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This work describes a screening of soil bacteria library to find bacteria that is able to produce higher amount of alkali-thermostable xylanases aiming it is use in paper industry. A *Bacillus sp.* producing higher amounts of extracellular xylanases with the desired biochemical characteristics was select and it is crude protein extract was successfully used for biobleaching of paper. In conclusion, we selected a bacteria isolate with biotechnological potential to be used in paper biobleaching. Our results are innovative in Biochemistry and Biotechnology fields because our paper describes new bacteria isolate producing higher amounts of industrially important enzyme. Furthermore, the crude protein extract of this isolate showed to be able to increase brightness of cellulose paper.