Replacement of Synthetic UV-Absorbents by Lignin

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The aim of the project was to propose the potential use of lignin in the prevention of UVA/UVB radiation in sunscreens and plastics. The subjects of the work were UV/Vis absorption and fluorescence spectra of lignin, influence of external factors on given spectra (time, solvent, UV, temperature), toxic effects of lignin on human epidermal cells in vitro, comparison of results with commercial sunscreens, infra-red spectra and mechanical properties of plastic after UV and temperature effects. The results show that lignin absorbs UVB radiation at a level of 86 % (at 80 μg/ml) and no significant change in absorption properties after external influences was observed. After exposure to UV radiation, lignin had increased UVA/UVB absorption. Comparing the results of lignin with commercial sunscreen (SPF 30) showed better absorption properties of lignin in UVB versus commercial preparation. Cell migration, confluent culture, and metabolic activity tests of keratinocytes in the presence of lignin have shown a positive effect on skin cells. Lignin added to RXP does not cause chemical changes in plastic. Mechanical properties of the plastic with lignin have shown that the presence of lignin leads to a reduction of UV degradation and does not affect the temperature degradation. The results of the work show the possible use of lignin as a UV absorbent in sunscreens and plastics. Key words: lignin, UV absorbance, keratinocytes, plastic additive, sun protection factor

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