1107-35-13 Muhammad Shabeer* (m.shabeer@qu.edu.qa), Department of Mathematics, Foundation Program, Qatar University, Doha, 2713, Qatar, and Muhammad Tahir Mustafa (tahir.mustafa@qu.edu.qa), Department of Math, Physics and Statistics, Qatar University, Doha, 2713, Qatar. New non-travelling wave solutions of porous Fisher equation using symmetries and sinh-cosh function ansatze.

The main aim of this work is to investigate solutions of porous Fisher equation of the form

$$\frac{\partial u}{\partial t} - \frac{\partial}{\partial x} \left(u \frac{\partial u}{\partial x} \right) = u \left(1 - u \right) \tag{1}$$

Such equations are relevant in understanding physical models where the population disperses to regions of lower density more rapidly as the population gets more crowded. Travelling wave solutions of Equation (1) have been widely studied. We investigate for non-travelling wave type solutions of Equation (1) and obtain some new explicit analytic solutions. The scheme for construction of these solutions utilizes a combination of similarity transformations and ansatze involving sinh or cosh functions. The new non-travelling wave type solutions obtained here may provide a new perspective in understanding the Biological models represented by Fisher equation (1). Furthermore, the results suggest that the sinh-ansatz or cosh-ansatz seem natural ansatze for reaction diffusion type equations and provide good candidates for determining solutions of such equations via similarity transformations. (Received January 01, 2015)