Fractional derivatives can be used to model time delays in a diffusion process, in which a cloud of particles spreads in a different manner than traditional diffusion and have appeared as an essential tool for the study of dynamics of various complex stochastic processes arising in anomalous diffusion in physics, finance, hydrology, and cell biology. When the order of the fractional derivative is distributed over the unit interval, it is useful for modeling a mixture of delay sources. In some special cases distributed order derivative can be used to model ultra-slow diffusion. In particular, we develop the strong analytic solutions of distributed order fractional Cauchy problems. (Received September 16, 2013)