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WORKING PAPER

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# Review of mass transfer characteristics in microchannels for liquid-liquid extractive systems using experimental techniques

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**Title:** Review of mass transfer characteristics in microchannels for liquid-liquid extractive systems using experimental techniques

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**Abstract (150 words):** In liquid-liquid extraction (LLE) the volumetric mass transfer coefficient's (VMTC) in micro-channels are two orders of magnitude higher than conventional extraction equipment's. In the present review, the research works of experimental studies for mass transfer in non-reactive and reactive systems are summarized. The VMTC's are affected by geometric, operating parameters, material of construction. An empirical correlation relating the dimensionless numbers of flow and mass transfer has been developed. The correlation predicts the VMTC well till  $Re < 150$ . Concept of j-factor for microchannels has been introduced similar to Chilton-Colburn Analogy. A new dimensionless number which is a ratio of Stanton number to Capillary number has been introduced. The dimensionless number is termed as Pandit number. The j-factor increases with increase in  $Re$ . The j-factor is a strong function of Capillary number for  $Re > 150$ . Recommendations for future work have been presented based on the review in the present work.

**Keywords:** Microchannels, liquid-liquid extraction, mass transfer, CFD, mass-transfer coefficient, analogy