



SP18: Development of a fast non-invasive in vivo measurement of UVA-PF and SPF with new diffuse reflectance spectroscopy (DRS) device

Wiora, Georg²; Throm, C.¹; Reble, C.²; Lademann, J.¹; Schanzer, S.¹;
Kobylinski, S.¹; Karrer, H.³; Rohr, M.⁴; Kolbe, L.⁵; Khazaka; G.²; Meinke,
M. C.¹

¹ Charité - Universitätsmedizin Berlin, Berlin, Germany

² Courage + Khazaka electronic GmbH, Cologne, Germany

³ Hans Karrer GmbH, Augsburg, Germany

⁴ Matthias Rohr, Institute Dr. Schrader, Holzminden, Germany

⁵ Beiersdorf, Hamburg, Germany



Courage + Khazaka electronic GmbH

State of the art: in vivo Sun Protection Factor according to ISO 24444

1. High dose UVA and UVB radiation on volunteers skin
2. Assessment of erythema 24h after exposure
3. MED = Minimal Erythema Dose
4.
$$SPF = \frac{MED_with_Protection}{MED_without_Protection}$$
5. >10 subjects per product

→ FDA und EU call for non-invasive methods

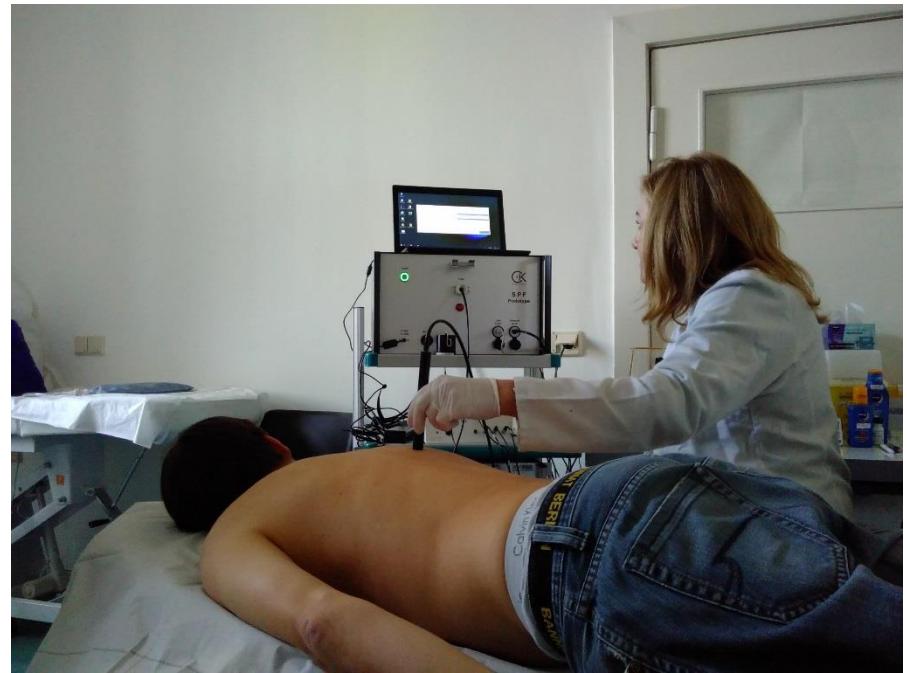


<http://www.schrader-institute.de/home/pruefung/haut-pruefung/sonnenschutz/>

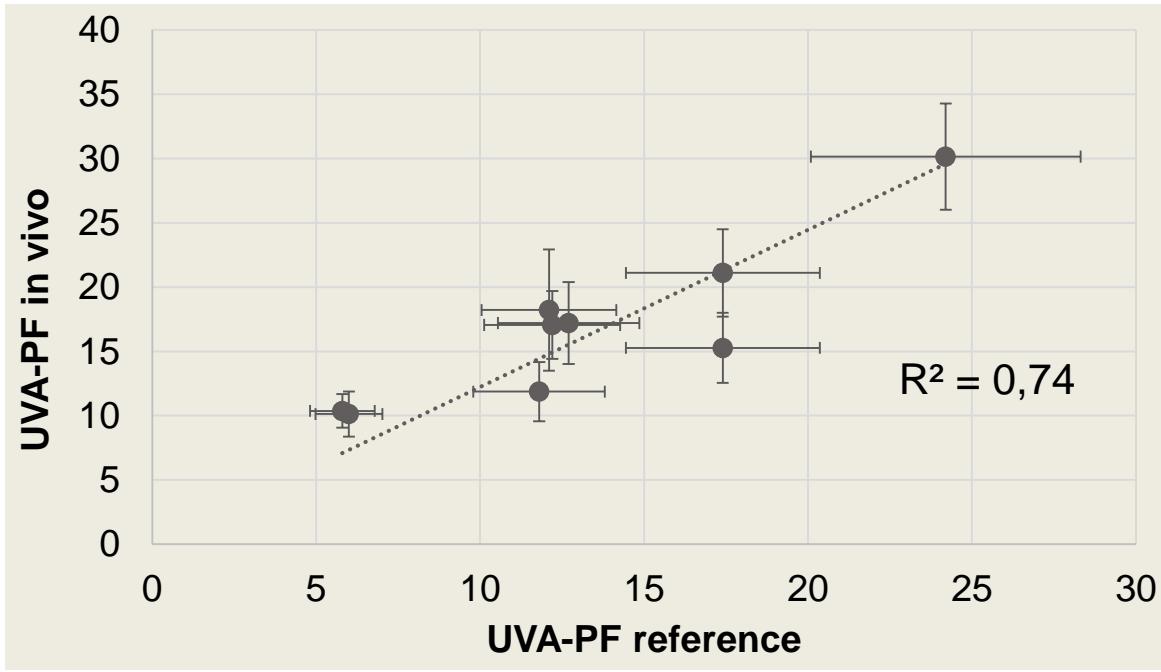


New non-invasive LED-based DRS/HDRS system

- DRS: in vivo Diffuse Reflectance Spectroscopy
- System components:
 - Multi-lambda-LED light source
 - Customized fiber optics
 - Customized imaging spectrograph
 - Spectral result display for improved skin protection development
- 2 Operation modes:
 1. pure in vivo
 2. HDRS (Hybrid DRS): combination with in vitro [Ruvolo et al 2014], [Rohr et al 2018]

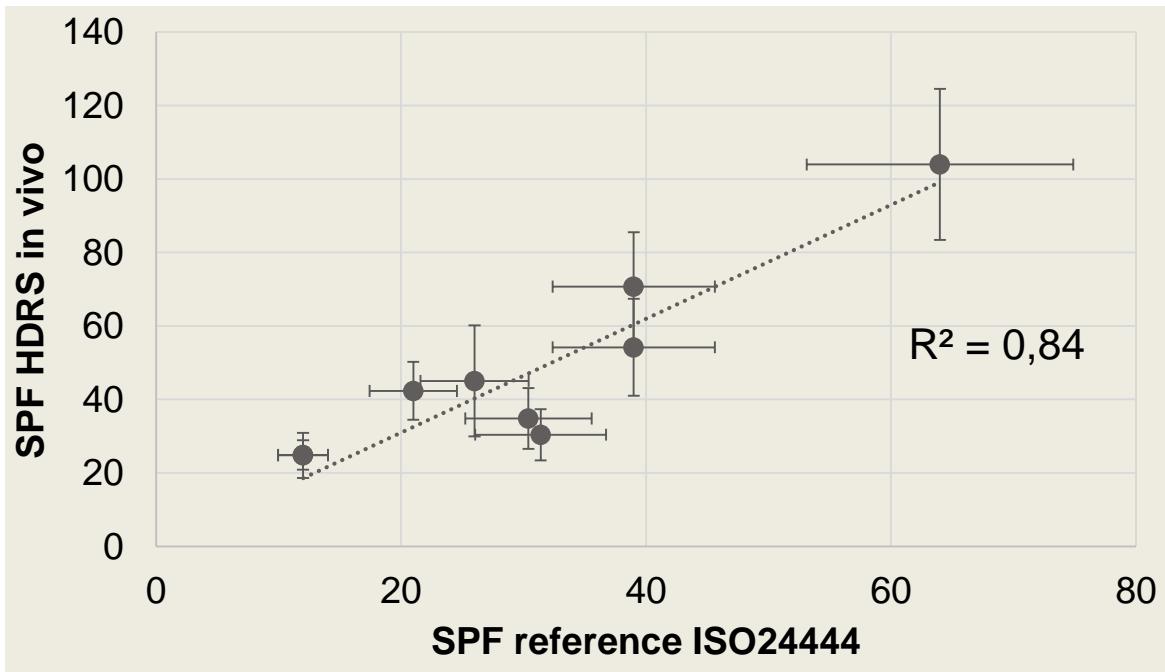


Pure in vivo UVA-PF results



- 9 products tested
- N=10 volunteers
- Aging correction included
- Good correlation
- Currently up to UVA-PF 30 (to be improved)

HDRS results



- HDRS [Ruvolo et al 2014], [Rohr et al 2018]
- 9 products tested
- N=10 volunteers
- Aging correction included
- Good correlation of HDRS

Summary



- Non invasive technology
- compact measurement system
- Simple and safe application
- Low effective UV-dose < 1/5 MED
- Fast in vivo measurement. e.g.
 - 4 products
 - on one volunteer
 - → Less than 60 minutes (compared to 24h for ISO 24444)
- Outlook
 - Participation in upcoming international ring study
 - Market introduction 2020

