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Seaweed extracts as potential source of new antiviral agents for bio-based cleaning wipes and filters

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During viral epidemics such as influenza, Ebola or SARS many states are unable to afford effective but expensive filtering facepiece respirators (FFP3 or N95 type). Unefficient alternative respiratory protective equipments such as cotton fabrics and medical masks are often used. Several methods have been recently developed for producing low-cost virucidal filters suitable for respiratory protective masks. The use of natural biocide molecules could make a contribution to introduce antimicrobial properties inside cellulose filters. Surface cleaning represents also an essential disinfection procedure for virus elimination from contaminated surfaces. The cleaning by modified wipes containing antiviral compounds is also of major interest. The present work reports the preparation of new antiviral cleaning wipes and filters using seaweeds extracts as antiviral agents. 30 seaweeds extracts containing ulvans, fucoidans, alginates, pectins or polyphenols were tested. The antiviral experiments were first performed on suspensions of T4D bacteriophage of *Escherichia coli*. Only polyphenols revealed antiviral activity. All polyphenol-grafted cellulose layers exhibited a large improvement in the reduction of the viral concentration (5-log after 20 min). Hence, these materials could be used as virucidal wipes for the virus elimination from contaminated surfaces. Virus filtration experiments were performed by spraying a suspension of bacteriophage through modified layers. The virus reduction was improved 10-fold for monolayer and 4-fold for bi-layers. Finally, two layers were placed inside a commercial medical mask in place of its cellulose layer. The virus reduction was improved 12-fold compared with the original mask. Based on these results, a significant improvement over conventional commercial medical masks was obtained.

Biography

Laurent Lebrun has completed his PhD in Physicochemistry in 1993 from Rouen University. He is currently an Assistant Professor. He has published 60 peer-reviewed publications and is Co-Inventor of one patent and two standards. His main research interest is concerned with polymers (synthesis and characterization), membranes, barrier materials and the use of polymers for the improvement of the environment. His application fields are packaging materials, gas separation and wastewater treatments and biocomposites.

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