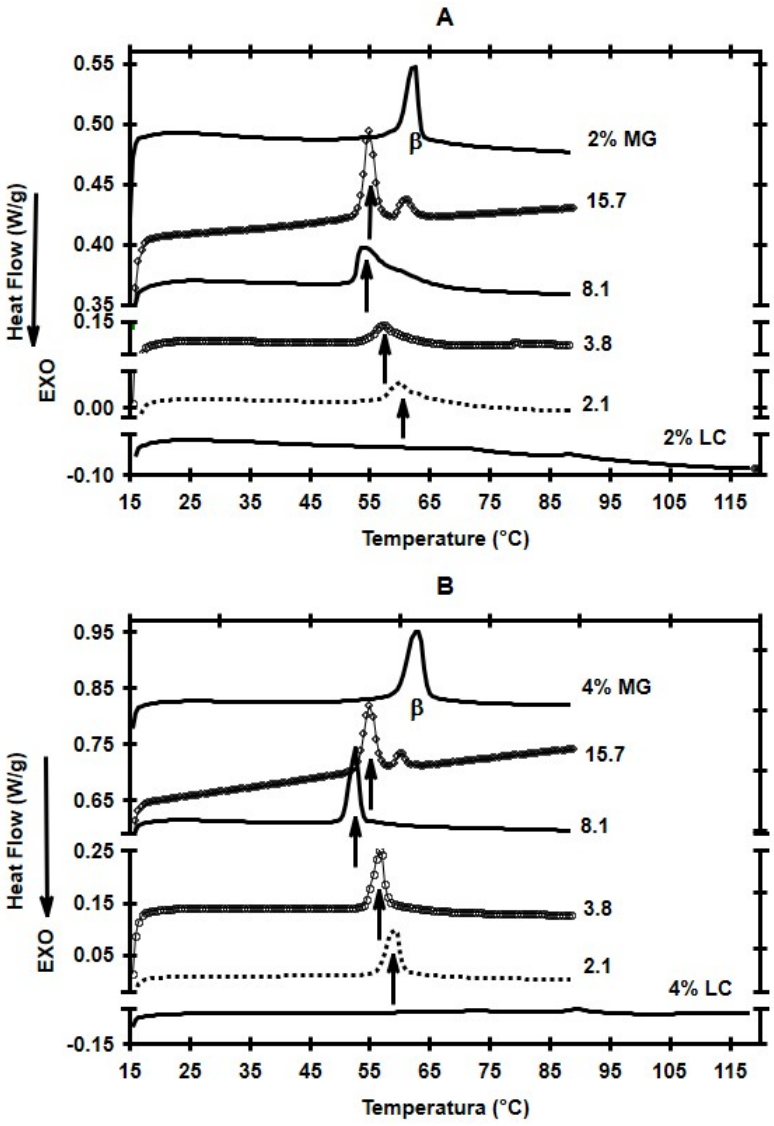

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