1) and rhodomyrtone (compound **2**) were isolated from the peel of camu-camu (*Myrciaria dubia*) fruit, while two other acylphloroglucinols (compounds **3** and **4**) were obtained from camu-camu seeds. The structures of the isolated compounds were characterized by spectrophotometric methods. Compounds **1** and **4** were confirmed to be new acylphloroglucinols with different substituents at the C7 or C9 position of **2**, and were named myrciarone A and B, respectively. Compound **3** was determined to be isomyrtucommulone B. This is the first report of the isolation of **3** from a natural resource. The antimicrobial activities of compounds **1**, **3**, and **4** were similar to those of **2**, and the minimum inhibitory concentrations were either similar to or lower than that of kanamycin. These results suggest that the peel and seeds of camu-camu fruit could be utilized for therapeutic applications.