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# Green extraction and enrichment of natural bioactive compounds: An innovative and economical approach in phytomedicine

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## Abstract

Natural sources in general and plants in specific are unique suppliers of novel bioactive compounds. However, their isolation involves a time-consuming, energy-intensive, multi-stage process that requires a large amount of toxic organic solvents, ultimately increasing its production costs. An alternative approach that presents the possibility of a synergistic effect is to prepare the active constituent's enriched extract using green extraction approaches with the help of microwave-assisted extraction technology and enrichment by using biodegradable resin columns. Recently, berberine-rich extract (BRE) has been prepared from *Berberis lyceum* root bark, having 58% w/w of berberine using microwave and hydrophobic resin Diaion® HP-20 column. BRE was compared with commercially available pure berberine (more expensive) in various pharmacological models including, antimicrobial (against *Proteus vulgaris, P. aeruginosa, Staphylococcus aureus, K. pneumonia, Salmonella typhi* and methicillin-resistant *staphylococcus aureus* (MRSA)), anti-inflammatory (*in vitro* chemiluminescence technique and *in vivo* carrageenan and formaldehyde-induced rodent inflammation models), wound healing (cell migration assays), antidiabetic (nicotinamide-streptozotocin induced diabetic rat model), anticancer (A549-lung cancer cell and MDA-MB-231-breast cancer cell lines) and ant-Alzheimer ($AlCl_3$ induced rat model). In all of the pharmacological models, BRE shows dose dependent, potent and significant bioequivalent effects to pure commercial berberine. The under taken study suggests that BRE can be used as an alternative of berberine.