

Bugs and flowers inspire new cocktail curiosities

January 6 2015, by Joel Garrett

Your mother probably warned against playing with your food, but she may have neglected to mention playing with your drinks. Dr. Lisa Burton, a scientist from MIT, thankfully missed that lesson. Inspired by a love of experimental cuisine, Burton and her colleagues developed several bio-inspired edible cocktail novelties as part of her graduate research. These devices take advantage of fluid-surface interactions first observed in nature to provide a fun science twist to fancy beverages.

Presented at the 2014 Society for Integrative and Comparative Biology annual conference, Burton's first invention is a cocktail boat inspired by *Microvelia* water bugs. These insects take advantage of a phenomenon called the Marangoni effect to escape predators: by expelling a chemical, they are able to rapidly propel themselves across the surface of a lake or pond. Liquids with high [surface tension](#) pull more strongly than liquids with low surface tension, so the insect is pulled forward when it reduces the surface tension behind itself.

The team's device, a tiny boat made of plastic or edible materials like wax or gelatin, uses the same principle of the water bug to dart around in a martini glass. High-proof alcohol is stored in a small reservoir, and slowly leaks out of a narrow channel on the stern. This reduces the surface tension behind the boat and allows the craft to steam forward for as long as two minutes before its "fuel" is expended. "We would love to develop a version of the device for children," says Dr. Burton, though so far the best non-alcoholic fuel seems to be Tabasco sauce, a spicy condiment that tends to inspire sour faces rather than excitement in

young diners.

Taking another cue from nature, Burton and her team also put together a flower-inspired pipette. In flood-prone regions of Brazil, rising water forces some plants to shut their petals to protect their genetic material. The flowers accomplish this defense through surface tension – the high surface tension of water holds neighboring petals together, preventing water from passing through. Burton's floral pipettes take advantage of a similar design, though with a reversed effect—when the "flower" is pulled away from the surface of water, the petals zip shut, encapsulating a droplet of drink that's just the right size for cleansing the palate between courses.

As with all engineering projects, these designs came as the result of years of dedicated study and countless hours developing prototypes in the lab. Still, Burton says, "The great thing is how much fun the work was. The whole team was always excited about the project; engineers were motivated to learn about food science and the chefs were motivated to learn about science. It's fun to have a project that people can relate to and understand and that encourages them to investigate science."

Biologically-inspired design is a rapidly expanding field, inspiring new technologies across a tremendous spectrum of engineering disciplines, from aerospace to biomedical. Recent applications include diving suits inspired by shark skin and display screens that mimic the refractive patterns of butterfly wings. Dr. Burton's creations take a different approach, resulting in some of the first successes in combining bio-inspired design with fine dining. She hopes to get the devices into restaurants and bars around the world, so be on the lookout for tiny martini swimmers soon.

More information: sicb.org/meetings/2014/

Provided by Society for Integrative & Comparative Biology

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