

บทคัดย่อภาษาอังกฤษ

Research title	Stability Improvement of bleached shellac by partial salt formation and/or composite formation
Researcher	Assoc. Prof. Dr. Manee Luangtana-anan
Office	Department of Pharmaceutical Technology, Faculty of Pharmacy, Silpakorn University
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Abstract

The objective of this study was to improve properties and stability of bleached shellac by the partial salt and composite formations. Initially, bleached shellac was prepared, evaluated and compared with unbleached shellac. The study proved that the bleaching process did not have effects on chemical structure, amorphousness and crystallinity, and mechanical properties. However, the acid values increased significantly and the stability was reduced. Further study was to improve the stability by partial salt formation with the use of sodium carbonate as a salt forming agent at various ratios. The improvement was also performed by composite formation based on bleached shellac and ethycellulose. The findings was the increase in the ratio of salt form contributed to the lower acid value, and increases in solubility in the medium, melting point and water permeability. Upon stability study at 40°C, 75% RH for 6 month, the acid values, insoluble solids and solubility properties changed significantly at the lower raiois of salt (10%, 20%, และ 30%) while the higher ratios at 50% and 100% were stable. The sufficient salt formation can prevent the interaction between hydroxyl and carbonyl groups by the formation of ionic bond between negative charge of shellac and positive charge of sodium. The suitable ratio for stability enhancement and enteric coating was at 50% salt.

For composite formation based on bleached shellac and ethyl cellulose, all the ratios of formulations did not cause any changes in various properties, except the solubility at pH 7.4 did not dissolve at the ratios of 7:3, 6:4 and 5:5 for 3 h. Upon 6-month storage at 40°C, 75% RH, the significant changes in acid value and insoluble solid were reported at the ratios of 9:1, 8:2, 7:3 and 6:4, whereas the ratio of 5:5 remained stable. This indicated that the sufficient amount of ethyl cellulose could prevent hydroxyl and carbonyl groups from the polymerization processs due to the entanglement effect of ethylcellulose. The stability enhancement by the composite formation is, hence, another approach to improve the stability of bleached shellac. However, the low solubility at the pH 7.4 was the obstacle for the dosage form. Further study is required to improve its solubility for dosage form design such as enteric dosage form. Therefore, the partial salt formation shows a better approach for the development of enteric coating.

Keywords: bleached shellac, stability, bleached shellac in partial salt form, bleached shellac in composite form