Sustainable Lithium Production From Geothermal Waters In Central Anatolia Region

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ABSTRACT

The increase in electrification in our country causes a strong increase in lithium demand. Energy storage is essential in electric and hybrid vehicles. Lithium is a vital raw material for the creation of both existing lithium-ion batteries and future-proof next-generation batteries. In this research, we aim to discuss the advantages and disadvantages of lithium recovery methods in geothermal hot spring waters of Central Anatolia from environmental, financial and material perspectives. By scanning the literature, the properties, flow rates, chemical properties, elements and especially lithium amounts of some geothermal water resources in the Central Anatolia region were examined. Our working areas are selected according to lithium, pH, temperature and flow values. According to the field research to be conducted, the characteristics of the region can guide which method should be applied. Electrodialysis method is examined in detail. It describes how to calculate the amount of lithium that can be obtained by this method. The electrodialysis method is very useful in reducing the salt content of process streams with high salt content, but is expensive. Depending on some meteorological parameters such as temperature, wind speed, relative humidity and precipitation of the region and the flow rate of the geothermal system, evaporation method is also being investigated to obtain lithium. As a result of our study, while evaporation is more efficient in Küçükhamam, Bulamaçlı and Eregli; Electrodialysis is more efficient in the Akşehir and Çavlak geothermal fields. While the highest recovery rate with the electrodialysis method was obtained in Sorgun-Yozgat (42.77 kg/day), the highest recovery rate with the evaporation method was obtained in the Ereğli Konya (34.51 kg/day) fields. If we compare the extraction methods, we need to apply the re-injection method for sustainability in the electrodialysis method. When we evaporate all the geothermal water, we can deplete the geothermal resource in the long run.

Key Words: Turkey, Central Anatolia, Geothermal, Lithium, Evaporation method, Electrodialysis method