

Lithium Brine Exploration in La Unión, Ahumada, Chihuahua, México

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La Unión Salar is located 100 kilometers southwest of Ciudad Juárez and 40 kilometers northwest of Villa Ahumada, within the El Barreal Playa Lake, an endorheic basin of approximately 1,200 km² that exhibits key characteristics associated with lithium brine deposits, including an arid climate, tectonic subsidence, potential lithium-bearing source rocks, and a highly saline aquifer. Felsic volcanic rocks, such as rhyolites, rhyolitic tuffs, and ignimbrites, have been identified in the Sierra de la Unión and Sierra de la Candelaria, which delineate the southeastern extension of the basin. The exploration focused on this sector, which encompasses approximately 200 km². These lithologies are interpreted as products of Oligocene ignimbritic pulses and are considered potential lithium sources, as observed in other brine deposits. Vertical Electrical Soundings indicate the presence of a brackish aquifer that likely transitions into a more saline system at depths beyond the reach of the geophysical survey. This aquifer appears to be locally confined or semi-confined by clay-rich sedimentary units. A systematic sampling grid was established, with cells measuring 1,000 by 1,000 meters. A total of 46 sediment samples were collected from the El Barreal basin, covering approximately 40 km². Lithium concentrations in the sediments ranged from 20 to 165 ppm, with an average of 62.6 ppm. In the northern portion of the study area, corresponding to La Unión Salar, the average lithium concentration was 101 ppm. These values are considered anomalous, with peak concentrations reaching up to 165 ppm, comparable to those reported in other lithium exploration projects in geologically similar settings, such as the Animas Valley Project in New Mexico.