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Crystalline Structure Properties of Bleached and Unbleached Wheat Straw (Triticum Aestivum L.) Soda-Oxygen Pulp

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<u>Abstract:</u> In this study, the crystallinity index and crystallite size of wheat straw powder, soda-oxygen pulp and soda oxygen pulp bleached with hypochlorite (H) and hypochlorite and peroxide (HP) sequences were determined using an x-ray diffractometer method. The crystallinity indexes of these pulp samples were found to be 45.61%, 52.00%, 52.60% and 54.11%, respectively. The crystallite sizes of these pulp samples were also determined and were 6.4 nm, 3.4 nm, 4.3 nm and 4.6 nm, respectively. On the other hand, the crystallinity index and crystallite size of holocellulose, cellulose and alpha-cellulose in wheat straw were then found to be 65.00%, 55.20% and 46.40%, and 6.1 nm, 3.7 nm and 9.1 nm, respectively. Consequently, the crystallinity index and crystallite size in pulp increase with respect to the removal of the lignin and hemicelluloses in pulp. However, the results obtained are not consistent, because the chemical agents used in the removal of the lignin and hemicelluloses may cause hydrolysis and swelling of the cellulose with a contaminant reduction in crystallinity.

Key Words: Cellulose, crystallinity index, crystallite size, pulp, wheat straw, x-ray

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