The Applications of Supercritical Fluid Simulated Moving Bed to the Separation of Natural Products

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The replacement of liquid desorbent by supercritical fluid for a simulated moving bed chromatography is called SF-SMB. It was firstly proposed by Clavier and Perrut in early 1990's for Omega fatty acids. In our lab, the authors designed and assembled various scales of the SF-SMB and applied this technology to the separation of natural products. Examples include the separation of lignan from the sesame and the Wuweizi seed oil, the separation of polyunsaturated fatty acid from fish oil and plant seed oil, and the separation of active components from Chinese herbs. Taiwan I-Shou University have three SF-SMB units from small to production scale. The facilities provide a platform for collaborations between academia and local industry. The SF-SMB provider, Jope Co is also the unit manufacture who dedicates to lower the capital cost in the interest of promoting SF-SMB to industrial use. This combined effort makes research outcome applicable for practical usage of industries' concern. In this presentation, the authors summarize recent applications and developments from references and in house. Both advantages and disadvantages of SF-SMB as compared to liq-SMB and the needs of fundamental studies to breakthrough of engineering limitation will be addressed with successful industrial application based on authors' experience in the last two decades.