MEDECINS SANS FRONTIERES
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SCIENTIFIC DAYS

A biodegradable, sustainable, body personal protective equipment (PPE) with germicidal properties, made of soap paper and gauze

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GreenScreen Protect

Problem Statement

Over 400 million tonnes of plastic waste are produced each year globally. 80% of this becomes plastic waste. 40% of the plastic waste is single use plastic.

9.2 billion tonnes of plastic have been produced till date

Plastic is non biodegradable. It stays around for hundreds of years. Plastics and microplastics are harmful to the environment and all life forms

In humans, they cause endocrine disruption, neurological problems, gonad related problems, and cancers due to toxic metabolites such as Phthalates, Bisphenols, Styrenes etc.

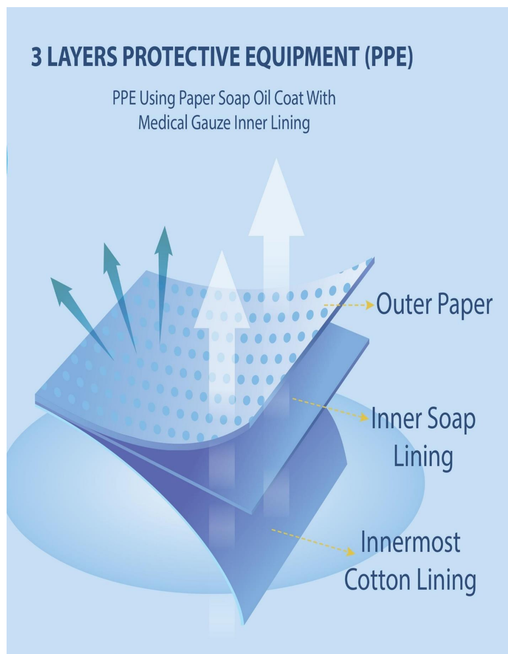
During The Covid Pandemic, a huge amount of plastic waste was generated due to the use of PPE's. This was labelled a 'Shadow Pandemic' of plastic waste

It is estimated that approximately one million tonnes of polypropylene waste were generated per month during the Pandemic

A sustainable, economical, safer alternative to conventional plastic PPEs in many ways :

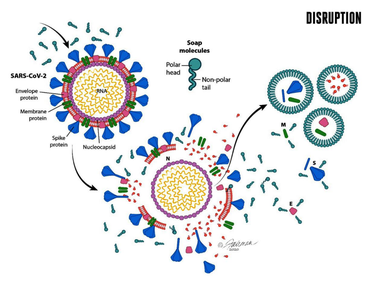
Gowns and other items made from biodegradable soap paper

	Biodegradable soap paper PPE	Plastic PPE -conventional
Sustainability	Biodegradable (30-90 days) Made from renewable raw materials	Non biodegradable > 450 years Made from fossil fuels
Comfort	Lightweight, airy, breathable, two piece – easy to wear	Hot, uncomfortable, can cause heat stress/dehydration. Restricted movement. Difficult to don & doff.
Safety	Physical barrier + a) Soap is virucidal to enveloped viruses, bacteria, Sars CoV2, Hep C, HIV b) If accidentally wetted, action enhanced due to micelle formation c) Careless disposal is safer	Physical barrier only Careless disposal unsafe as viruses can survive on surface of plastic for 72 hours
Economics	500-600/-Rs (handmade); less if machine produced Recyclable –paper recycling well known	350-1600/-Rs – Average 800 Rs Recyclable back to plastics
Raw Materials	Local, inexpensive, cheap	Fossil fuel derived , higher grades costly
Skin friendliness	a) No harsh chemicals used b) Coconut oil (raw material) is good for skin + used in skin products	Micro-plastics close to skin



Some common enveloped viruses

Corona
HIV
Hep B
Hep C
Influenza
RSV
Measles
Mumps



Soap molecules destroy the lipid bilayer of the viral envelope

Other ways to enhance germicidal action of fabrics : Fabrics are saturated with medical molecules such as PHMB and polymyxin to give an anti-viral coating, or saturating nanofibers with elements such as silver, copper, zinc nano oxide etc. These are complex, expensive.
This soap paper has an inherent anti-viral property, is low cost, and does not require any complex technology like the above processes. This fits in with the MSF ethos of simple processes replicable in low resource settings

Several uses of this biodegradable material :
This material can be used for diverse medical and non medical products such as trolley sheets, table covers, aprons, etc & for packaging

Indian Patent 2022

GREENSCREEN PROTECT

Winner of the best innovation All India Ophthalmic Society annual conference 2023

Tested in govt. labs for medical applications using standards for plastic PPE

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Conclusion

This patented biodegradable material made of soap paper, which can be used to fashion PPEs as well as other medical and non medical items, has several advantages over plastic and can replace it.

Currently it is in the stage of an advanced prototype and we are seeking collaboration + funding for a large scale pilot for 100 doctors followed by commercial production and use.

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