International Textile Manufacturers Federation (ITMF)
International Cotton Committee on Testing Methods (ICCTM)
Stickiness WG

Introduction

GOURLOT Jean-Paul
Bremen, March 2012

CIRAD UPR102
Laboratoire de Technologie et de Caractérisation des fibres naturelles
Agenda of the ITMF-ICCTM meeting
Stickiness WG/TF

Gourlot J.-P., CIRAD
International Textile Manufacturers Federation (ITMF), International Cotton Committee on Testing Methods (ICCTM), Stickiness WG, Introduction, bibliography and latest information

Harzallah O., ENSISA LPMT
Peel test: A Tool to Assess the Stickiness of honeydew Sugar

Latif A., SCC
Long term benefit of a CFC/ICAC project: global improvement of the situation
Plan of presentation

✓ Introduction

✓ Stickiness: origins

✓ Stickiness: measurement
Introduction

The challenge for cotton today

- To remain competitive with synthetic fibers
- To maintain acceptable profitability in production

Reduction of the production and processing costs
Introduction

The challenge for cotton today

Cotton fiber stickiness

Defects / Disruptions of the spinning processes

Price discount

Additional operations

Higher spinning cost
Lower yarn quality

Trader
Classer
Researcher
Spinner
Producer
Plan of presentation

✓ Introduction
✓ Stickiness: origins
✓ Stickiness: measurement
Origins of stickiness

Stickiness

- Vegetal parts
- Oil traces
- Waxes
- Plant sugars
- Insect sugars

APHIDS

WHITEFLIES
Origins of stickiness

Mature boll covered with honeydew
Origins of stickiness

Mature boll covered with honeydew
Main sugars (in %) determined by HPLC in aphid, whitefly and aleurod honeydew, harvested on *G. hirsutum*

<table>
<thead>
<tr>
<th>Insect</th>
<th>Mono-saccharides</th>
<th>Polysaccharides</th>
<th>Sucrose</th>
<th>Trehalulose</th>
<th>Melezitose</th>
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</thead>
<tbody>
<tr>
<td><em>Aphis gossypii</em></td>
<td>25</td>
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<td>12</td>
<td>1</td>
<td>38</td>
</tr>
<tr>
<td><em>Bemisia tabaci</em></td>
<td>19</td>
<td></td>
<td>16</td>
<td>44</td>
<td>17</td>
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<tr>
<td><em>Trialeurodes abutilonea</em></td>
<td>44</td>
<td></td>
<td>33</td>
<td>3</td>
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</table>
Origins of stickiness

• The most important cause of stickiness is due to these entomological sugars.

• Honeydew has now become one of the main contaminants present in cotton.

• Sticky points remain in the cotton from the field up to the spinning processes where they cause production and quality losses.

• The behavior of contaminated fibres during processing is highly dependent upon the quantity and the type of the main sugars present in fibres.
Plan of presentation

- Introduction
- Stickiness: origins
- Stickiness: measurement
Stickiness measurement

Chemical methods
- Simple: Perkins Fehling Color reaction KOTITI
- Complex: HPLC GC

Physical techniques
- Simple: Infra-red
- Complex: Mini-card

Mechanical
- ITMF Reference method
- ITMF Recommended method
- Simple: SCT H2SD
- Complex: FCT / FQT Quickspin

Thermo-mechanical

Diagram describes the methods for measuring stickiness, categorizing them into simple and complex chemical methods, physical techniques, and mechanical methods. Each category includes specific methods such as Perkins Fehling Color reaction, HPLC GC, Infra-red, Mini-card, SCT H2SD, FCT / FQT, and Quickspin.
Fig. 3: Stickiness 1989 - 2011

% of all cottons evaluated

Thanks to M. Christian Schindler, ITMF
• Conclusion of Cotton Contamination survey

« Stickiness – significant rise

The presence of sticky cotton as perceived by the spinning mills increased in 2011 significantly from the record low 16% in 2009 to 20%. While this level is still lower than the long-term average, the level of stickiness is still considerable high and remains a major challenge to the global cotton spinning industry. »
Update of bibliography on stickiness
Causes, measurements and consequences

GOURLOT J.-P.
ICCTM-ITMF, Stickiness WG
Bremen, March 2012

CIRAD UPR102
Laboratoire de Technologie et de Caractérisation
des fibres naturelles
Introduction of the bibliography

• In order to allow everyone to learn more about this contamination, we decided to prepare this extract of the available literature. We retained around 233 references out of thousands of available references, focusing on the cause of stickiness, on the possible means of evaluation and/or measurement and on major consequences during fibre processing.

• Papers on measurements only are added to the list since 2010.

• The bibliography now covers a period going from the 1960’s to 2012.
Observation

Number of documents on stickiness

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of Documents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960-1964</td>
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<td>1965-1969</td>
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<td>2005-2009</td>
<td>40</td>
</tr>
<tr>
<td>2010-2014</td>
<td>10</td>
</tr>
</tbody>
</table>
Observation

Number of documents on stickiness

- 1960-1964: 1
- 1965-1969: 0
- 1970-1974: 5
- 1975-1979: 9
- 1980-1984: 14
- 1985-1989: 14
- 1990-1994: 62
- 1995-1999: 30
- 2000-2004: 45
- 2005-2009: 17
- 2010-2014: 3

Number of documents range from 0 to 62.
Trend in stickiness results along time
CIRAD results

In average: around 750 samples/year
PDF file

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Thanks for attention … and suggestions
International Textile Manufacturers Federation (ITMF)
International Cotton Committee on Testing Methods (ICCTM)
Stickiness WG

Latest information

GOURLOT Jean-Paul
Bremen, March 2010

CIRAD UPR102
Laboratoire de Technologie et de Caractérisation des fibres naturelles
✓ SYDEL SA, Montpellier, France: closed
✓ KOTITI method: ISO standard under preparation
✓ Manufacture of SCT and of H2SD by Prodev System
  199 rue Hélène BOUCHER
  Parc Mermoz
  34170 Castelnau Le Lez
  France
  Email: contact@prodev-system.fr
Thank you for your attention

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