

CONTROL ODOR NATURALLY WITH COTTON

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COTTON UNIVERSITY™

LEARN. CONNECT. GROW.



Q & A

TYPE YOUR QUESTIONS
IN THE Q&A WINDOW
AT ANY TIME DURING
THE WEBCAST.



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RESOURCES

ARTICLES,
RESEARCH METHODOLOGY
AND MORE

TO PARTICIPATE IN WEBCAST... **TURN OFF POP-UP BLOCKER!**

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IN THE HEADLINES....

Polyester shirts bad summer choice, say U of A smell testers

With the first weekend of the summer upon us, it might be time to start thinking of ways to stay cool and keep body odour at bay.

HEALTH

Your Fancy Non-Cotton Workout Clothes Stink

By Melissa Dahl [Follow @melissadahl](#)

NEWSWIRE



Synthetic Workout Gear Smells Worse Than Cotton Gear

Featured Research

Polyester clothes stink after exercise; cotton, not so much

Stinky T-Shirt? Bacteria Love Polyester In A Special Way

EVENTS | **HEALTH** | HOMES | FOOD | HOROSCOPES | EDUCATION | COMICS | GAMES | LIVING PICS | FASHION

Cotton could be the best weapon in fight against BO: study

My Sweaty Valentine

PICK COTTON OVER POLYESTER TO PREVENT B.O.

CONSUMER PERSPECTIVE ODOR IN ACTIVEWEAR



COTTON INCORPORATED'S

CONSUMER & RETAIL INSIGHTS



100,000+

INTERVIEWS
CONDUCTED



900,000+

GARMENTS
AUDITED

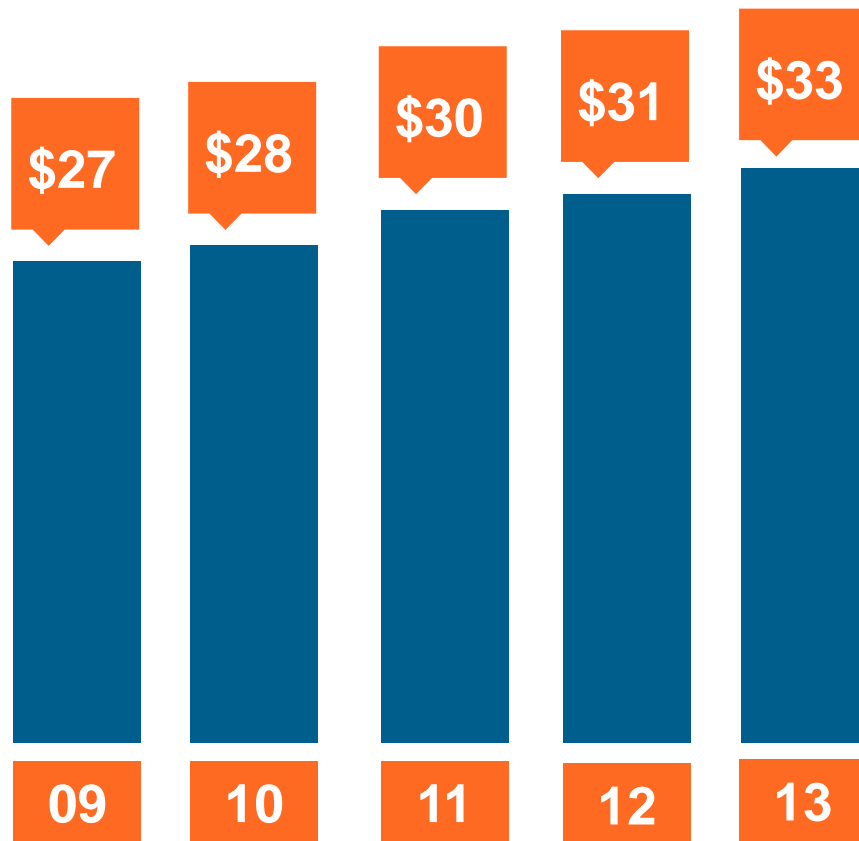


500,000+

REVIEWS
ANALYZED

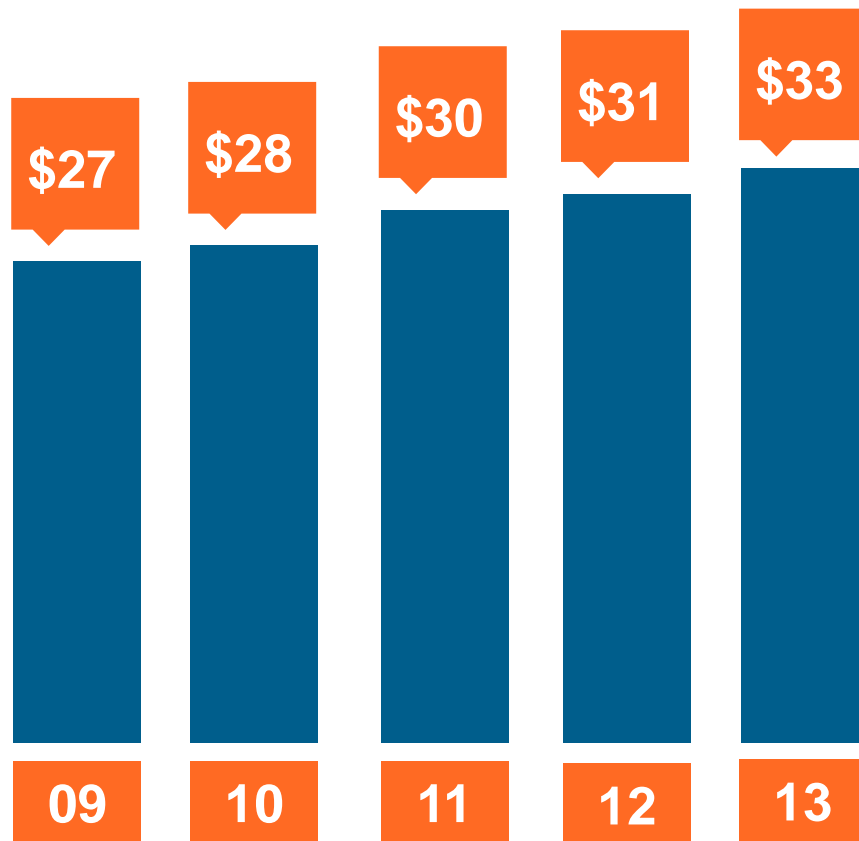


GROWTH IN ACTIVEWEAR



U.S. ACTIVEWEAR SALES (\$ billion)

GROWTH IN ACTIVEWEAR



U.S. ACTIVEWEAR SALES (\$ billion)



HEALTH & WELLNESS



WOMEN & MILLENNIALS

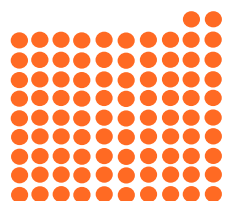


NON-ACTIVES



ATHLEISURE

GROWTH IN ATHLEISURE



92%



wear activewear
for purposes
beyond exercise

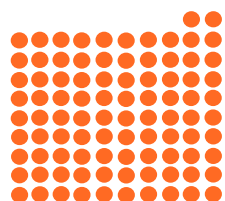


52%



more likely to shop
at stores offering
athleisure styles

GROWTH IN ATHLEISURE



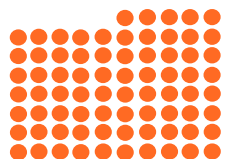
92%

wear activewear
for purposes
beyond exercise



52%

more likely to shop
at stores offering
athleisure styles



75%

likely to wear
active underwear
all day



23%

likely to
purchase active
denim in 2015

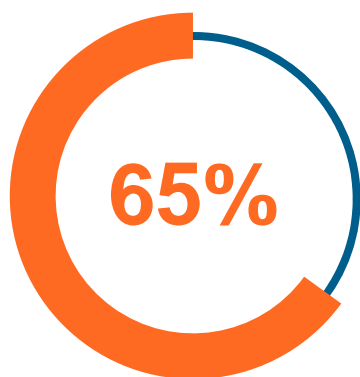
IMPACT OF ODOR ISSUES



I like how this shirt fits, but after you sweat in it and wash it, it smells horrible! I have tried washing it with vinegar to get rid of the smell, but it will smell fine until I sweat. Then, the smell comes back in full force! I am too embarrassed to wear this shirt to the gym anymore. I know if I can smell it, everyone around me can as well!

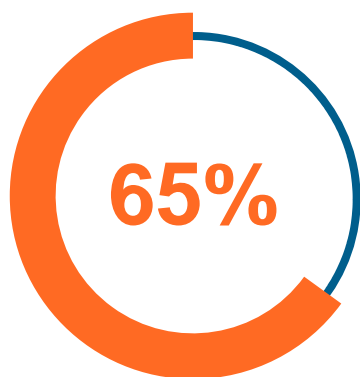
CUSTOMER REVIEW | WOMEN'S NYLON/POLYESTER ACTIVE TOP |
SPORTS SPECIALTY STORE | 2 OUT OF 5 STARS | NOVEMBER 2014

IMPACT OF ODOR ISSUES

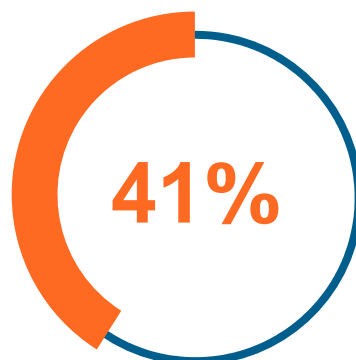


washing clean or
being odor free is
very important in
activewear
purchases

IMPACT OF ODOR ISSUES

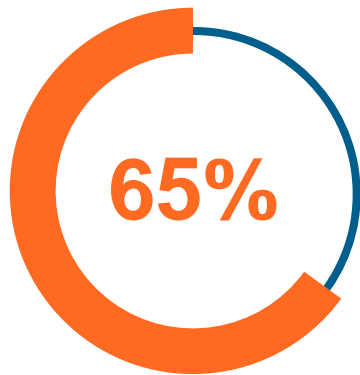


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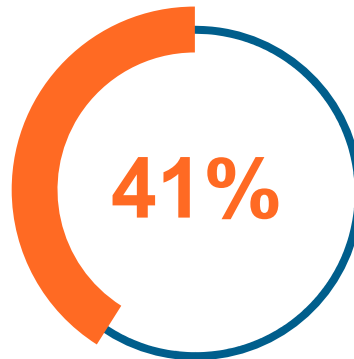


experience odor
issues in
activewear

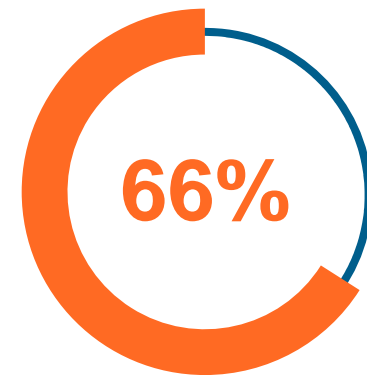
IMPACT OF ODOR ISSUES



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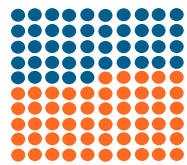
experience odor
issues in
activewear



odor & sweat
prevents
activewear from
becoming
athleisure

CONSUMERS BLAME

SYNETHICS FOR ODOR



55%

**SYNTHETICS BLAMED
FOR ODOR**

majority of those experiencing
odor issues blame synthetics

CONSUMERS BLAME

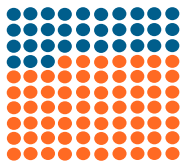
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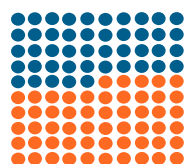
**ACTIVEWEAR
MOSTLY SYNTHETIC**

67%

2 in 3 activewear items at
retail are synthetic

CONSUMERS BLAME

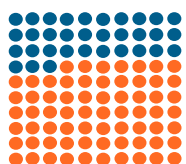
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**ACTIVEWEAR
MOSTLY SYNTHETIC**

67%

2 in 3 activewear items at
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**COTTON WASHES
CLEAN**

74%

nearly 3 in 4 say cotton does
not retain odor or washes clean

CONSUMER PERSPECTIVE

ODOR IN ACTIVEWEAR



IMPACT

POTENTIAL TO
STIFLE
ACTIVEWEAR
SALES



BLAME

CONSUMERS
BLAME
SYNTHETICS
FOR ODOR



SOLUTION

CONTROL
ODOR
NATURALLY
WITH COTTON

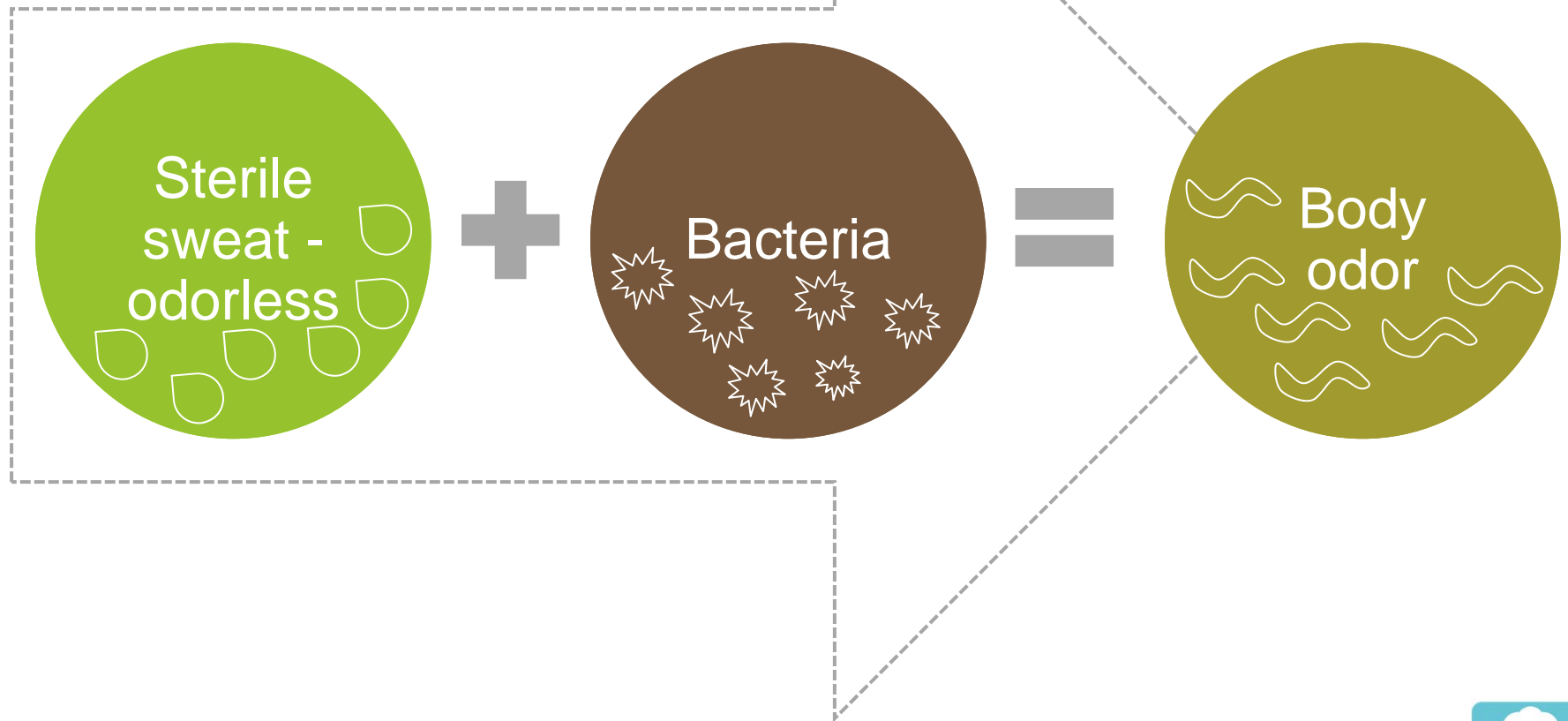


A photograph of two men in a gym setting, both using rowing machines. The man in the foreground is wearing a dark grey long-sleeved shirt and black shorts, and is captured in a rowing stroke with his arms extended forward. The man in the background is wearing a blue t-shirt and is also rowing. The background features a colorful abstract mural and gym equipment. The text "THE SCIENCE OF ODOR" is overlaid in white, italicized, sans-serif font, with a dashed line underneath it.

THE SCIENCE OF ODOR

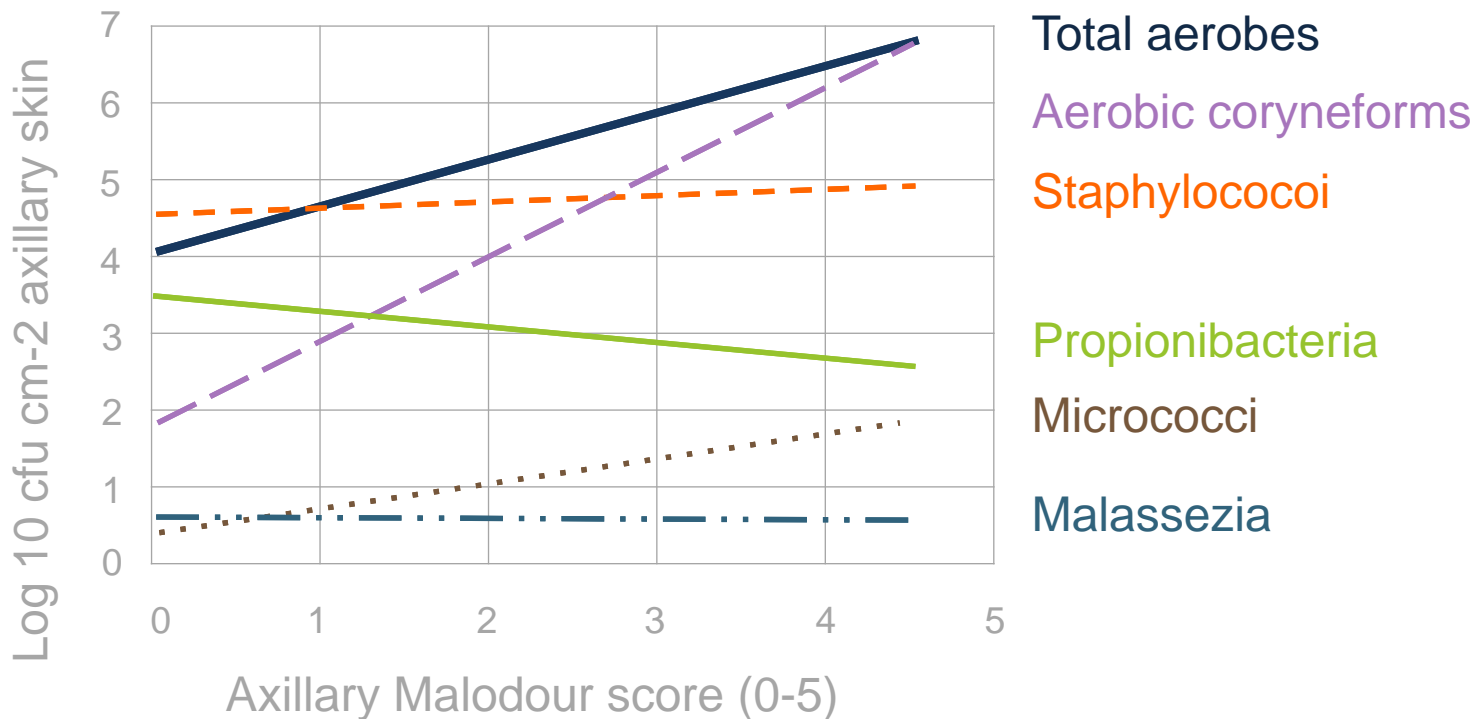
INTRODUCTION

ODOR SCIENCE



INTRODUCTION

ODOR SCIENCE

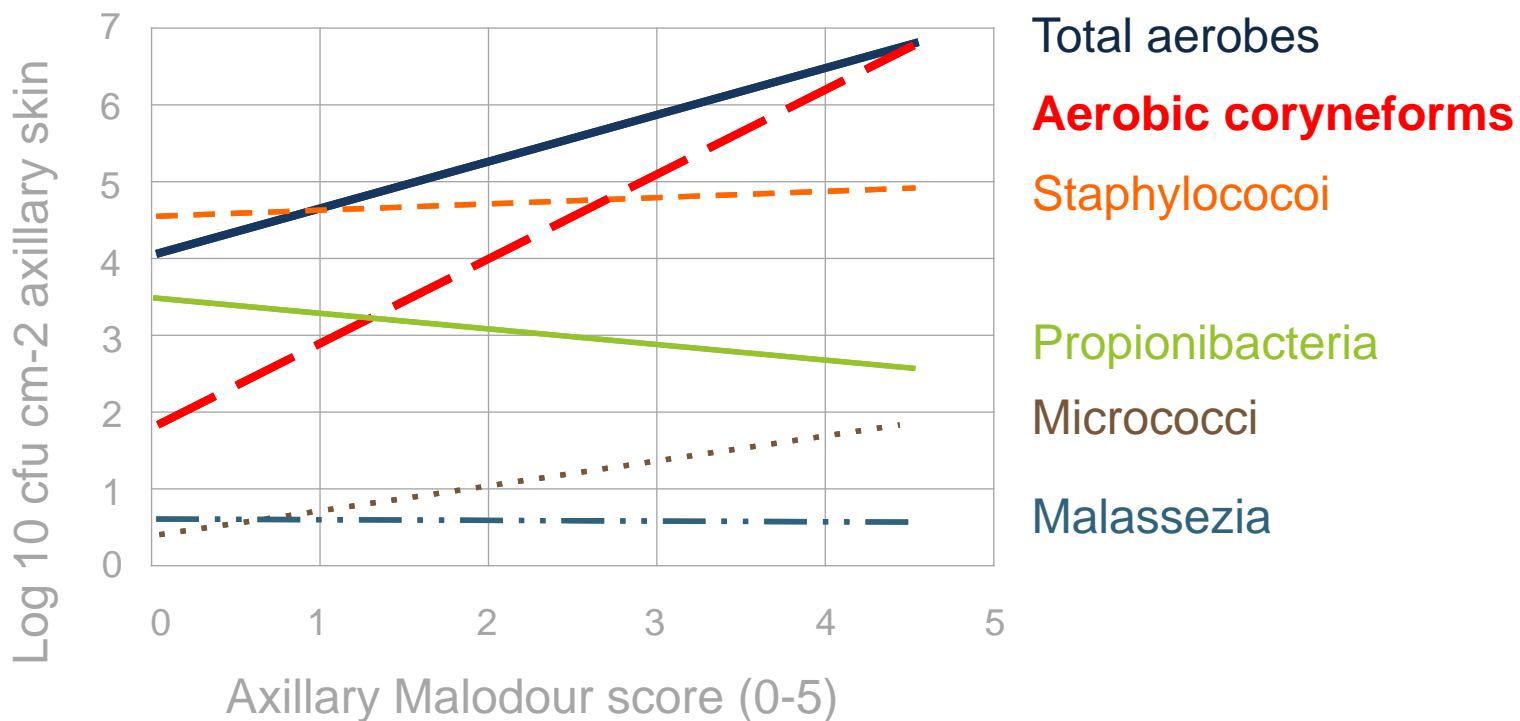


(Taylor et al., 2003)



INTRODUCTION

ODOR SCIENCE

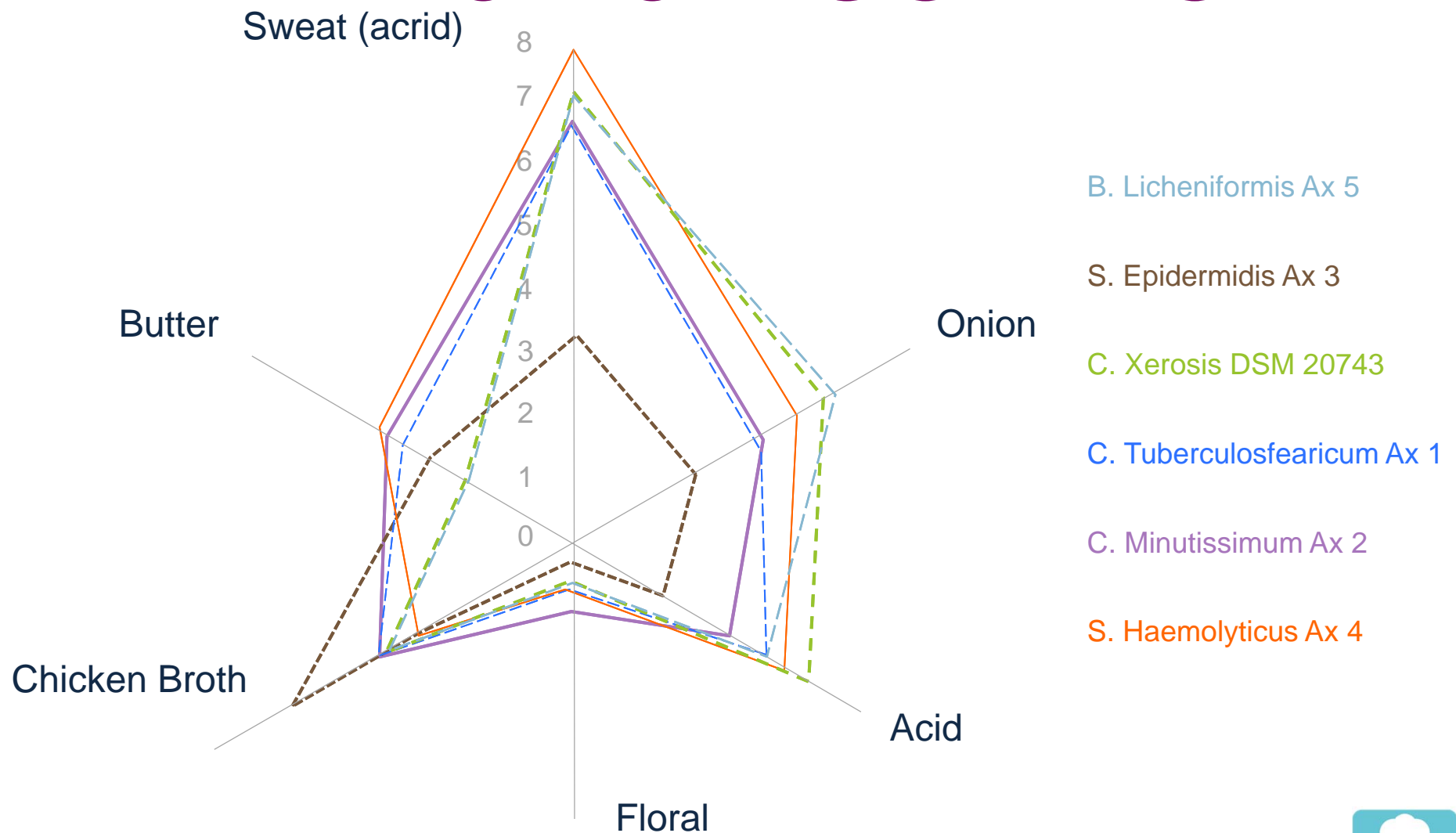


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INTRODUCTION

ODOR SCIENCE

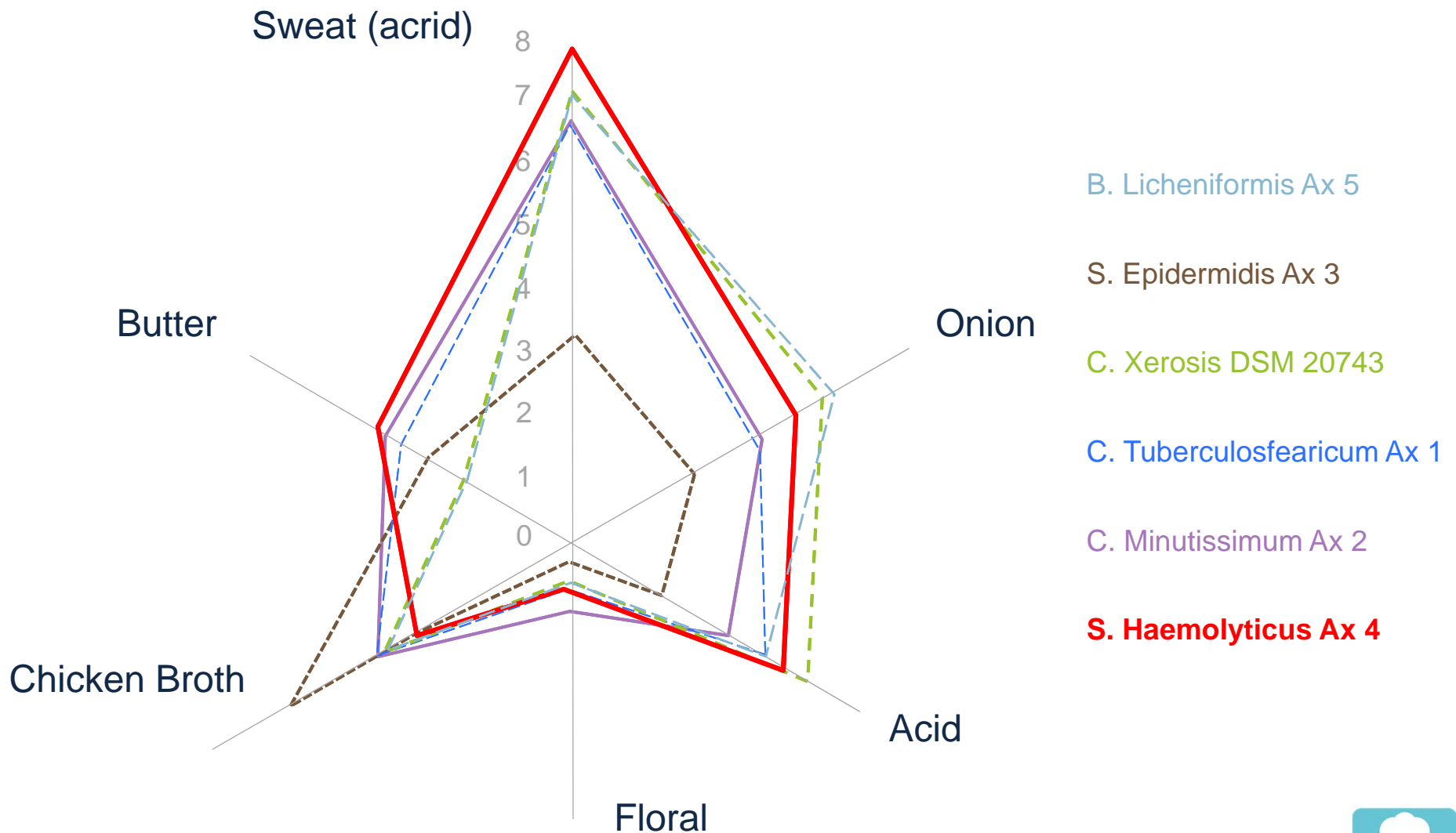


(Troccaz et al., 2004)



INTRODUCTION

ODOR SCIENCE



(Troccaz et al., 2004)



INTRODUCTION

SWEAT GLANDS

- underarm has a high density of sweat glands
- eccrine = wet sweat encourages bacterial growth
- apocrine sweat offers nutrients for bacteria → odor

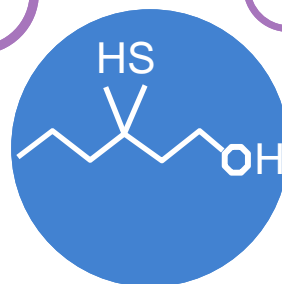
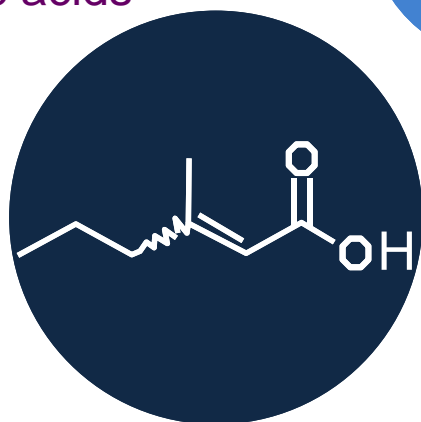


INTRODUCTION

ODOROUS COMPOUNDS

Many compounds make up the total axillary odor “bouquet”

short- & mid-chain
carboxylic acids



Volatile sulfur
compounds



16-androstene steroids

INTRODUCTION

ODOR IMPACTS



INTRODUCTION

ODOR & FIBER

- Natural fibers are perceived to be less smelly than synthetic
- This was largely anecdotal but now supported by the research:

Polyester had a greater number of high-odor volatiles than cotton fabrics

Munk et al., (2000; 2001)



INTRODUCTION

ODOR & FIBER

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Munk et al., (2000; 2001)

Polyester was found to be the most odorous and continued to emit intense odor even up to 4 weeks after being worn

McQueen et al., (2007)



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Munk et al., (2000; 2001)

Polyester was found to be the most odorous and continued to emit intense odor even up to 4 weeks after being worn

McQueen et al., (2007)

“Polyester t-shirts smelled significantly less pleasant and more intense, compared to the cotton t-shirts”

Callewaert et al., (2014)



INTRODUCTION

FIBER CHEMISTRY

- sorption of odorous molecules
- sorption precursors to odor
- selective growth of certain types of bacteria (e.g., micrococci on polyester)



INTRODUCTION

STUDY PURPOSE

- To determine how cotton and polyester compare in odor following exercise.
- Odor and volatile odorous compounds were evaluated on t-shirts worn multiple times, before and after laundering.



METHODS

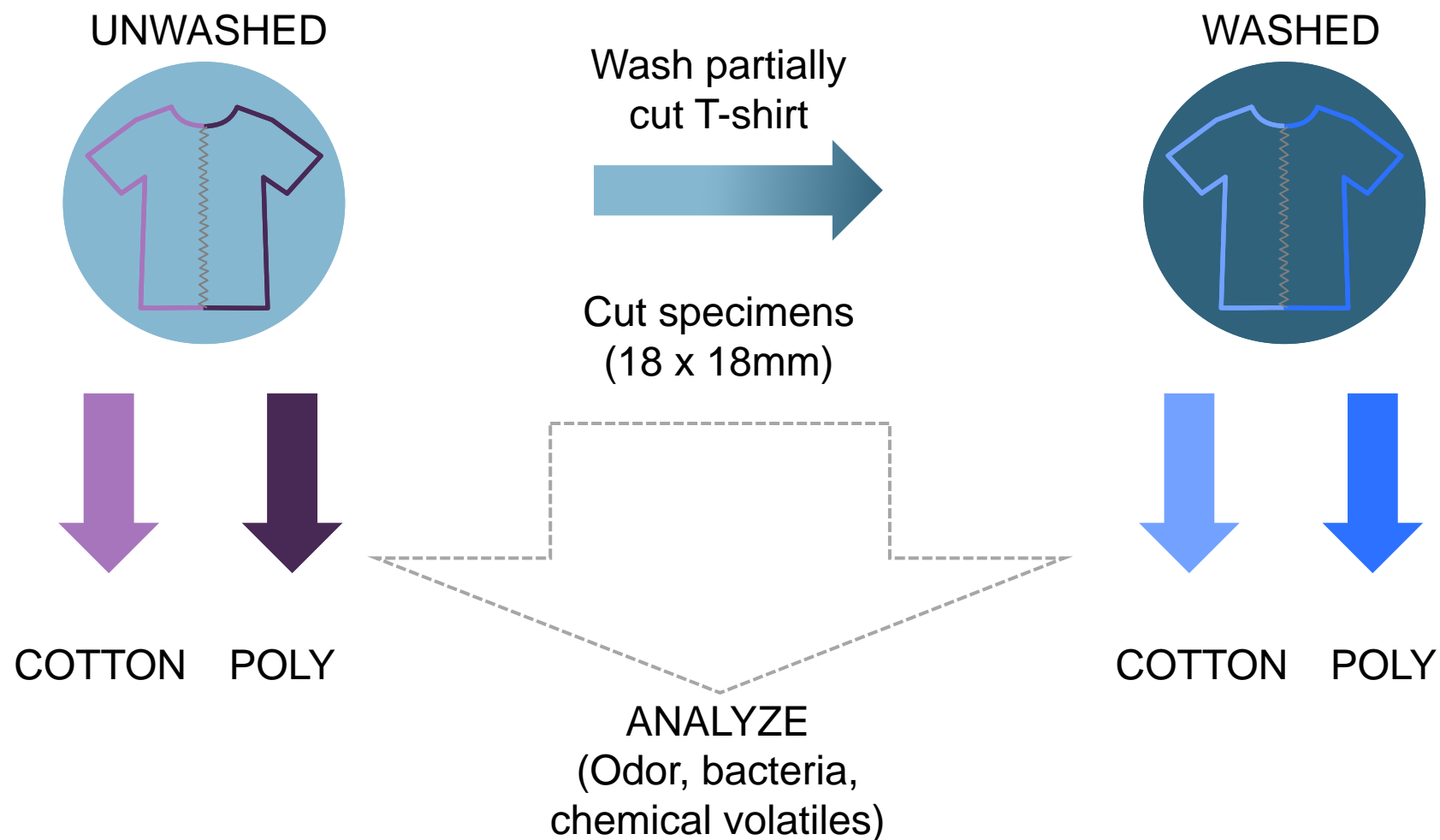
OVERVIEW

- 95% cotton (COT) OR polyester (POL) fiber content with 5% spandex; Single knit jersey fabrics
- 10-week field trial – each t-shirt worn 20 times
- 8 participants (2 t-shirts each)
- Exercise in test t-shirt for ~1 hour
- Washed t-shirts at home
- Recorded activities in log-book
- Following 20th wear – returned unwashed t-shirts



METHODS

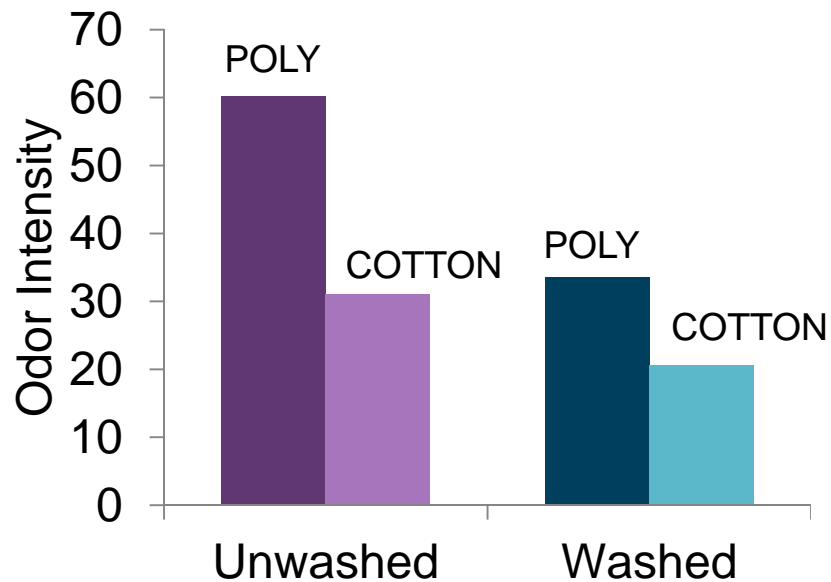
SAMPLE PREPARATION



RESULTS

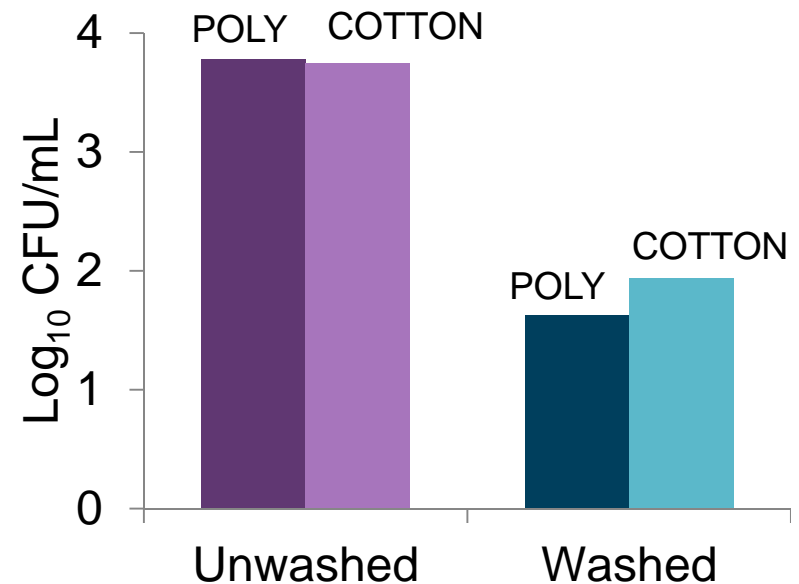
ODOR INTENSITY

- Laundering decreased odor
- Polyester had higher odor than cotton before and after laundering



BACTERIAL COUNTS

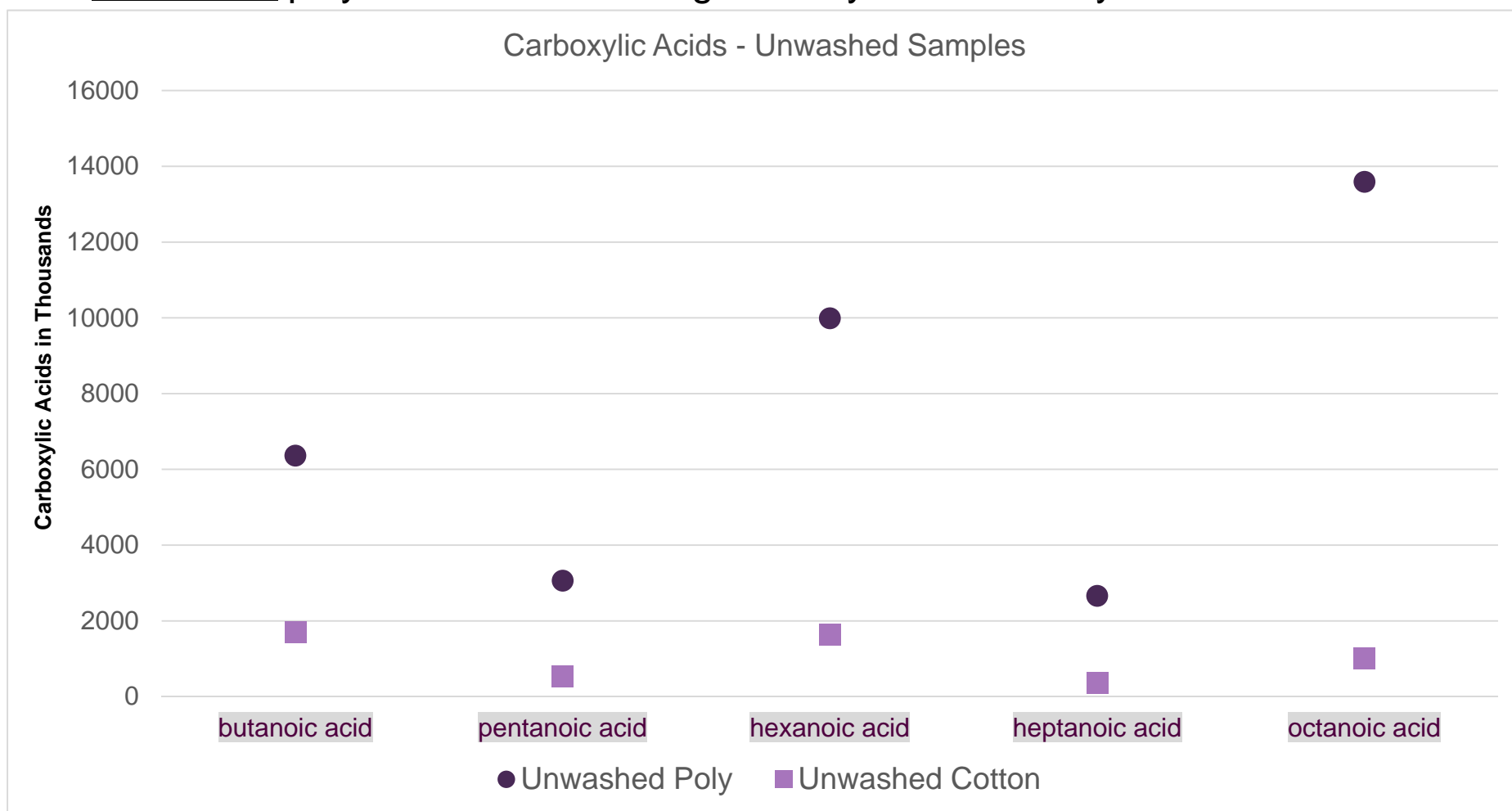
- Laundering reduced bacteria
- No difference between bacterial counts between fabrics



RESULTS

CARBOXYLIC ACIDS

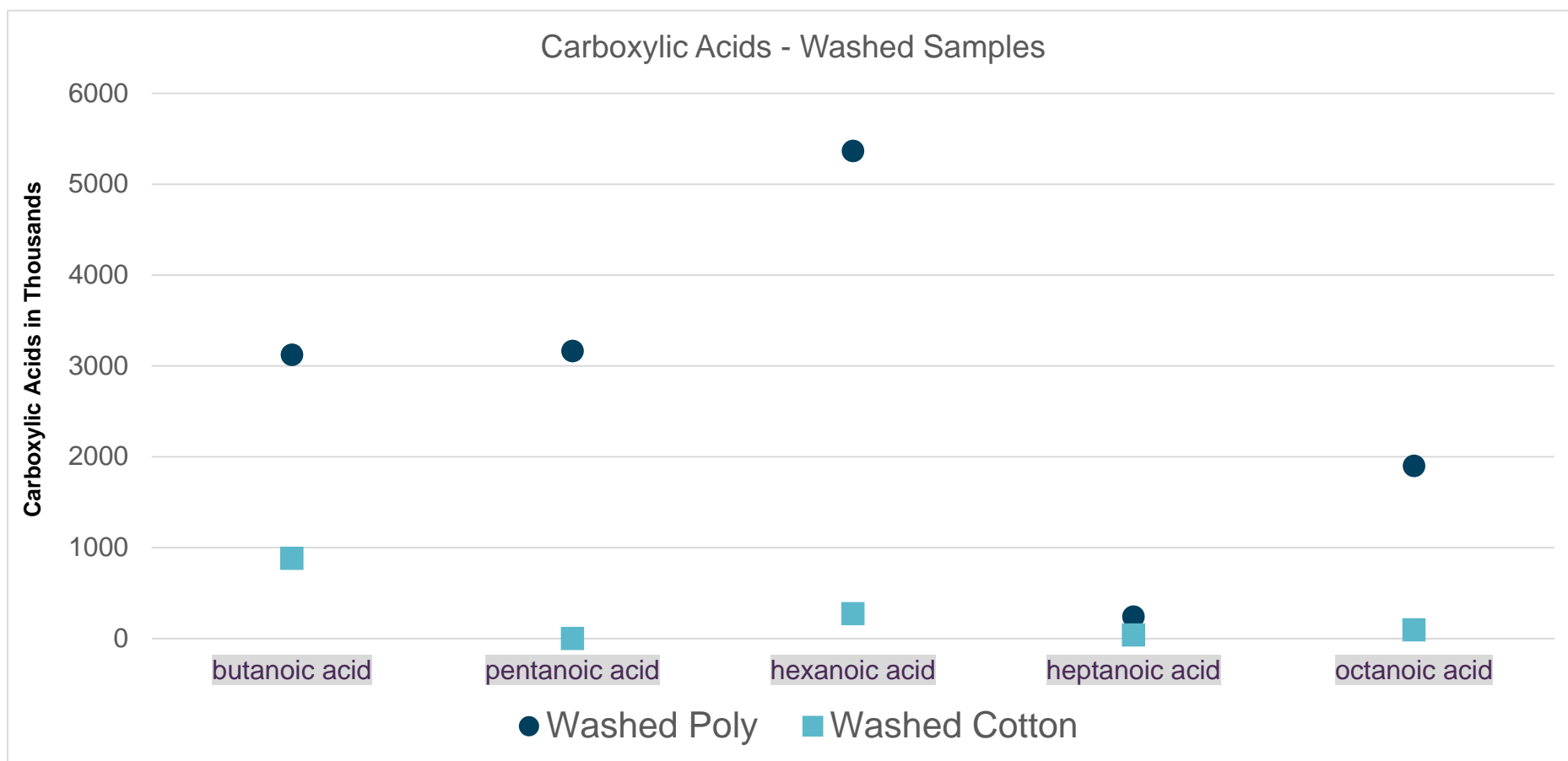
- Unwashed polyester t-shirts had significantly more carboxylic acids than cotton



RESULTS

CARBOXYLIC ACIDS

- Washed polyester t-shirts had significantly more carboxylic acids than cotton
- Carboxylic acids were more effectively removed from cotton by laundering



CONCLUSIONS

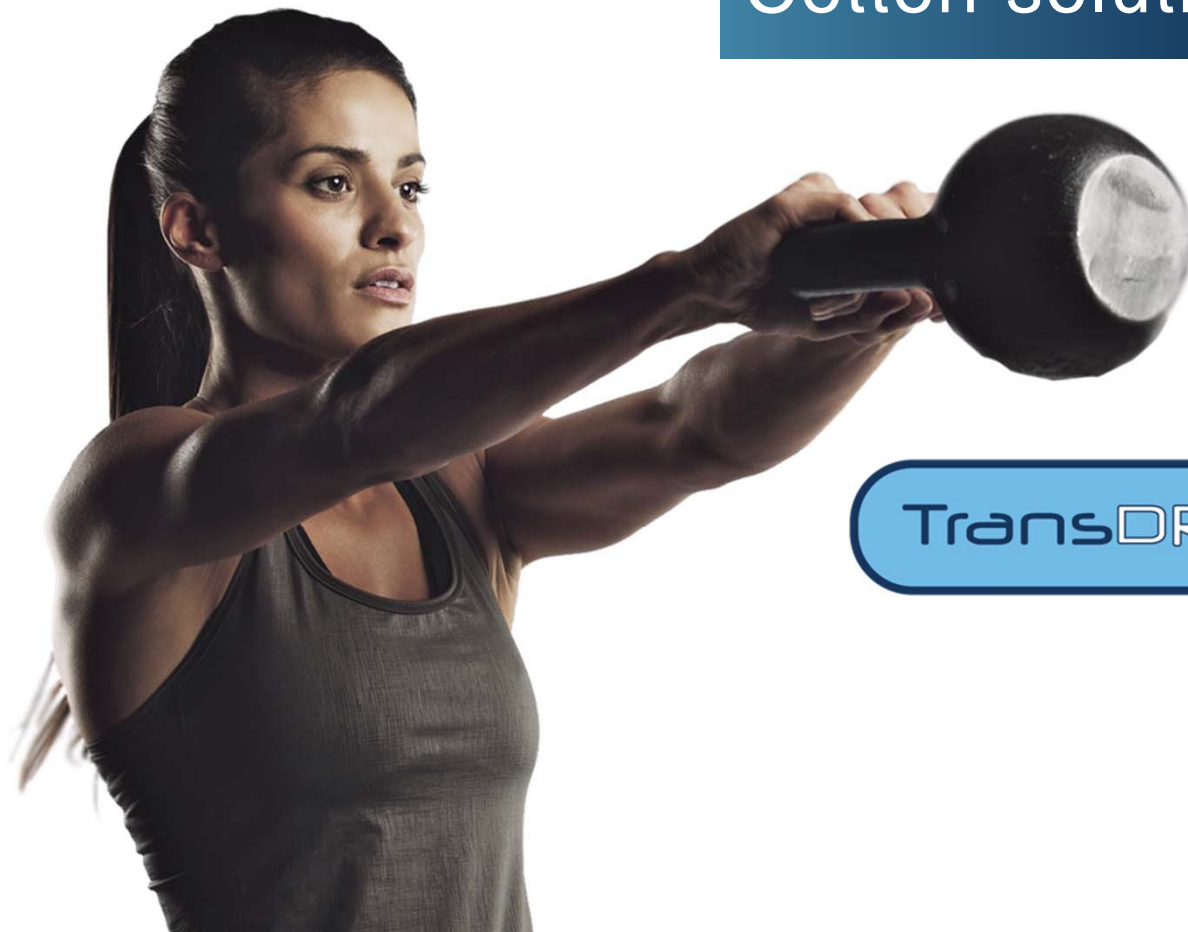
- Polyester significantly more odorous following exercise than cotton, both before and after washing
- Cotton is a preferable fiber of choice for consumers concerned with odor
- The build-up of odor in polyester fabrics may be cumulative as important odorants such as carboxylic acids are not as effectively removed from polyester compared to cotton
- Carboxylic acids tend to be retained by polyester in greater quantities than in cotton even before washing.

Visit CottonUniversity.org for References



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Cotton solutions for activewear.



TransDRY®

WICKING
WINDOWS™



TransDRY®

**ENGINEERED
PERFORMANCE
STAY COOL.
STAY DRY.
STAY COMFORTABLE.**



— Natural cotton yarn wicks and spreads moisture.

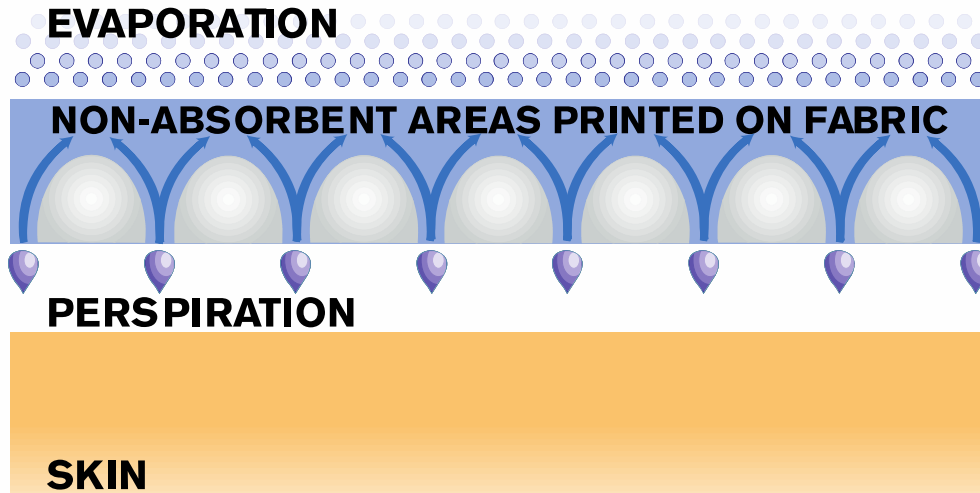
— TransDRY® treated yarn repels moisture to improve drying rate and transfer moisture directionally.

When they demand more.
Advanced Cotton Technology.



WICKING
WINDOWS™

UNIQUE MOISTURE MANAGEMENT APPLICATION



Print pattern
moves moisture

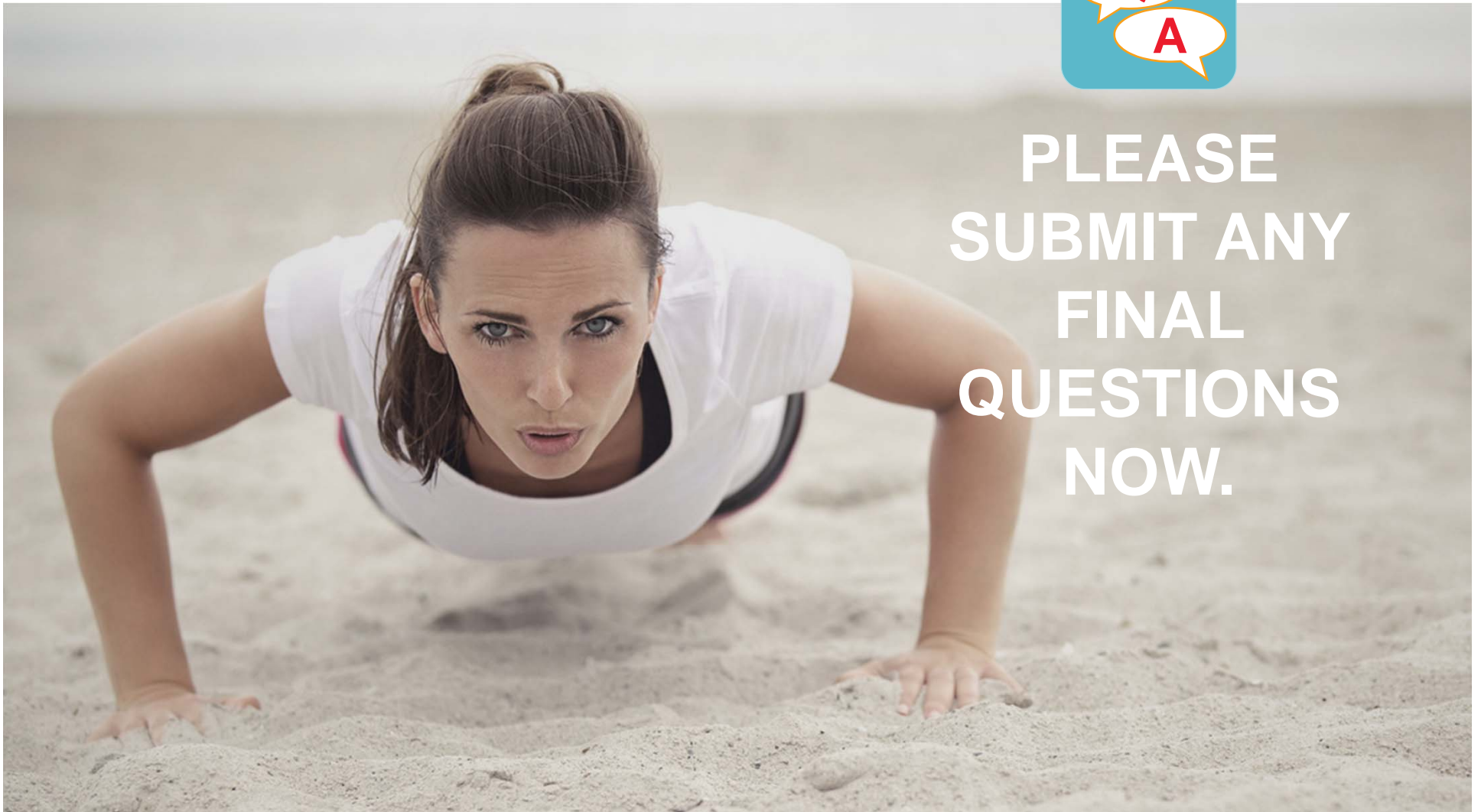
When they demand more.
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QUESTION AND ANSWER



PLEASE
SUBMIT ANY
FINAL
QUESTIONS
NOW.



VISIT US ONLINE

COTTONUNIVERSITY.ORG

The screenshot shows the Cotton University website interface. At the top is a navigation bar with links: COTTON UNIVERSITY™, MY COTTON U, COLLEGES, COURSES, LIBRARY, PROJECTS, CONNECT, and DIRECTORY. A search bar is on the right. The main header features the 'My COTTON UNIVERSITY™' logo. A large blue arrow points from the right towards the 'Webcast' section.

MY COURSES AND LIBRARY ITEMS

- Farm Tours 2012**
(course in College Of General Studies)
- Major Factors Affecting Demand for Apparel and Home Textiles**
(course in College Of General Studies)
- Linda DeFranco – Trend at Cotton Incorporated**
(course in College Of General Studies, College Of Retail)

MY COURSES AND LIBRARY HISTORY

SPOTLIGHT

Webcast: Control Odor Naturally with Cotton

CONTROL ODOR NATURALLY WITH COTTON

• WEBCAST - WEDNESDAY, MARCH 18 2:00PM EDT

Register to attend Wednesday, March 18 at 2:00 PM EDT.
[Read more](#)

FROM THE COMMUNITY

COTTON UNIVERSITY HEADLINES
COTTON UNIVERSITY

COTTON MAKERS

All around the country, people are crafting with cotton. Come meet the Cotton Makers and see what's possible.

ON INSTAGRAM

- Webcast slides for download
- Research methodology
- Additional Q&A