Review on synthesis of phosphonate derivatives under aqueous condition and it's pharmaceutical and industrial applications.

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Abstract: A concise, highly efficient and eco-compatible route for the synthesis of phosphonate derivatives under aqueous conditions has been developed. Phosphonates and phosphomalanoates are a versatile class of bioactive compounds possessing a stable C−P or C−P−C bonds, respectively, which account for their potent use as enzyme inhibitors. Apart from this, their diverse oriented use as antimalarials, antimicrobials, antifungal and antihypertensive agents has greatly motivated and prompted us to devise a more rational and green synthetic route for synthesis of such an elite class of molecules. Phosphonates are increasingly used in medicine to treat disorders associated with bone formation. Indeed ,both man-made and natural phosphonates have found widespread use as potent antifungal, herbicidal, antiparasitic or anti-microbial agent. Synthetic phosphonates are alendronate used to treat osteoporosis.There is a wide use of phosphonates and their derivatives because of their biological activities and wide range of application as a metabolites,peptide mimetics ,antibodies.The current devised protocol offers multidimensional advantages such as operational simplicity, ease in reaction handling and easy workup procedure, excellent yield of products, eco-compatibility, time and high atom economy, ambient reaction conditions etc.Keeping in view the emerging trends of phosphonates,a brief review will be conducted and it's importance will be highlighted. Structure of all the synthesized compounds has been characterized by ^{1}H-nuclear magnetic resonance (NMR), ^{13}C NMR, ^{31}P NMR and spectroscopy.

Keywords: multi-component reactions, phosphonate derivatives, mild catalyst, aqueous condition, green chemistry.