In the present study, medium (H-ZSM-5) and large pore (H-BEA, H-Y, H-MOR) zeolites were studied as a solid acid catalysts. Depending on the catalysts activities in the multicomponent reaction (MCRs), zeolite H-BEA found to be superior than the other catalysts. Dealuminated zeolite BEA samples were synthesized via acid treatment to increase its catalytic activity to perform MCRs. All the dealuminated zeolite BEA catalysts were characterized by various characterization techniques such as XRD, Elemental analysis by ICP-AES, surface area characterization by BET, NH3-TPD, FT-IR, 1H MAS and 27Al NMR. Powder XRD of all the catalysts showed the existence of well-structured microphase of zeolite H-BEA and also indicated retention of the framework structure of zeolite BEA even upon controlled dealumination process of the parent zeolite by acid treatment. The performance of the material as a solid acid catalyst was investigated for the synthesis of biologically active compounds through MCRs and it displayed excellent activity towards the synthesis of 1-benzyl-2,4,5-triphenyl-1H-imidazole. Cost effectiveness, easy isolation, elimination of use of hazardous solvents, high yields; shorter reaction time, easy work-up procedure and reusability of the catalysts without any loss of its catalytic activity are the key advantages of this novel green protocol.

Keywords: Zeolite BEA, MCRs, dealumination