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Gold nanoparticles conjugate with *Bacopa procumbens* extract improve wound healing in *in vivo* model

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Rapid healing of wounds is important to prevent infections and to reduce post-treatment side-effects. Gold nanoparticles (AuNPs) could be employed to enhance drug effects and to transport drugs1. Our previous results demonstrated that extract of the *Bacopa Procumbens* (BPE) improve wound healing process$_2$. Here we evaluated if BPE-AuNPs conjugation enhance the wound healing effects *in vivo*. Gold nanoparticles were synthetized and conjugated with BPE, the complex was characterized by UV-Vis spectroscopy. Then, we evaluated the morphometric effects of the AuNPs-BPE conjugates at different concentration, applied topically on the excisional *in vivo* wound healing model in male Wistar rat. The percentage of wound area at 7 days post-injuries were similar in those animals treated with 160mg/ml BPE than in those treated with BPE-AuNPs using 16 or 1.6 mg/ml BPE (14.77±1.16, 15.48±1.35 and 14.1±1.39, respectively), suggesting that nano-conjugation reduced 100 fold the BPE amount needed to have the same phenotypic effect. Gold nanoparticles were successfully conjugated with BPE. Topical application of BPE and BPE-AuNPs using 16 and 1.6 mg/ml enhance the wound healing process. These findings support the potential role of AuNPs as an adjuvant compound in the treatment of cutaneous wounds.

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Fast centrifugal partition chromatography: An efficient tool for isolation of bioactive compounds from natural products

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Safe-by-Design (SbD) is not new, the method has been used for years by the industry to minimize the toxicity of products. Natural products have been a key source for the discovery of new drugs. Isolation of the active components from a natural product has always been associated with complex separation problems due to the enormous chemical complexity of the extracts, but recent advances in separation sciences have facilitated the isolation of these active components from natural products. At present, the used adsorbents SiO2 and Al2O3 are not chemical inert. Separation of natural products on alumina or silica gel sometimes results in recovery of only 70-90%. Sometimes severe losses of valuable materials result because of irreversible adsorption on a solid support. In addition, isolation of artifacts has also been reported due to chemical reaction of the substrates with solid phase adsorbents. A Fast Centrifugal Partition Chromatograph (FCPC), which utilizes centrifugal force to enhance phase separation, provides a new dimension in the area of separation science. FCPC is based on liquid-liquid partitioning and is an excellent alternative to circumvent the problems associated with solid phase adsorbents and to preserve the chemical integrity of mixtures subjected to fractionation which provide recovery more than 90%. CPC relies on the partition of a sample between two immiscible solvents to achieve separation. The relative proportions of solute passing into each of the two phases are determined by the respective partition coefficients. CPC has been successfully used for the separation of a wide variety of natural products and synthetic molecules. We applied this method for the large-scale separation of alkaloids, steroidal glycoalkaloids, nitrile glycoside and the tri-terpenes.

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