

Effect of Supercritical CO₂ and type of co-solvent for extraction of lipids and terpenics from Guayule biomass (*Parthenium argentatum*)

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Guayule (*Parthenium argentatum*), a perennial crop under semi-arid climate, producing polyisoprene (Guayule rubber, GR) and resin, is the most probable alternative source of natural rubber. GR is similar to Hevea's. To date efforts aimed at marketing GR, while the bagasse (GB) (90%-dw, dry weight) left after water-based extraction remains underused. Thus Cirad is investigating a "green" process for extracting valuable compounds from GB, including lipids. After having obtained preliminary results, showing that a co-solvent is necessary in addition to SC-CO₂, we now investigate the influence of operating parameters.

Under SC-CO₂, resin extract is higher with ethanol as co-solvent (12.1%-dw) compared to acetone (7.8%-dw), at temperature 35°C and 300 bar, co-solvent flow rate 3mL/min, CO₂ flow rate 34.4 g/min. Acetone-based extraction under pressurized conditions above boiling point (ASE-acetone) is used as reference method. The selectivity for aromatic carboxylic acids (cinnamic, *p*-anisic) initially linked to sesquiterpenes, is better with SC-CO₂-ethanol compared to SC-CO₂-acetone. The minor components are lipids rich in C18:2, C16:0, C18:3, in between cotton and soybean oils, although poorer in C18:1. The unsaponifiable contains sesquiterpenes, whose extraction is mainly dependent on pressure but not temperature with SC-CO₂-ethanol.

