Galectin-8 has gained attention as a potential new pharmacological target for the treatment of various diseases, including cancer, inflammation, and disorders associated with bone mass reduction. To that end, new molecular probes are needed in order to better understand its role and its functions. Herein we aimed to improve the affinity and target selectivity of a recently published galectin-8 ligand, 3-O-[1-carboxyethyl]-β-d-galactopyranoside, by introducing modifications at positions 1 and 3 of the galactose. Affinity data measured by fluorescence polarization show that the most potent compound reached a K_D of 12 µM. Furthermore, reasonable selectivity versus other galectins was achieved, making the highlighted compound a promising lead for the development of new selective and potent ligands for galectin-8 as molecular probes to examine the protein’s role in cell-based and in vivo studies.