

KEY WORD : LEACHING/NATURAL RUBBER/LIQUID CARBON DIOXIDE

PORNREDEE MOONGSAMANKUL : LEACHING OF NATURAL RUBBER PELLETS BY LIQUID CARBON DIOXIDE. THESIS ADVISORS : PIENPAK TASAKORN, Ph.D., 123 pp., ISBN 974-581-911-5

Liquid carbon dioxide leaching is a new separation technique that exploits the solvent power at supercritical conditions (73.8 bar and 31.06°C). It is particularly effective for the isolation of substances of low molecular weight and relatively low polarity. Carbon dioxide has high diffusivity and low density, viscosity and polarity, thus allowing rapid leaching and phase separation. This technique is, therefore, employed to decrease protein content in natural rubber. It is achieved through the removal of protein surrounding/isoprene polymer molecules by carbon dioxide molecules, and the protein leached out afterwards. The color of natural rubber pellets is also making it desirable for industrial usage.

From the study, it is observed that the nitrogen content and color index decreased with both temperature and pressure. The optimum condition for leaching is at 80 bar and 30 °C for 30 min. The nitrogen content of natural rubber pellets is decreased from 0.27 % to 0.048 %, and the color index of the natural rubber pellet is lower from the original. The ability in leaching out protein from natural rubber pellets by carbon dioxide can be represented by

$$\varepsilon = 1 - 0.95 (P_r/T_r) e^{-20 \eta}$$

where ε is the fraction of protein leached out and η is the weight ratio of carbon dioxide and rubber pellets.