ABSTRACT
Ten pentacyclic triterpenes (1-10) were isolated from Lavandula coronopifolia. We evaluated their α-glucosidase inhibitory activity, and found that the aglycones, 1, 2, 3, 4, 7 and 10 showed superior IC50 values to the positive control. In order to explain the structural requirements for α-glucosidase inhibitory activity, eleven derivatives were prepared, including one new compound, 2-formyl-(A) 1–19α-hydroxy-1-norursane-2, 12-dien-28-oic acid 10c. The results demonstrated that a free hydroxyl at ring-A and a free carboxylic group at position 28 are key structural features for the α-glucosidase inhibitory activity, also that an ursane skeleton is optimum for the activity. Additionally, enzyme kinetic analysis of pomolic acid 2, the most potent compound, revealed that it inhibited α-glucosidase in a mixed-type manner. The molecular docking simulation validated this type of inhibition and highlighted the role of the C-3 hydroxyl and C-28 carboxylic groups in interaction with the enzyme in silico.
Keywords: Triterpene, a-glucosidase, SAR, Lavandula, mixed inhibiter, catalytic, allostreric