

EIHA's classification of hemp fibre by colour grades

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Overview

• Introduction

- Subjective colour determination
- Influences on colour impression
- Objective colour determination
- CIELAB L*, a* and b*

• Materials, Methods & Results

- Hemp fibers
- Colour measurement method
- Results

• Conclusions

Which colour?

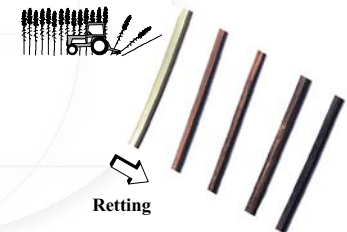
Which colour has this sweet pepper?



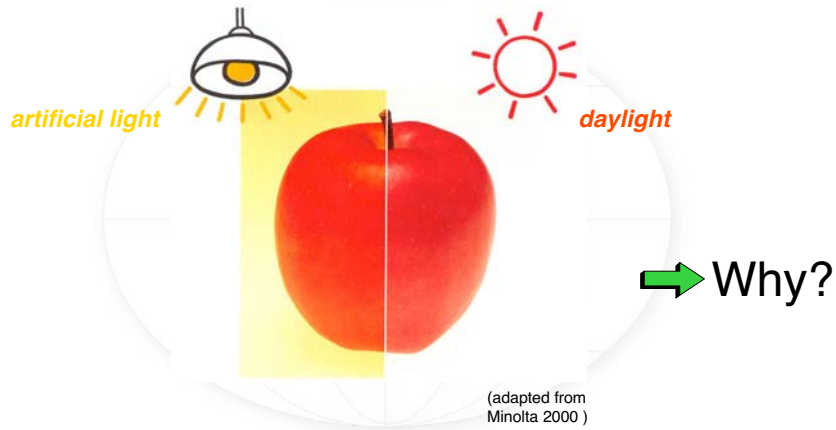
Subjectivity



Ten different people will see ten different colours!



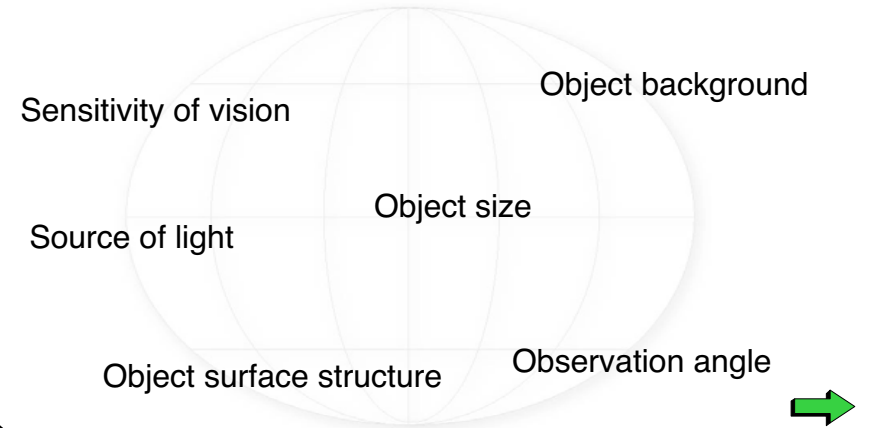
Same colour different look?



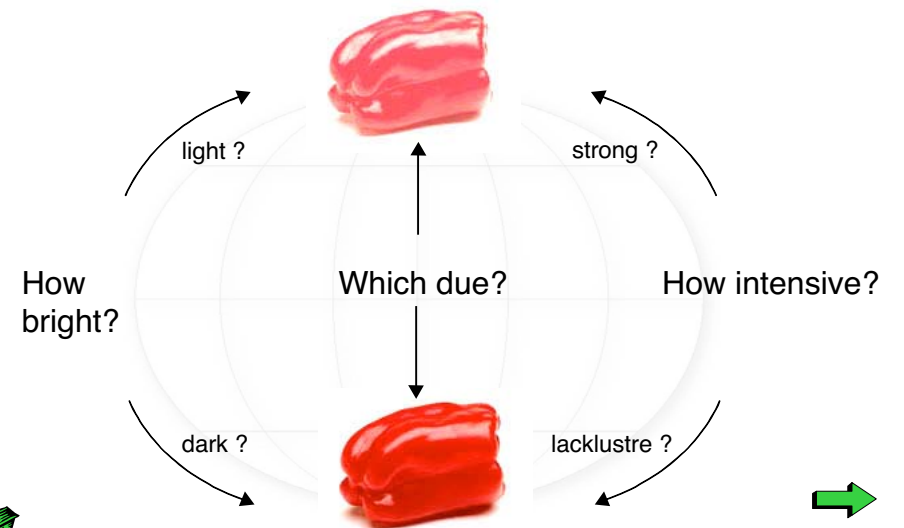
(adapted from Minolta 2000)



Colour impression is influenced by many factors

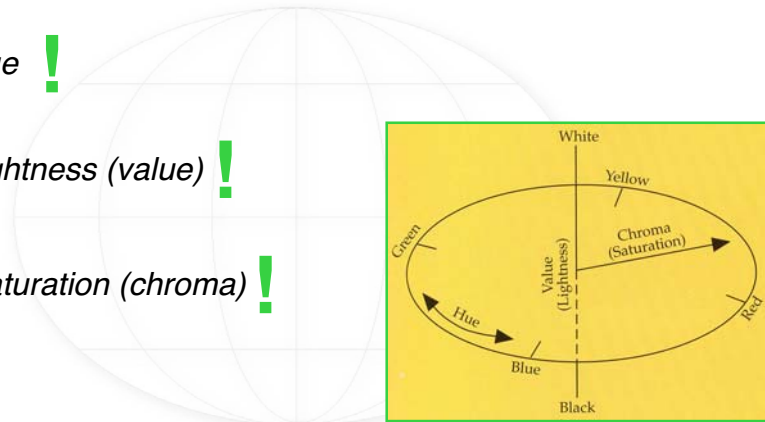


Objective colour determination



Classification of colours

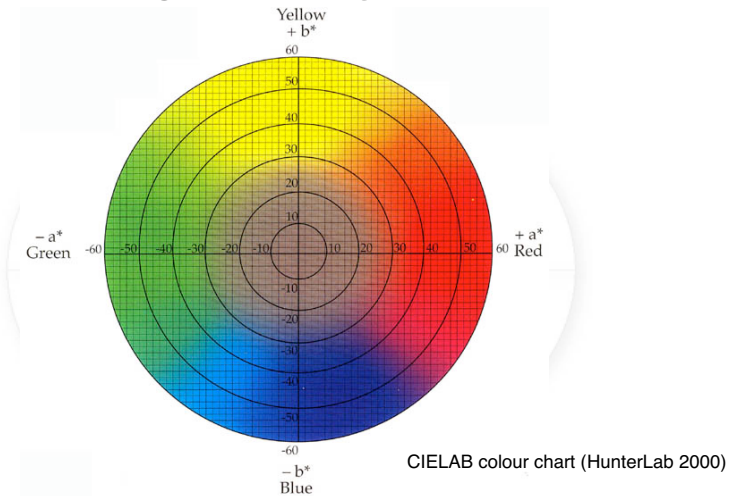
- ➔ Hue !
- ➔ Lightness (value) !
- ➔ Saturation (chroma) !



(HunterLab 2000)



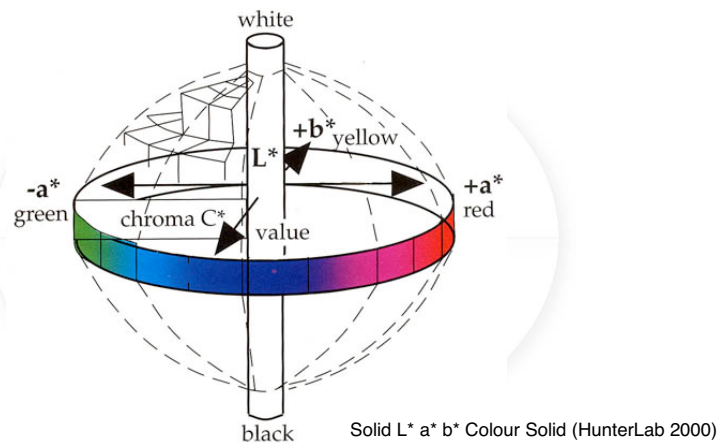
Communicating colour by number



CIELAB colour chart (HunterLab 2000)



Communicating colour by number



Solid L* a* b* Colour Solid (HunterLab 2000)



CIELAB L*, a* and b*

L* scale represents lightness from black (0) to white (100)

a* term represents greenness (-a) to redness (+a)

b* scale represents blueness (-b) to yellowness (+b)



5 important parts of a colour specification

1. Which scale? (CIELAB, CIELUV, or ?)
2. Which observation angle? (2° or 10°?)
3. Which illuminant? (A, C, D65, F2 or?)
4. Which geometry of instrument? (sphere d/8°(specular included or excluded), 45° / 0°, or?)
5. What specific procedure is used in measurements process?

➔ *With these details, communication of colour has meaning and can be universally interpreted.*



(HunterLab 2000)

England

- Hemcore 1, 2, 3, 4 & 5

France

- LCDA yellow, LCDA yellow green
- EP2-vert clair, EP3-jâune, EV2-gris clair, EV3-gris, EV4-gris-sombre

Germany

- AGRO-Dienst R1, R2-3, R3 & R4

Netherlands

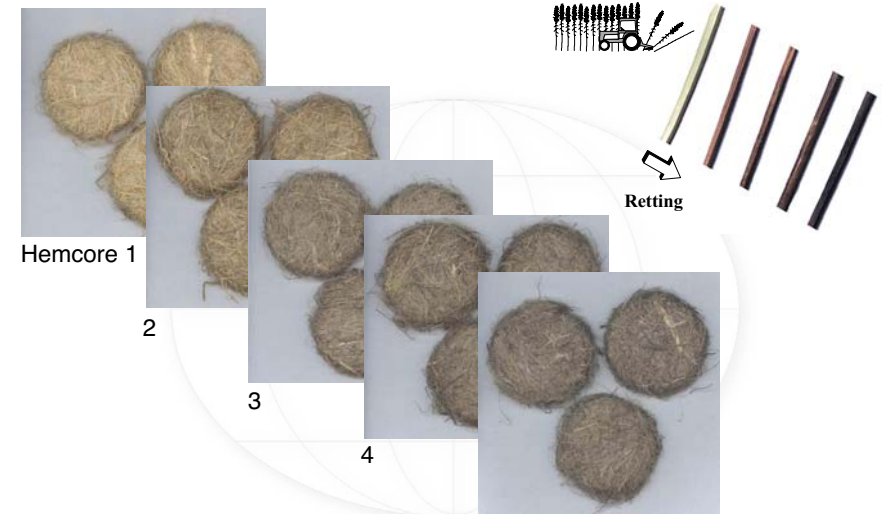
- HempFlax V1, V2, V3, V4 & V5

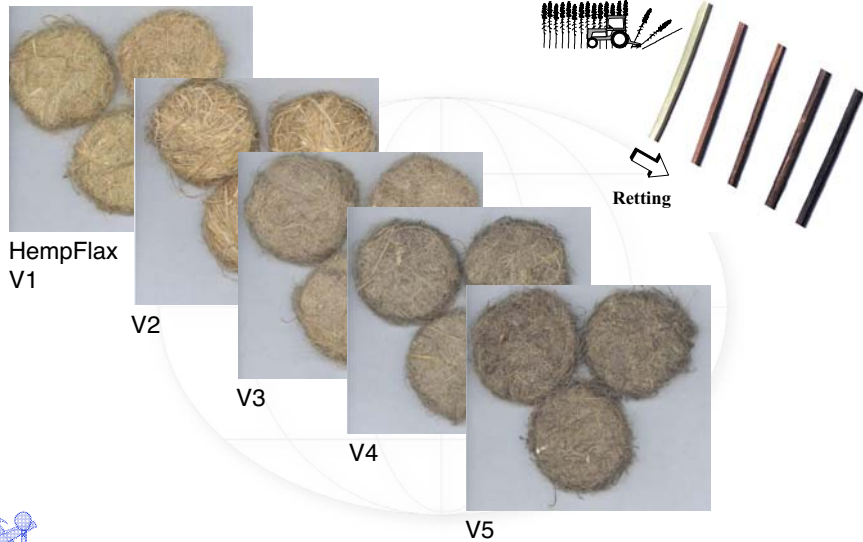


Method



Spectrophotometer CM-2600d, CIELAB, 10° standard observer, illuminant D65, SCE (diffuse reflection without orientation), 3 samples each 4 g (climate 20°C, 65 % humidity of air), 3 measurements (0°, 120° & 240°) on each side

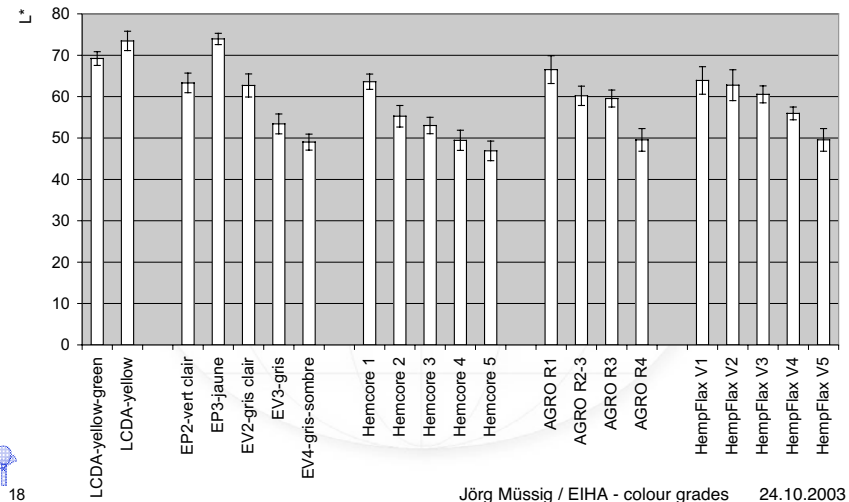




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CIELAB

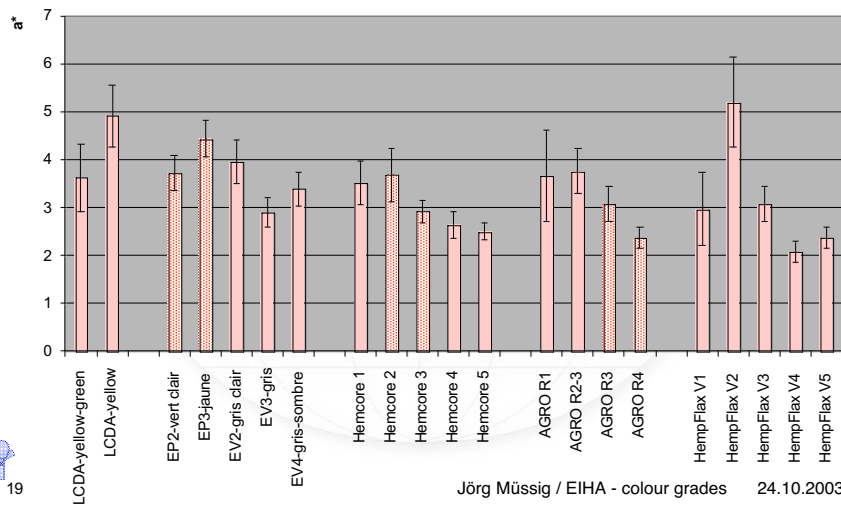
L* scale represents lightness from black (0) to white (100)



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CIELAB

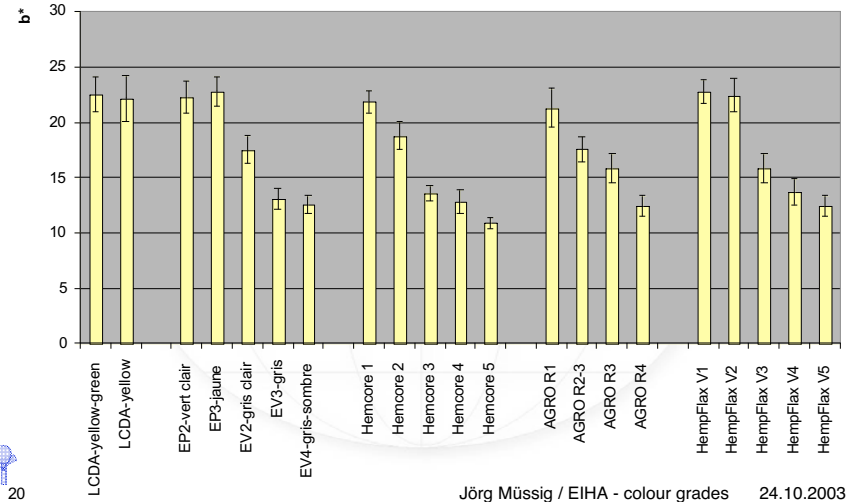
a* term represents greenness (-a) to redness (+a)



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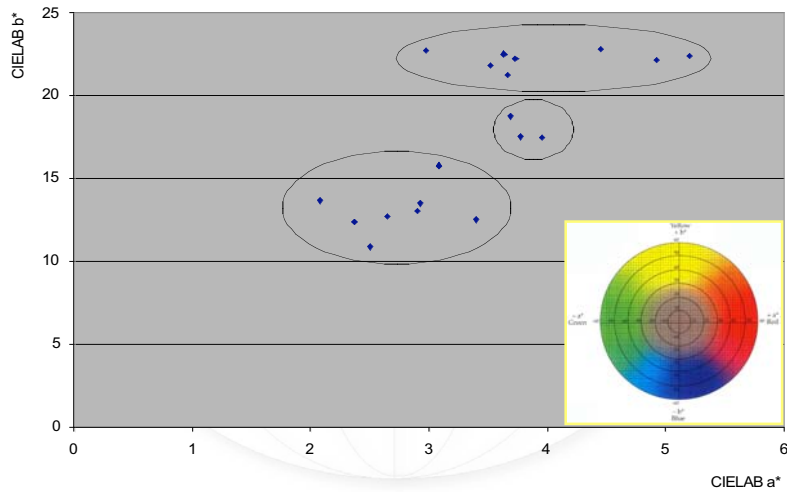
CIELAB

b* scale represents blueness (-b) to yellowness (+b)



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CIELAB a* vs. b*



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England

Germany

Difference

- Hemcore 1

- AGRO-Dienst R1

L* = 63.31

L* = 66.54

$\Delta L^* = - 2.93$

a* = 3.51

a* = 3.66

$\Delta a^* = - 0.15$

b* = 21.85

b* = 21.29

$\Delta b^* = + 0.56$



- ΔL^* = Hemcore 1 sample a little darker
- Δa^* = Hemcore 1 sample a little greener
- + Δb^* = Hemcore 1 sample a little yellower



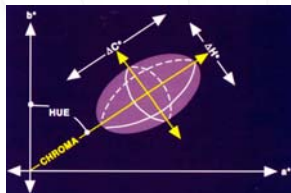
Communicating colour by number !



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Conclusions

- ④ The data and results demonstrate that communication of hemp fibre colour has meaning and can be universally interpreted; reliable values can replace the subjectivity of colour determination
- ④ Colour impression is influenced by many factors; observation conditions and the specifics of the measurements must be the same; standardisation and harmonisation of the method is important
- ④ With CIELAB and CIE comparisons between hemp specimens are possible; retting influence can be seen in differences in lightness, chroma and hue
- ④ For EIHA we must develop a tolerance specification for an Europe-wide hemp classification; defining areas of "Acceptability"



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