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Enhancement of wash fastness of the lemongrass oil treated mosquito repellent nylon nets by air plasma pretreatment

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Insect-transmitted disease remains a major source of illness and death worldwide. Mosquitoes alone transmit disease to more than 700 million persons annually. Malaria kills 3 million persons each year, including 1 child every 30 seconds. The worldwide threat of arthropod transmitted diseases, with their associated morbidity and mortality, underscores the need for effective insect repellents. Protection from arthropod bites, especially mosquito bites, is best achieved by avoiding infested habitats, wearing protective clothing, using protective nets, and using insect repellent. In many circumstances, use of nets that inhibit the entry of mosquitoes was the most feasible way to protect against mosquito bites. It is added advantage of treating the nets with insect repellents that not only protect the entry of the mosquitoes but also repel the mosquitoes. The most commonly used insect repellents contain organochlorine and organophosphate insecticides which are not only highly toxic to man but they are also not easily biodegradable in the environment and sometimes infiltrate into the food chain. Herbal insect repellents prove to be a suitable alternative for the hazardous chemical insect repellents. Traditional wet finishing methods necessitate usage of huge amounts of chemicals, water and energy, whereas plasma is a dry processing technique and offers a solution to reduce the use of all three resources. The present research work has been designed with an aim of developing herbal insect repellent (essential oil) treated nylon mosquito nets. These natural products will effectively repel mosquitoes, but they require more frequent reapplication i.e. poor wash fastness. Hence an attempt has been made to increase the wash fastness of the essential oil coated nets by plasma pre-treatment. Besides insect repellency, the antimicrobial efficacy of the nets was also evaluated by standard methods. In the present study, the essential oil used to impart insect repellency was lemon grass oil and the type of plasma used in the study was air plasma. The results showed that plasma pretreatment of the nylon net increase the affinity of net to finishing agents, which in turn increases the washfastness of the nets. The results of the antimicrobial study clearly demonstrated the antimicrobial activity of plasma pre-treated lemon grass oil treated nets. Hence it can be concluded that plasma pretreatment increase the hyrophilicity, finishing affinity, and consequently washfastness properties of the lemon grass oil treated nylon mosquito nets.

Biography

Hasabo A Muhammad Ahmed completed his degree at College of Engineering, Sudan University, Khartoum, P.G. Dip, at Leeds University (UK), M.Sc at NSW University (Australia) and Ph.D at Sudan University. He is an Associate Prof. at Sudan University. He is the President and founder Textile Graduate Association, (Sudan) and he served as Head, Textile and cotton Standards Committees (SSMO), 2001-2010. He has attended many management courses and his Teaching and Management Experience span around three decades. He has published more than 20 papers in reputed journals and serving as an editorial board member of some reputed international journals. He has visited more than 20 countries and has presented many papers in international seminars/conferences.

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