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Texas Tech professor's cotton mat could improve oil spill clean up

The mat is made of a specific type of nonwoven cotton, which can absorb up to 50 times its weight in oil.

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Prof. Ramkumar and the oil-absorbing cotton mat.

Courtesy Texas Tech University

A new, super-absorbent cotton mat could improve developed by researchers in Lubbock and India could improve chemical spill cleanups.

The mat repels water, but absorbs chemicals such as crude oil. Its developers are pitching it as a sustainable way to mitigate the impact of events like oil spills.

Seshadri Ramkumar is a professor of chemical countermeasures and advanced materials at Texas Tech University's Department of Environmental Toxicology. He spoke to Texas Standard about the mat's current applications, and plans for the future. Listen to the full interview in the audio player above or read the interview transcript below.

This interview has been edited lightly for clarity.

Texas Standard: This oil spill cleanup product that you've developed is, as I've heard it described, a kind of cotton mat. Can you describe what it looks like?

Seshadri Ramkumar: Yes. So for the past 10 years, our lab has been working on looking at cotton for multiple new and advanced applications. And one such application we are targeting is to have a highly absorbent cotton for oil and other toxic chemicals. So it's basically, we are choosing a particular type of cotton, which can absorb relatively better than other, regular cotton. And this cotton has been made into a mat form using a new technology called nonwoven technologies. We are trying to pitch this as a sustainable material. This particular type of cotton on its own can absorb anywhere about 25 to 30 grams of its weight of crude. And then in terms of other oil, it can go a little bit higher – up to 50 grams per gram.

So how does this work? Do you just throw it over the spill like you might a towel or something?

Ramkumar: Yes. So it's like basically you are draining using your terry towel. But this cotton will not absorb water. Rather, it will only absorb the oil. So we can also put this cotton inside the plastic tubing you'll see as a containment boom instead of a microplastic material. Normally, they use very fine polypropylene material; we are trying to use sustainable products so there is no environmental pollution in the great seas.

What do you do with a mat once it's once it has absorbed all that oil?

Ramkumar: You can wring it to squeeze the oil. And the beauty is cotton is a biodegradable material. We have done some testing in collaboration with an Indian entity and shown that within three months, the cotton that absorbed the oil can degrade, which is not the case with synthetic polypropylene materials.

So, in a large-scale oil spill like the one in Southern California, would you throw out what, hundreds or thousands of these mats?

Ramkumar: The immediate application is to wipe these sea, marine animals and birds … we can use it [for that] because that's very important. And the other thing is you can insert these cotton in lump form inside the big plastic tubing instead of micro and minute plastic materials they are using. So you can use it to wipe [oil] away [from] living creatures like birds and gulls. And you can also use this as an absorbent core inside these PVC tubing instead of synthetic material.

What's the timeline for getting this new technology on the market and into the ocean?

Ramkumar: As we speak, the product has been tested, particularly in the wide form. It functions well. We are yet to investigate how we could put this inside the tubing to develop a next-generation containment boom. So that idea evolved. And then it's getting into some kind of thought process, evolution of that thought process, only based on what we are seeing right now in the Southern California and beaches. It should be within a year because we have already developed such booms. Now we would like to make it in a large scale. So that's what it is. So translation of technology into large scale is what we have to do. That's the next step.