Photo by Hadassa Koning

“The development of a diagnostic tool in order to contain the Vinegar Syndrome by effective collection management”

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Content presentation

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Consortium

- ✓TNO Indoor Health and Environment (lead contractor)
- ✓Art Conservation bv
- ✓Buchi Labortechnik GmbH
- ✓Nederlands Filmmuseum
- ✓Nationaal Archief

Background 1

Vinegar Syndrome is a threat!

- Employees, exposure to acetic acid → harmful to health

- Cultural heritage → deterioration photographic materials

Photo by Hadassa Koning

Background 2

Methods curently used to manage photographic collections:

- determination type of material: destructive or by visual observation
- observation of odour by nose (vinegar) in combination with AD-strips

Need for a rapid and objective method to determine:

- type of photogaphic material (cellulose acetate, cellulose nitrate or polyester)
- degradation state of the materials

Detection method

Detection method

1. Rapid
2. Reproducible
3. Objective

→ Method is based on Near Infrared spectroscopy

Method has successfully been applied in:

- Pharmaceutics
- Food and nutrition
- Paper and pulp

Goal of the project

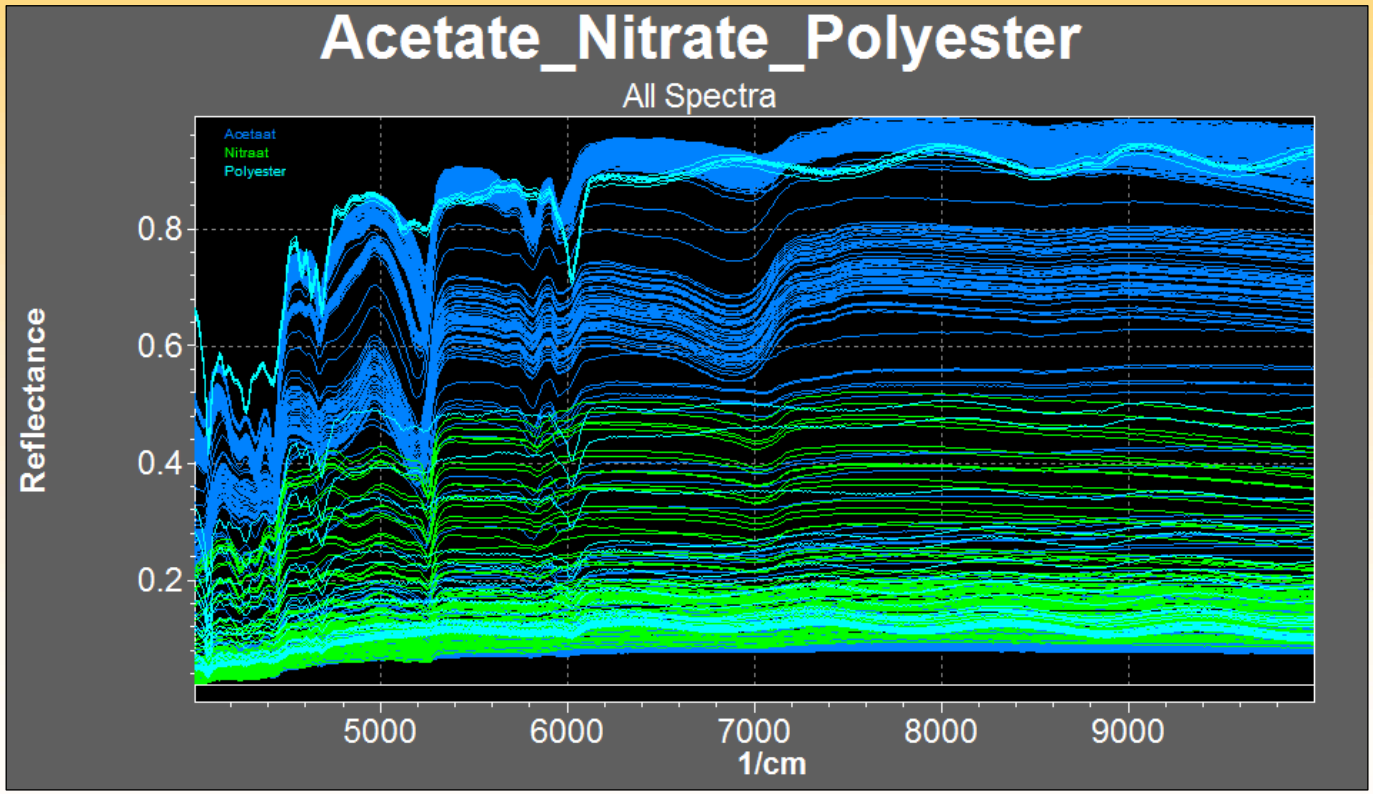
Application of Near Infrared Spectroscopy in order to determine the class and degradation state of photographic films.

Experimental

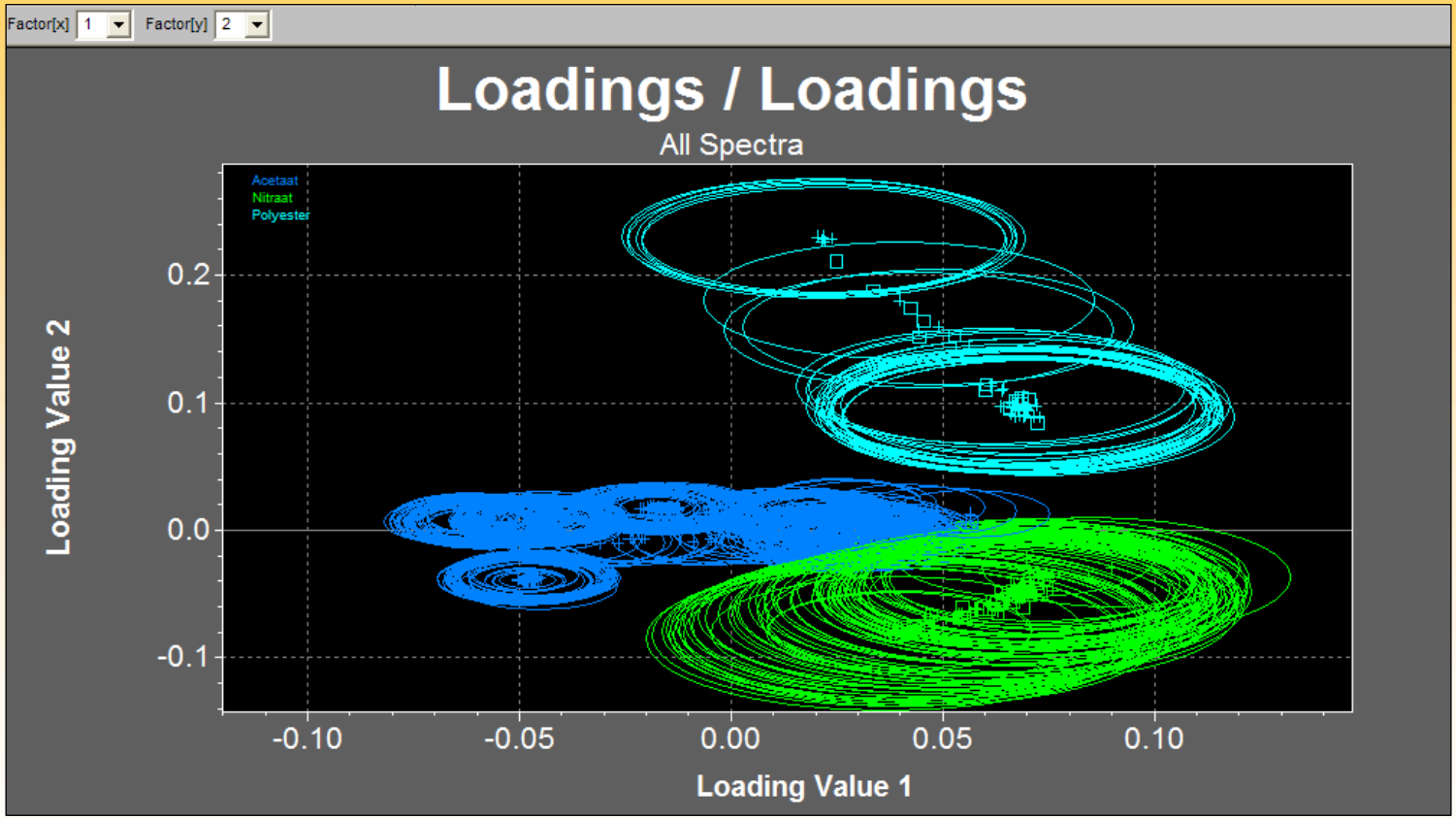
- Selection materials (consortium)
- Description materials
- Determination degradation state using AD-strips
- Recording NIR spectra
- Translation NIR spectra to models

Results 1

Model: Acetate / Nitrate / Polyester

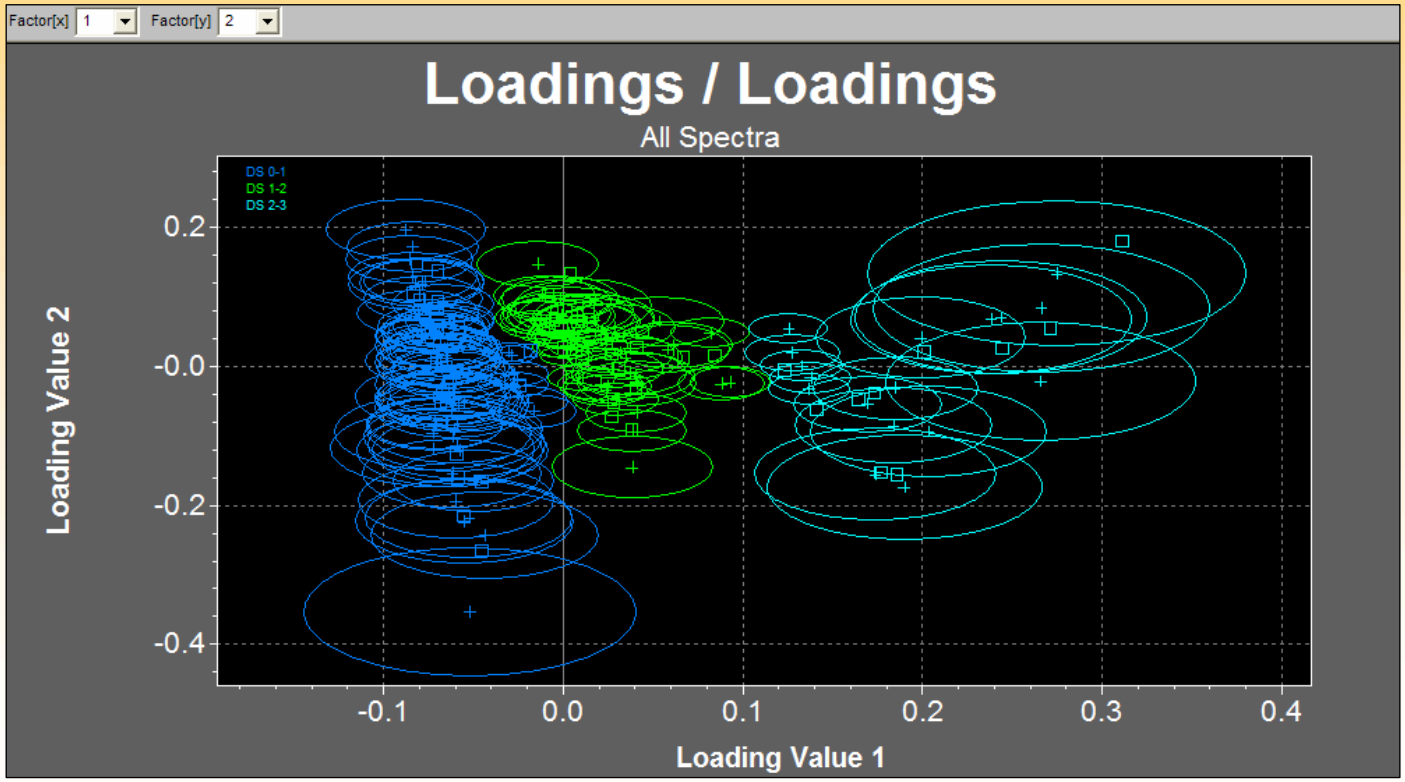


Results 2


Factor[x] 1
Factor[y] 2
Loadings / Loadings
All Spectra
Acetaat
Nitraat
Polyester
0.2
0.1
0.0
-0.1
Loading Value 2
-0.10
-0.05
0.00
0.05
0.10
Loading Value 1

Results 3

Degradation model: Cellulose Acetate



Results 4

Example routine measurement

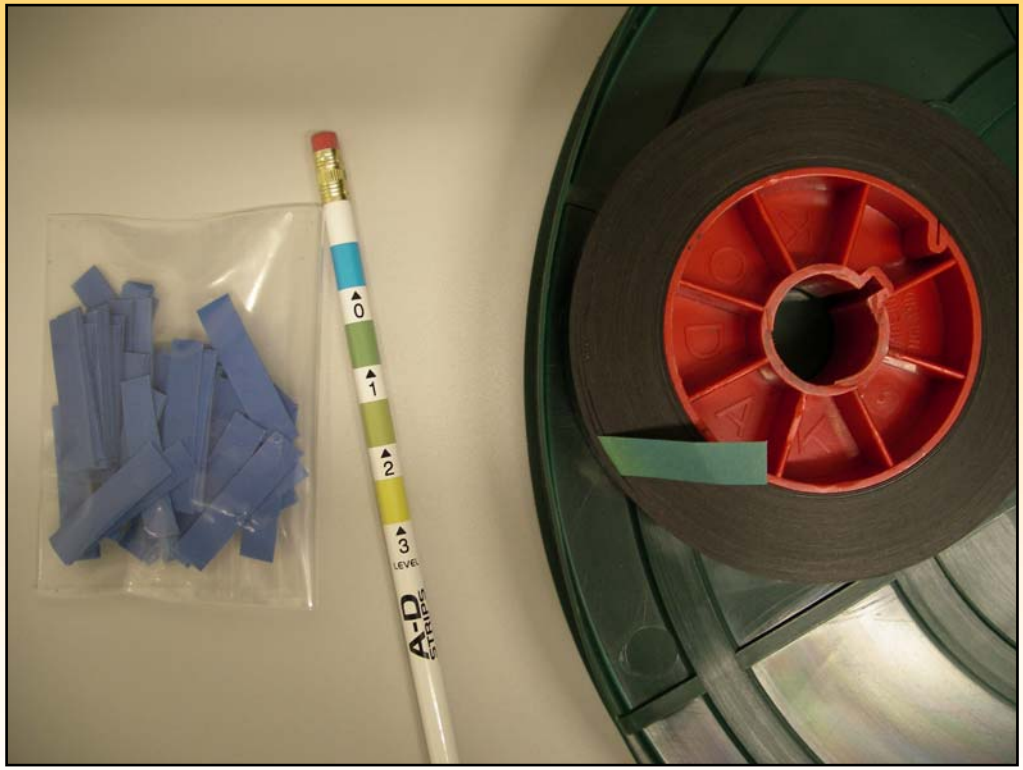
Input

Sample no.	123
Date	15/11/2006

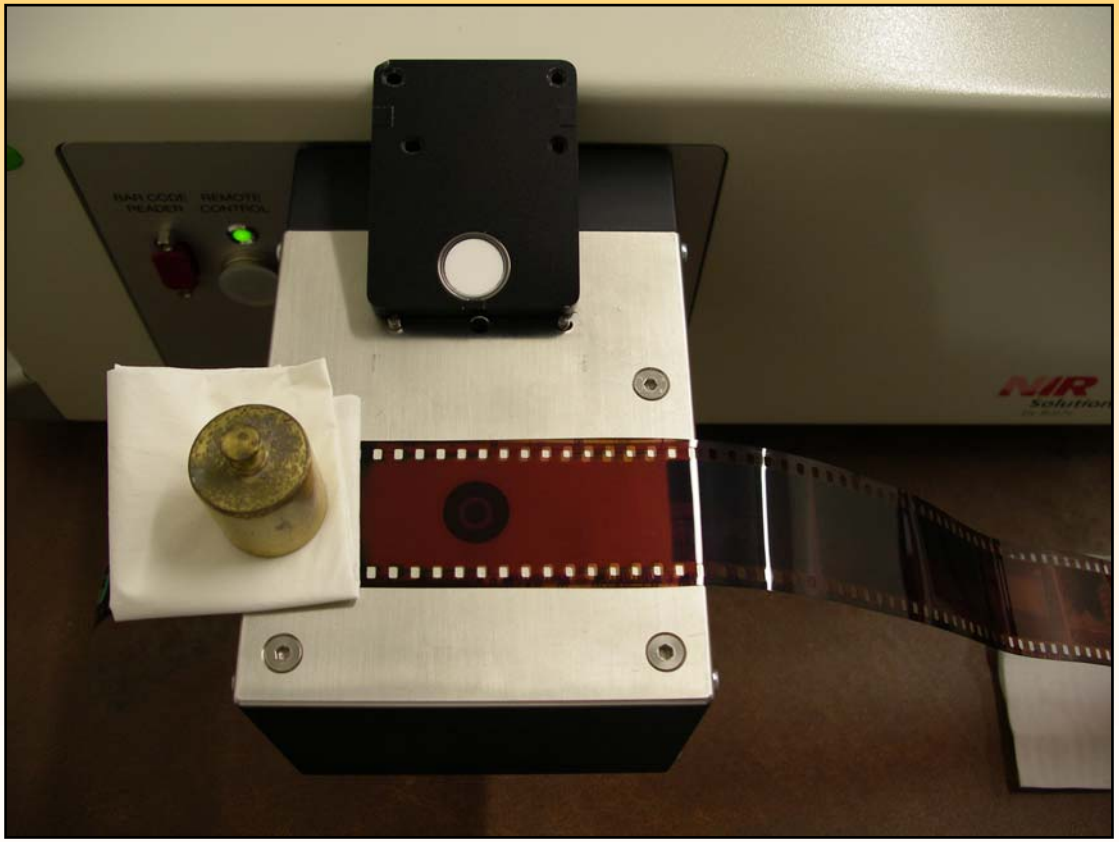
Output

Sample 123	
Origin	Cellulose acetate
Degradation	DS 1-2

Impressions (1)



Impressions (2)



Impressions (3)

Conclusions

- The origin and degradation state of the films and transparencies can be easily performed using NIR
- Importance of this method.
  - Conventional methods were often failing to determine the origin of the photographic materials.
  - Even if senior conservators were using it.
  - This method proved to be a reliable and fast tool.

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