ULTRASOUND-ASSISTED EXTRACTION OPTIMIZATION OF BIOACTIVE COMPOUNDS FROM Dipteryx alata LEAVES USING RESPONSE SURFACE METHODOLOGY

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The Brazilian Cerrado is one of the most biodiverse savannas in the world and a valuable source of phytochemicals. *Dipteryx alata* Vogel (baru), a native species used in folk medicine, has been studied mainly for its fruits and seeds, while its leaves remain underexplored. These leaves contain bioactive metabolites, particularly phenolic compounds and flavonoids, relevant to pharmaceutical and cosmetic applications. This study aimed to optimize ultrasound-assisted extraction (UAE) of *D. alata* leaves, focusing on yield, phenolics, and flavonoids. A Central Composite Design (CCD) and Response Surface Methodology (RSM) were employed, considering extraction time (60, 90, 120 min) and ethanol concentration (30, 50, 70%) as independent variables. Leaves collected in Palmas-TO, Brazil, were identified at the UNITINS herbarium (voucher HUTO 8056), dried, powdered, and extracted in an ultrasonic bath (200 W, 40 kHz). Extracts were lyophilized and analyzed for yield, total phenolic content (Folin–Ciocalteu, mg GAE/g), and total flavonoid content (quercetin method, mg QE/g). The maximum yield (42.51%) was obtained with 30% ethanol at 120 minutes, while the highest phenolic (136.46 mg GAE/g) and flavonoid (23.45 mg QE/g) levels occurred with 70% ethanol at 60 minutes. Statistical models showed good predictive capacity ($R^2 > 78\%$ for phenolics and flavonoids; 90% for yield). RSM revealed ethanol concentration as the most influential factor, and global desirability indicated optimal conditions at 60 minutes and 70% ethanol. In conclusion, UAE proved efficient for recovering phenolic compounds and flavonoids from *D. alata* leaves. The application of RSM enabled the identification of optimal conditions, maximizing extraction efficiency and reducing experimental effort. These results support the valorization of *D. alata* leaves as a promising phytochemical source and highlight statistical optimization as a valuable tool in green extraction processes.

Keywords: *Baru; Cerrado biome; phenolic compounds; flavonoids; Phytochemical valorization, Statistical optimization*