Abstract: We study strategy-proof probabilistic mechanisms in a binary excludable public good model. We construct a new class of probabilistic mechanisms satisfying strategy-proofness, called α -mechanisms. We first show that the α -mechanisms are second-best efficient. Next, we identify the optimal α -mechanism with respect to the supremal welfare loss, and show that it improves the inefficiency of the equal cost sharing with maximal participation mechanism [Moulin (1994)] and the anonymous augmented serial mechanisms [Ohseto (2005)].