

Wipes for Detection and Cleaning of Hazardous Drug Contamination

Simple to use cleaning wipes for detection and decontamination of chemotherapy drug spills

Advantages:

- Rapid and visible detection of hazardous drug contamination
- Simple clean-up of contamination
- Does not produce additional contamination like some current cleaning protocol
- Easy to use “wipe” format

Principal Inventor(s):

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Publications/References:

Provencher, P. A.; Love, J. A. Synthesis and Performance of a Biomimetic Indicator for Alkylating Agents, *J. Org. Chem.* **2015**, 80 (19) pp 9603

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Patent Pending

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Background - Summary

The adverse health effects associated with chemotherapy drugs are well documented. Although cancer patients who take these drugs often experience negative side effects during treatment, these disappear once treatment is complete. On the other hand, hospital workers may be chronically exposed to low levels of these drugs. Chronic occupational exposure to cytotoxic drugs has been reported to have significant negative impacts on health, including increased incidence of cancer, liver and kidney toxicity, infertility and fetal damage; thus posing a major problem for the healthcare industry. Exposure is typically through dermal penetration via contact with a contaminated surface or by inhalation. The US National Institute for Occupational Safety and Health (NIOSH) has indicated that more than 50% of workers in US facilities where these drugs are administered could have chronic exposure. A number of reports indicate that current practices in North America to clean contaminated surfaces are at best inadequate and at worst can spread contamination or increase the toxicity of the drugs by partial decomposition.

UBC Technology - Summary

A “litmus test for hazardous drug contamination”, the product is a simple-to-use indicator that turns blue within seconds when exposed to hazardous drug residues. The indicator is provided in combination with a solution and wipe that effectively dilutes and absorbs hazardous drugs, rather than oxidizing them to form toxic byproducts. The indicator can be applied by means of a spray-bottle and subsequently removed with an absorbent towel or wipe, or can be provided in a pre-infused wet-wipe format. Workers in situations where drug contamination may be present can apply the indicator to spills or potentially contaminated surfaces to determine whether contamination is present; cleaning should continue until the indicator no longer turns blue on contact.



Product Details

The product is a simple to use wipe that turns blue within seconds when it detects alkylating agents are present (which is common in many cytotoxic drugs). The wipe also holds a solution that effectively traps cytotoxic drugs in the solution and cloth. The product dilutes and absorbs, rather than reacts with cytotoxic agents, thereby avoiding the production of additional toxic byproducts of the drugs. Cleaning should continue until a wipe no longer turns blue on contact.

Market Details

The adverse health effects associated with antineoplastic agents (cancer chemotherapy drugs, cytotoxic drugs) in patients treated with these drugs are well documented. Pharmacists who formulate these drugs or nurses who may prepare and/or administer them are the two occupational groups who have the highest potential exposure to antineoplastic agents. Additionally, physicians and operating room personnel may also be exposed through the treatment of patients. Hospital staff, such as shipping and receiving personnel, custodial workers, laundry workers and waste handlers, all have potential exposure to these drugs during the course of their work. Although personal susceptibility to different carcinogenic substances varies, elimination of these chemical or biological toxins in the work environment is an important and accessible step in the prevention of cancer among healthcare workers.

NIOSH has reported that the number of exposed healthcare workers may exceed 5.5 million in the United States, and from this statistic it may be estimated that over half a million workers in Canada may be similarly exposed. The need for a product that can detect and clean drug contamination from surfaces is well established in the literature. UBC therefore contracted a survey of pharmacists and oncology ward nurses to determine the level of awareness of issues in contamination and to validate their potential as customers for the product. The market assessment found that users and purchasers in the pharmacy and oncology ward spaces were receptive to a new product for detection and decontamination of drug residues. Both cleaning wipes and a cleaning spray, imbued with an indicator for the level of drug contamination, received enthusiastic support.

Key Findings:

1. Pharmacists feel relatively safe but know that there is an underlying risk, particularly with respect to the thoroughness with which the preparation area was most recently cleaned. There is no current method of knowing if a surface is contaminated.
2. Oncology nurses also feel relatively safe, but identify the following concerns that increase exposure risk
 - a. Patients may excrete chemotherapy drugs during and after treatment
 - b. Patients, nursing assistants, and cleaning staff do not have the same understanding of risks as well trained nurses.
 - c. Chemotherapy drugs may leak from injection sites
3. Chemotherapy drugs provide exacerbated dangers to women who are or may become pregnant, unfortunately nurses, administrators and cleaning staff in oncology wards preponderantly female.



Quotes from Interviewees:

"Sounds like an ideal cloth when you clean the hood, first the worker would know how badly the hood is dirty compared to Surface Safe [a current cleaning protocol], where spots of problems are, where would need extra cleaning."

"Would use it multiple times in each day. Would use it before and after administration, and throughout the working day."

"Sounds awesome. Like idea that it's not creating more toxic chemicals and you know when it's actually clean... Whether one wipe or ten wipes. So easy to train people on wipes, even from housekeeping to nursing."

"Wow! Impressive because we have no way of knowing if the surface we've cleaned is adequately cleaned. Don't know if anything even there to start... Sounds easy and doable."

Stage of Development

The indicator chemistry has been developed, the research team is seeking funding and/or partnerships to establish the limits of detection (i.e. the sensitivity of the indicator to trace amounts of contamination) and rate of response, the optimal formulation and the incorporation of the indicator into a wipe format. Partnering with an existing company or formation of a new company are being investigated to bring this technology to market.

