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Studying the Effect of Ethanol and Operating Temperature on Purification of Lactulose Syrup Containing Lactose

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Abstract : Lactulose is a synthetic disaccharide which has remarkable applications in food and pharmaceutical fields. Lactulose is not found in nature and it is produced by isomerization reaction of lactose in an alkaline environment. It should be noted that this reaction has a very low yield since significant amount of lactose stays un-reacted in the system. Basically, purification of lactulose is difficult and costly. Previous studies have revealed that solubility of lactose and lactulose are significantly different in ethanol. Considering the fact that solubility is also affected by temperature itself, we investigated the effect of ethanol and temperature on separation process of lactose from the syrup containing lactose and lactulose. For this purpose, a saturated solution containing lactulose and lactose was made at three different temperatures; 25^{o}C (room temperature), 31^{o}C, and 37^{o}C first. Five samples containing 2g saturated solution was taken and then 2g, 3g, 4g, 5g, and 6g ethanol separately was added to the sampling tubes. Sampling tubes were kept at respective temperatures afterward. The concentration of lactose and lactulose after separation process measured and analyzed by High Performance Liquid Chromatography (HPLC). Results showed that ethanol has such a greater impact than operating temperature on purification process. Also, it was observed that the maximum rate of separation occurred at initial amount of added ethanol.

Keywords : lactulose, lactose, purification, solubility
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