ASK THE EXPERT: MICROENCAPSULATION

Built-in benefits

Microencapsulation in textiles is the theme for this article, the next article in our series of question-and-answer encounters with specialist textile academics from around the world, with the answers on this occasion coming from Dr Jaime Rocha Gomes, a professor at the department of textile engineering at the Minho University in Portugal.

Question: Over recent years we have heard many claims being made for textiles with skin-enhancing properties as well as cosmetic benefits. How real are these claims or are they only effective under laboratory test conditions?

Answer: I feel there is a lot of marketing relating to these effects, for anti-cellulite microcapsules, for example, but it has still not been proved that these work. I haven't seen one scientific report that proves it. I doubt if they can improve hydrating capacity, since they are fixed by hydrophobic means such as binders and softeners. Aloe vera is partially soluble in water, meaning most of it is outside the microcapsule (I confirmed this by scanning electron microscope) and will be washed away. Fragrances are not perfumes, they only work for essential oils and not for mixtures. In my opinion, in the laboratory we can never imitate a real body properly. What do they use for skin? I hope we are not talking about experiments on animals.

Q: Which fibres are more receptive for microencapsulation treatment? Is acrylic a better receiver than, say, cotton or polyester?



Professor Jaime Rocha Gomes from the department of textile engineering at the Minho University in Portugal.

Minho University

A: I doubt that acrylic is better. The favourites are cotton, poly-cotton, or even 100% polyester. This is to do with the binders adhering better on these fibres.

Q: When cosmetic microcapsules are embedded inside a synthetic yarn, how do they release their content? When the capsules are empty, are the mechanical properties of the yarn altered?

A: Obviously the microcapusles cannot release their content inside a synthetic fibre. I presume we are now talking about yarns and not synthetic fibres: They might affect the properties of the yarn, even empty. They will have binders that will alter the properties of the yarn.

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Q: What is the definition of 'permanent' in terms of textile applications? When clothing brands or their suppliers claim that the benefits from the microcapsules (a small and finite resource) will last, for how long do they mean?

A: Microcapsules do not usually last more than between six and ten washes, that is when they are above 15 microns. Smaller ones, five microns, say, might last a bit longer. More than 20 I think will be 'marketing' and not based on scientific measurements.

Q: Related to this, how effective are methods to 'reload' the active ingredient in consumers' washing machines or by spray?

A: Reloading by machine is expensive and will not last more than a few washes since they will only be bound by ionic forces, by cationisation. By spray I should think they wouldn't last more than one or two washes, since there is no chemical binding.

Q: How effective are phase-change materials? How much difference can they make? And do you think PCMs can really work in application such as footwear, considering how much perspiration our feet can generate?

A: We have tested PCM on footwear and have found that they work but at higher phase-change temperatures, such as 32°C. Perspiration will not have that much influence. Supposedly there will not be that much perspiration if you have enough PCM and if anything it will enhance the PCM since it will force the temperature down, forcing the phase change for the next cycle.

Q: Typically, what size do the capsules have to be in relation to the denier of the fibre? Why don't they affect the feel of the fabric?

A: I believe microcapsules should be between five and 15 microns so as not to be too exposed to friction during washing and have longer durability.



It's hard to imitate a real body in the laboratory.

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