SAVEHRA RESEARCH · YOUR 8 HOURS OF SKIN & HAIR CARE

The science of what you sleep on.

What university labs, sleep studies and fiber makers reveal about modal, cotton and silk: staying dry, staying smooth, staying fresh and sleeping better.

MODAL COTTON SILK



AT A GLANCE

8 hours a night. 2,900 hours a year.



That's how long your skin, hair and face spend pressed against fabric. So we dug into the science, from university labs, sleep studies and the companies that make these fibers, to find out what's really best to sleep on.

The big takeaways

Up to 50%

more moisture soaked up by modal than cotton

ASTM FIBER STANDARDS · MORTON & HEARLE

2×

more rubbing on your skin when fabric turns damp

SWISS LAB STUDY · J R SOC INTERFACE, 2008

0

of the tested **odour-causing bacteria** grew on viscose, modal's fiber family

GHENT UNIVERSITY · APPL ENVIRON MICROBIOL, 2014

14 min

faster to fall asleep in moisture-absorbing sleepwear vs cotton

UNIVERSITY OF SYDNEY SLEEP LAB · 2019

#1

MicroModal ranked softest of 100+ fabrics in Lenzing's scientific softness study

LENZING × EMTEC ELECTRONIC

The secret?

Moisture. Fabrics that soak up sweat keep your skin drier. Drier skin means less rubbing, fewer odour-causing bacteria and a cooler, comfier night. Modal is a moisture superstar, and the next pages show why.

MEET THE FABRICS

Same bed. Three very different fibers.

Modal and cotton both come from plants. Silk comes from silkworms. How each fiber is built explains exactly how it feels on your skin.



Modal

SAVEHRA PICK

MADE FROM
Beech trees, turned into a silky-smooth fiber

UP CLOSE
Smooth, round and perfectly even

THICKNESS
~10–13 microns (super fine)

KNOWN FOR
Soft, cool, absorbent, keeps its shape

Cotton

MADE FROM
Fluffy fibers from the cotton plant

UP CLOSE
Short and twisty, with tiny fuzzy ends

THICKNESS
12–22 microns

KNOWN FOR
Classic and tough



Silk

MADE FROM
Thread spun by silkworms

UP CLOSE
One long, smooth strand

THICKNESS
~10–13 microns

KNOWN FOR
Shiny and slippery

FUN FACT

6× thinner

A human hair is about 70 microns wide. A modal fiber is just 10–13, so it's around six times finer.

Built to stay strong

Modal is officially defined by BISFA, the international fiber standards body, as a fiber with a **high wet modulus: it holds its shape when damp** far better than ordinary viscose. That's what makes it soft and durable at the same time.

Fiber data: Morton & Hearle, *Physical Properties of Textile Fibres* (2008); BISFA terminology for modal fibres.

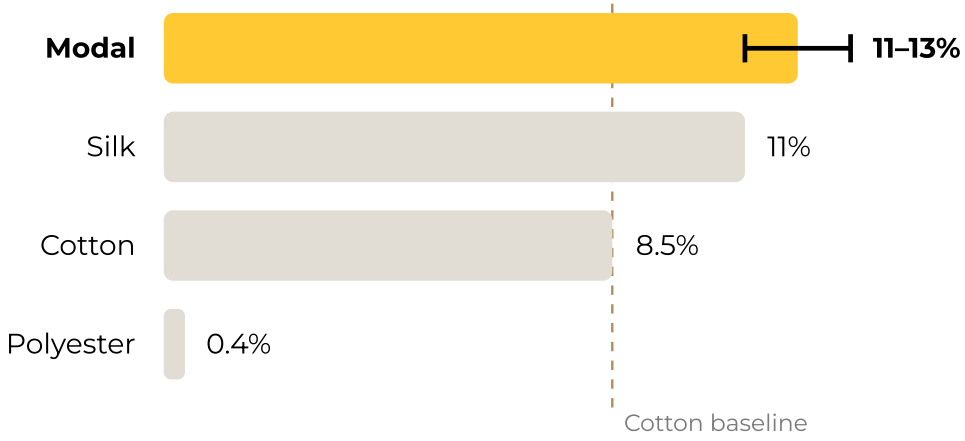
01 · Staying dry

Modal soaks up the most.

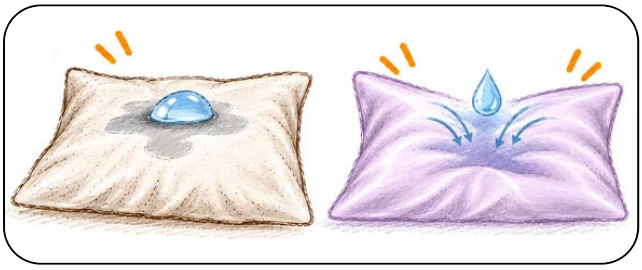
Even when you don't feel sweaty, your skin releases moisture all night. Modal pulls that moisture *into the fiber itself*, holding 11–13% of its own weight from the air. Cotton holds 8.5%. That makes modal up to **50% more absorbent** than cotton.

Modal holds 30–50% more moisture than cotton

How much moisture each fiber soaks up from the air, as % of its own weight



Sources: ASTM D1909-13 commercial moisture regain (cotton, silk); Morton & Hearle 2008 and Lenzinger Berichte 89 (2011) for modal; polyester approximate textbook value.



MOISTURE SITS ON COTTON · IT'S DRAWN IN BY SMOOTH FIBERS

Why you'll feel it

Moisture that goes into the fiber isn't sitting on your skin, so you wake up feeling dry instead of clammy.

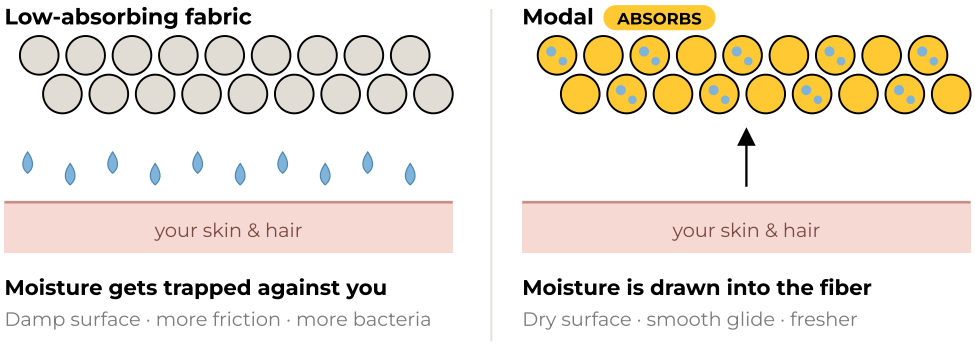
Breathes better, too

Scientists knitted modal and cotton the exact same way at four tightness levels. **Modal let more air through every single time.** Another study found modal combines high airflow with low heat trapping: the cooler-feeling choice.

Good to know · absorption

Why soaking up more is a good thing.

"Absorbent" doesn't mean a fabric dries you out. Modal soaks up the **extra** moisture (sweat vapour and the warm, humid air trapped between you and your pillow) so it isn't left sitting on your skin and hair.



2×

Drier surface, less friction. Damp fabric causes more than twice the rubbing of dry fabric.

GERHARDT ET AL., 2008

0

Less water for bacteria. None of the tested sweat bacteria grew on viscose, modal's fiber family.

CALLEWAERT ET AL., 2014

14 min

A less humid bed. The most moisture-buffering sleepwear helped people fall asleep up to 14 minutes faster.

CHOW ET AL., 2019

Kinder to skin

Over-moist skin softens and grips fabric more, so it rubs and creases more easily. Keeping the surface dry helps skin glide.

Won't it dry me out?

No. Absorbency works like a **buffer**. Moisture regain is a fiber's balance with the air around it: modal takes in water vapour when the air next to you gets humid and releases it again as the air dries. It evens out the air around you; it doesn't pull water out of you.

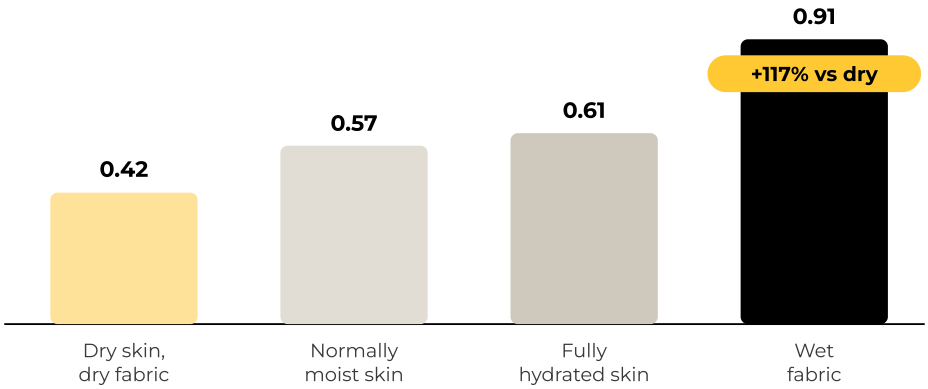
02 · Staying smooth

Damp fabric drags. Dry fabric glides.

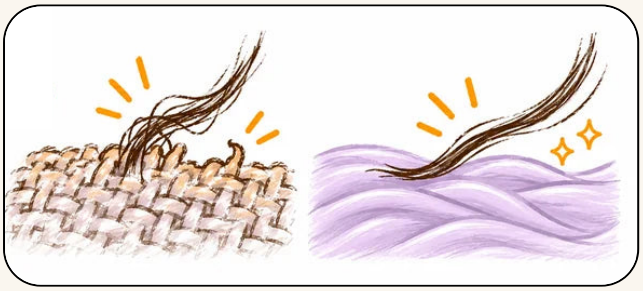
When fabric gets damp, it grips your skin and rubs more. Researchers in Switzerland measured this on 22 volunteers: **wet fabric caused more than twice the rubbing** of dry fabric.

Damp fabric more than doubles friction on skin

How much fabric drags on skin (higher = more rubbing), measured on 22 volunteers



Source: Gerhardt et al., J R Soc Interface 2008; 5(28):1317–1328. Moist and hydrated values average men's and women's results.



ROUGH WEAVE SNAGS · SMOOTH FIBERS GLIDE

Where modal comes in

Because modal soaks up more moisture than cotton, it helps keep your skin on the **dry, low-rubbing side** of this chart all night.

Smooth fibers glide

A 2022 science review found rough, fuzzy fabrics create more rubbing. Modal's fibers are long, fine and even, with none of cotton's fuzzy ends.

65% of the night is spent on your side. Plastic surgeons in *Aesthetic Surgery Journal* found pressing and pulling against the pillow causes "sleep lines", so a **smooth, dry pillowcase** means less tugging on your face every night.

03 · Staying fresh

Fewer odour-causing bacteria.

That "slept-in" smell comes from bacteria feeding on sweat in your fabric. Scientists at **Ghent University** in Belgium grew real sweat bacteria on different fabrics to see which ones they liked.

FABRIC	WHAT GREW ON IT
Viscose MODAL'S FIBER FAMILY	**Nothing.** None of the sweat bacteria tested grew.
Cotton	3 types, including one linked to breakouts (*Propionibacterium*)
Polyester	The most growth of 3 types
Wool	Almost every type tested

Source: Callewaert et al., Appl Environ Microbiol 2014; 80(21):6611–6619.

SMELL TEST · 26 PEOPLE · SPIN CLASS

−0.61 Cotton (plant fiber)

−2.04 Polyester (synthetic)

On a scale from −4 (awful) to +4 (lovely), plant-based fabric smelled far fresher than synthetic.



More labs agree

Innsbruck Medical University found wood-based fibers and cotton carried **less bacteria than polyester and nylon**. Testing at Germany's Hohenstein Institute also measured lower bacterial growth on wood-based fibers than on polyester.

How it works

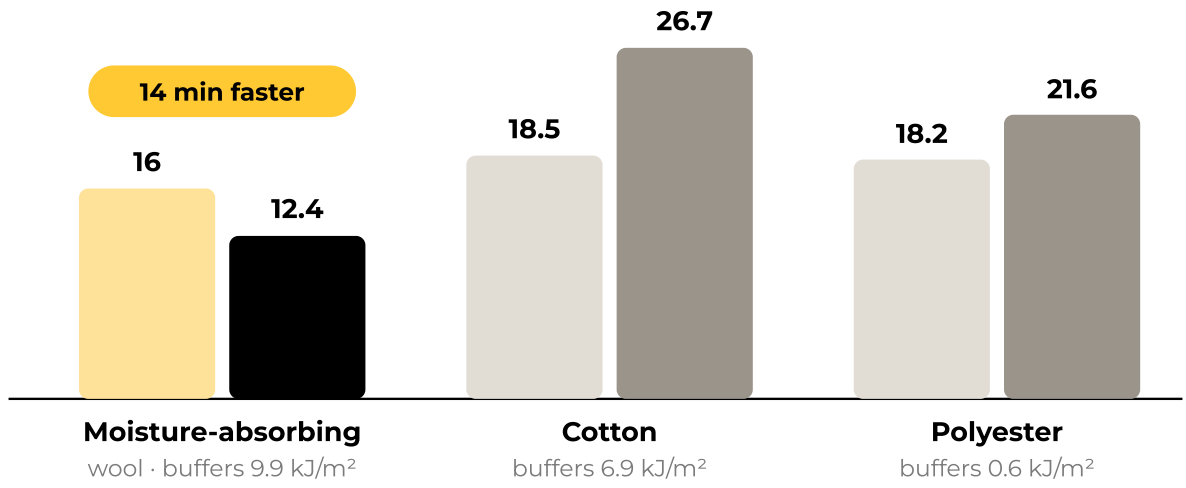
Bacteria need moisture on the surface to grow. Wood-based fibers like modal **pull that moisture inside the fiber**, so there's less left for bacteria. Fresh tip: wash bedding weekly. Modal is machine washable and keeps its shape wash after wash.

Stay cool. Fall asleep faster.

Feeling hot and sticky is one of the biggest reasons people toss, turn and miss out on deep sleep. Your sleepwear and sheets are the layer that controls that heat and moisture, and sleep-lab studies show it makes a real difference.

Moisture-absorbing sleepwear: asleep 14 minutes faster

Minutes to fall asleep by pajama fabric · 36 adults in a warm bedroom · measured in a sleep lab



Sources: Chow et al., Nat Sci Sleep 2019; 11:167–178. Moisture buffering values from Li, Halaki & Chow, J Sleep Res 2024.



TRAPPED HEAT · COOL, BREATHABLE COMFORT

Researchers at the University of Sydney tracked people's sleep all night in different pajama fabrics. **The fabric that absorbed the most moisture helped people fall asleep fastest.** In a second study, moisture-absorbing sleepwear cut the time to fall asleep from 15 to 11 minutes.

Where modal fits: modal soaks up to 50% more moisture than cotton, putting it firmly on the moisture-absorbing side of these results.

05 · Softness that lasts

Soft out of the bag. Soft for good.

Lenzing, the Austrian company behind Lenzing Modal, teamed up with German instrument maker Emtec Electronic to measure softness scientifically, using sensors that "listen" to a fabric instead of relying on touch.

100+

fabrics tested, from cotton and cotton blends to modal and MicroModal

#1

MicroModal ranked softest of every fiber tested

↑

The more modal, the softer. Softness rose with the amount of modal in the fabric

✓

Still soft after washing in Lenzing's wash tests



	MODAL	COTTON
Stretch before breaking	**12–16%** · bends and moves with you	6–10%
When damp	**Keeps its shape** (high wet modulus)	Holds water, wrinkles easily
Feel	**Silky, cool**, drapes smoothly	Crisp, can feel stiff

Sources: Lenzing / Emtec Electronic softness study (Textilegence); Morton & Hearle 2008; Lenzing technical literature.

THE VERDICT

The Savehra Scorecard.

Here's how the three fabrics stack up, side by side.

	MODAL	SILK	COTTON
Soaks up moisture	**Excellent** 11–13%	**Excellent** 11%	**Good** 8.5%
Breathability	**Excellent** Beat cotton in every knit test	**Good**	**Good**
Smooth on skin	**Excellent** Fine, even fibers	**Excellent**	**Fair** Short, fuzzy fibers
Stays fresh	**Excellent** Fiber family grew no tested bacteria	**Good**	**Good**
Sleep comfort	**Excellent** High moisture control	**Excellent**	**Good**
Softness	**Excellent** MicroModal #1 of 100+ fabrics	**Excellent**	**Good**
Easy care	**Excellent** Machine washable, keeps its shape	**Fair** Dry clean or hand wash	**Excellent**



The bottom line

Modal is the only fabric of the three that scores **Excellent across the board**. It stays dry, smooth, fresh and soft all night, and it's easy to wash.

That's why we chose it.

So we're fixing this. One pillowcase at a time.



Ultra-smooth modal pillowcases, designed around the science in this report: drier, smoother, fresher nights for your skin and hair.

Shop the Anti-Frizz Pillowcase →

savehra.com

Sources

Every figure in this report comes from the peer-reviewed studies, international standards and fiber-manufacturer research listed below.

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