Lehre und Forschung in pharmazeutischer Technologie an der Hochschule für (industrielle) Life Sciences – FHNW

seit 2006

neu für die Schweiz

Institute und Studienrichtungen – Hochschule für Life Sciences

Institut für Chemie und Bioanalytik

Institut für Medizinaltechnologie

Institut für Eucopreneurship

Institut für Pharma Technologie

Gegenstand / Fokus

Studiengänge nach Bologna

Bachelor of Science
Master of Science

Naturwissenschaftliche und medizinische Grundlagen – BSc

Fach	ECTS	
Physik I	3	Pflicht
Analysis I	3	Pflicht
Allgemeine und anorganische Chemie	3	Pflicht
Biologie	3	Pflicht
Organische Chemie	3	Pflicht
Physik II	3	Pflicht
Lineare Algebra	3	Pflicht
Analysis II	3	Pflicht
Erweiterte Biologie	3	Pflicht
Angewandte Mathematik	3	Pflicht
Statistik und Wahrscheinlichkeitsrechnung	3	Pflicht
Bioorganische Chemie und Biochemie	3	Pflicht
Anatomie - Physiologie	3	Pflicht

Naturwissenschaftliche und medizinische Grundlagen – BSc

Fach	ECTS	
Materialien und Werkstoffe	3	Pflicht
System- und Biophysik	3	Pflicht
Technische Mechanik	3	Pflicht
Physik praktisch	3	Pflicht
Total	**51**	

Kommunikation und Unternehmertum – BSc

Fach	ECTS	
Kommunikation, Sprache, Wissenschaft	3	Pflicht
Management / Betriebswirtschaft I	3	Pflicht
Projekt- und Selbstmanagement	3	Pflicht
Management / Betriebswirtschaft II	3	Pflicht
My Future	3	Pflicht
Englisch I	3	Wahlpflicht
Englisch II	3	Wahlpflicht
Englisch III	3	Wahlpflicht
Total	**21**	

Grundlagen aus anderen Studienrichtungen – BSc

Fach	ECTS	
Einführung in die Informatik	3	Pflicht
Datenbanken und Datenmodellierung	3	Pflicht
Programmieren I	3	Pflicht
Netzwerke und Datenkommunikation	3	Wahlpflicht
Programmieren II	3	Wahlpflicht
Erweiterte Informatik	3	Wahlpflicht
Hardwarenahe Softwareentwicklung	3	Wahlpflicht
Fluidik, Fluiddynamik und Dosiersysteme	3	Pflicht
Elektronik	3	Wahlpflicht
Elektrotechnik	3	Wahlpflicht
Automatisierungssysteme	3	Wahlpflicht
Mikrosystemtechnik	3	Wahlpflicht
Mechanik und Konstruktion	3	Wahlpflicht
Biosignalverarbeitung	3	Wahlpflicht

Grundlagen aus anderen Studienrichtungen – BSc

Fach	ECTS	
Qualitätsmanagement für Life Sciences	3	Wahlpflicht
Pharma- und Umwelt-Trennverfahren	3	Pflicht
Umweltwissenschaften	3	Wahlpflicht
Umweltmanagement	3	Wahlpflicht
Umweltbereiche und -technik	3	Wahlpflicht
Ressourcen und Abfallwirtschaft	3	Wahlpflicht
Nachhaltigkeit und Entwicklung	3	Wahlpflicht
Grundlagen Verfahrens- und Reaktionstechnik	3	Wahlpflicht
Wahl-Kurs	3	Wahlpflicht
Total	**24**	

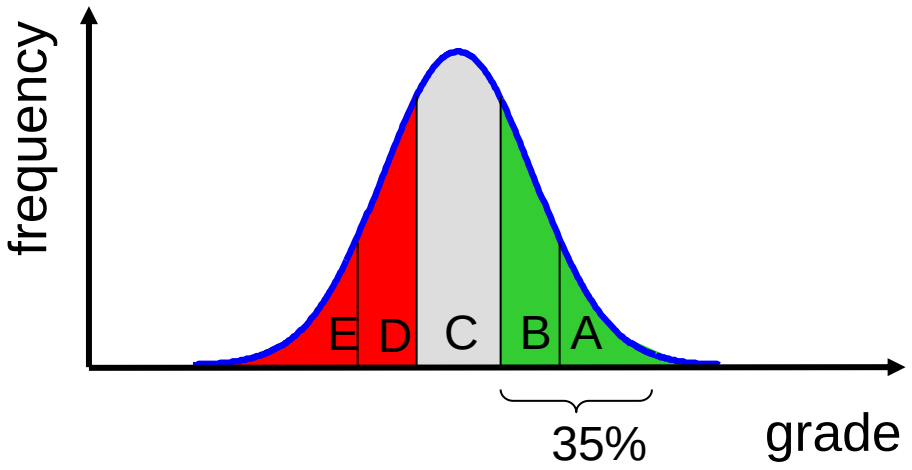
Pharma Technologie Grundlagen – BSc

Fach	ECTS	
Pharma / Life Science Industrieprozesse	3	Pflicht
Drug Discovery and Development	3	Pflicht
Reinraumtechnik	3	Pflicht
Grundlagen der Chemieprozesse	3	Pflicht
Pharmakologie und Toxikologie	3	Pflicht
Erweiterte Pharmakologie	3	Pflicht
Biopharmazie	3	Pflicht
Projektarbeit	6	Pflicht
Total	**27**	

Vertiefung Pharma Technologie – BSc

Fach	ECTS	
Chemie und Profilierung der Wirkstoffe	6	Pflicht
Parenteralia und biologische Wirkstoffe	3	Pflicht
Molekulare Galenik	6	Pflicht
Pharmazeutische Analytik	6	Pflicht
Prozess- und Anlagentechnik	6	Pflicht
Anlagenplanung	3	Pflicht
Verpackung und Logistik	3	Pflicht
Qualitätsmanagement und Registrierung	6	Pflicht
Praxisprojekt	6	Pflicht
Bachelor Arbeit	12	Pflicht
Total	**57**	

MSc Admission Requirements



A, B or grade ≥ 5 from a relevant Bachelor Degree program.

Equivalent education and professional experience.

Eligibility evaluation, Interview and/or proficiency examination.

FCE

TOEFL

Major in Pharmaceutical Technology – MSc

Fach	ECTS	
Drug formulation and delivery • Controlled release • Routes of administration • Macromolecular drugs • Per-oral poorly water-soluble drugs	5	Pflicht
Drug manufacturing • Advanced pharmaceutical production units • System dynamics of production processes • Processing of biologics • Technical services and process media	5	Pflicht
Instrumental analytics	5	Wahlpflicht
Chemical engineering	5	Wahlpflicht
Nanotechnology	5	Wahlpflicht
Sustainable production and clean technologies	5	Wahlpflicht
Medical systems	5	Wahlpflicht
Master's thesis	40	Pflicht
Total	**60**	

Advanced Life Science Topics – MSc

Fach	ECTS	
Material science	3	Wahlpflicht
Biodiversity	3	Wahlpflicht
Polymers and applications	3	Wahlpflicht
Natural products	3	Wahlpflicht
Modeling complex systems	3	Wahlpflicht
Cellular and molecular physiology	3	Wahlpflicht
Data management and visualization	3	Wahlpflicht
Applied statistics	3	Wahlpflicht
Management of R&D projects	3	Wahlpflicht
Life cycle assessment	3	Wahlpflicht
Nutrition and chronic diseases	3	Wahlpflicht
Quality excellence	3	Wahlpflicht
Sustainable development	3	Wahlpflicht
Total	**18**	

Courses at University of Basel – MSc

Fach	ECTS	
Nah Infrarot, Chemometrie und Bildanalyse: Methoden für ein pharmazeutisches Prozessverständnis	1	Wahlpflicht
Therapeutische Antikörper	1	Wahlpflicht
Vom Target zur Therapie: in vitro Assays und in vivo Modelle	1	Wahlpflicht
Total	**3**	

Entrepreneurial skills – MSc

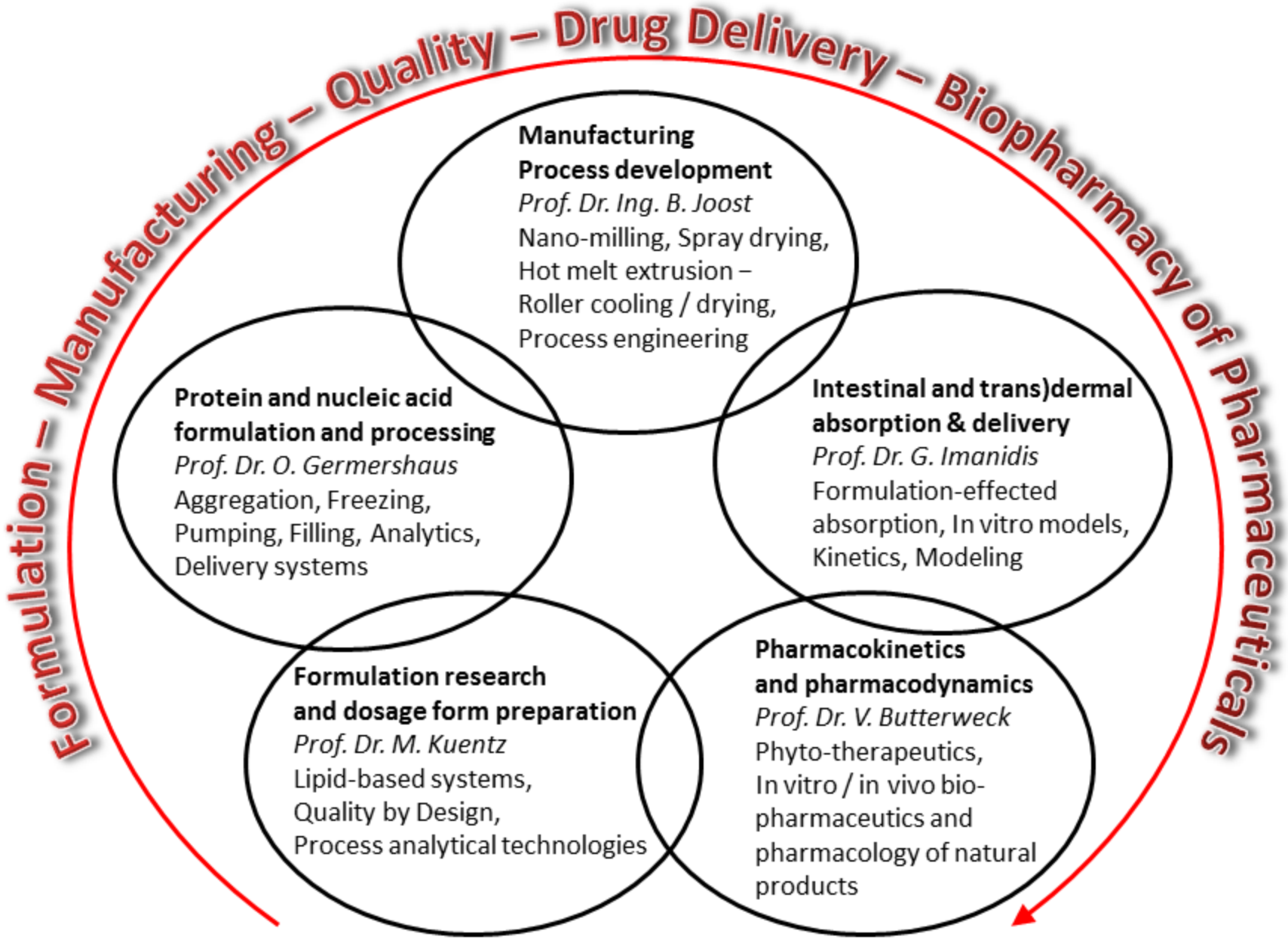
Fach	ECTS	
Leadership	4	Wahlpflicht
Innovation and knowledge management	4	Wahlpflicht
Business management	4	Wahlpflicht
Communication and marketing	4	Wahlpflicht
Society and politics	4	Wahlpflicht
Total	**12**	

Werbung

https://www.youtube.com/watch?v=wt55RFaTgNQ

University of Applied Sciences Northwestern Switzerland
School of Life Sciences

Institute of Pharma Technology



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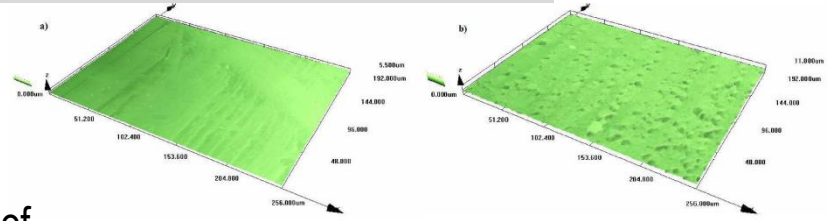
Starch-based PVA thermoplastic capsules (S-PVA-C) for hydrophilic lipid-based formulations

M. Kuentz

Background:
Compatibility issues of gelatin shell with hydrophilic lipid-based formulations.

Aim:
Development of a novel capsule shell material as replacement of gelatin for encapsulation of hydrophilic formulations.

Surface by confocal microscopy

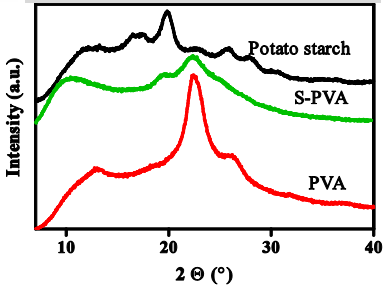


Soft gelatin capsules

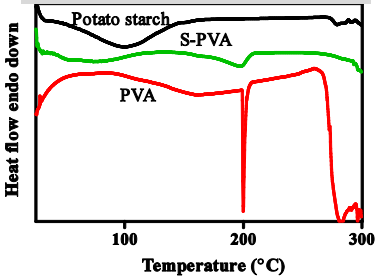
S-PVA-C

Water activity measurement during drying

Crystallinity by XRD



Crystallinity by DSC



Improved water exchange pattern

- S-PVA-C showed slight water exchange between shell and fill compared to SGC
- Water migration in SGC brought the drug loading close to the limiting drug solubility in the formulation

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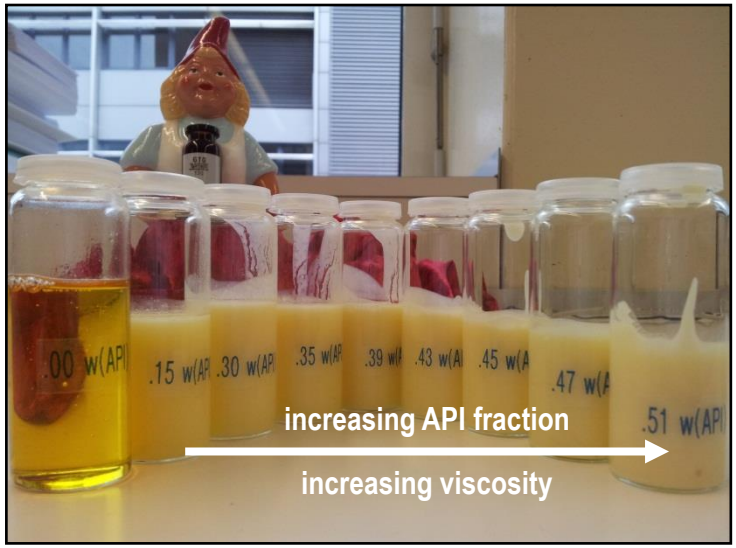
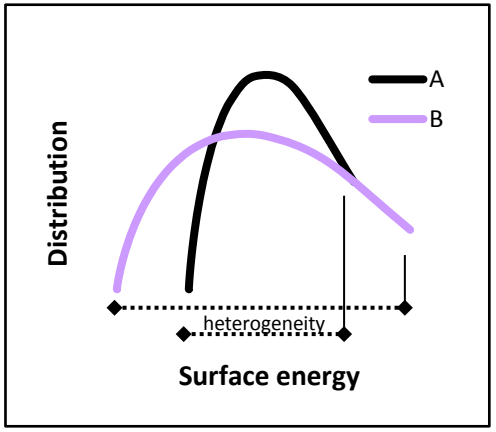
Characterization of lipid-based formulation in the QbD initiative M. Kuentz



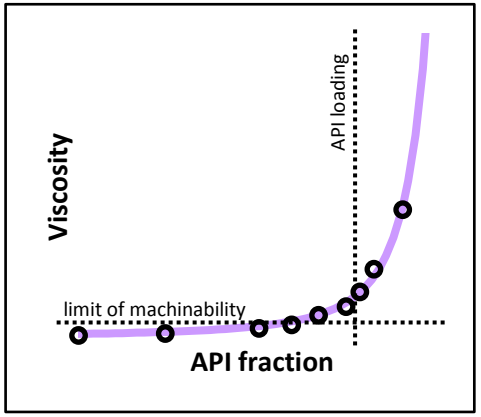
- Different API lots for physico-chemical analysis and surface properties characterization
- Formulation and manufacturing of the API
- Rheological analysis and mathematical modeling

Surface energy
Different viscosities related to different surface energy distributions of API lots

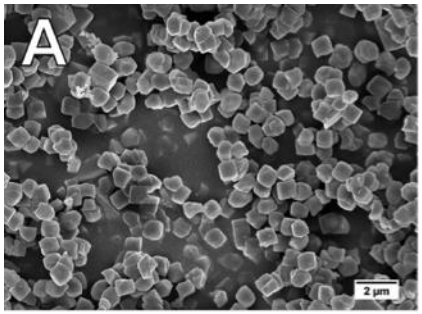


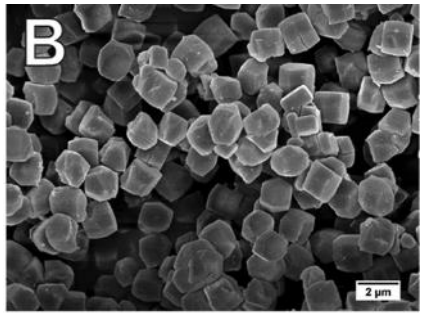
Fractal flocculation
First application to pharma suspensions to describe aggregation patterns

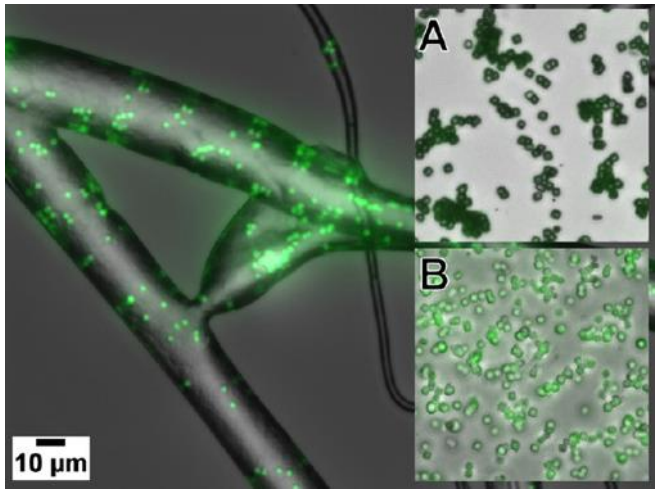
Mathematical model
The model allowed a sensible prediction of the viscosity in critical manufacturing ranges

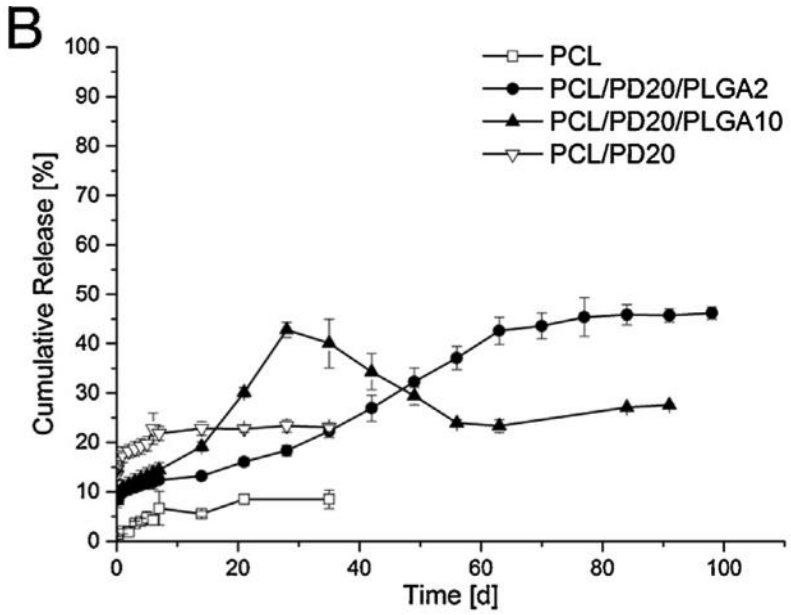


Release of protein crystals from biodegradable polymer matrices O. Germershaus

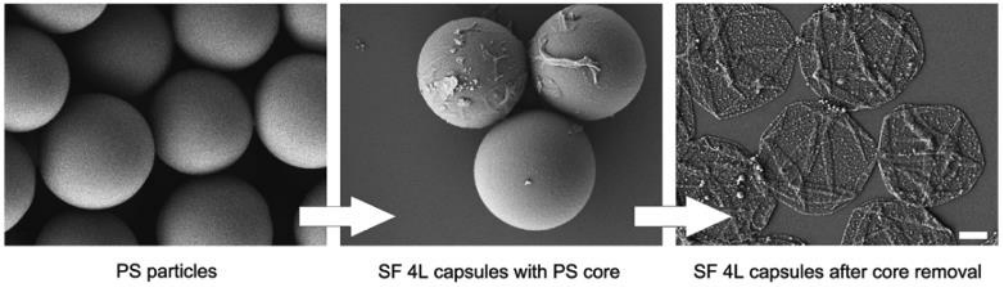


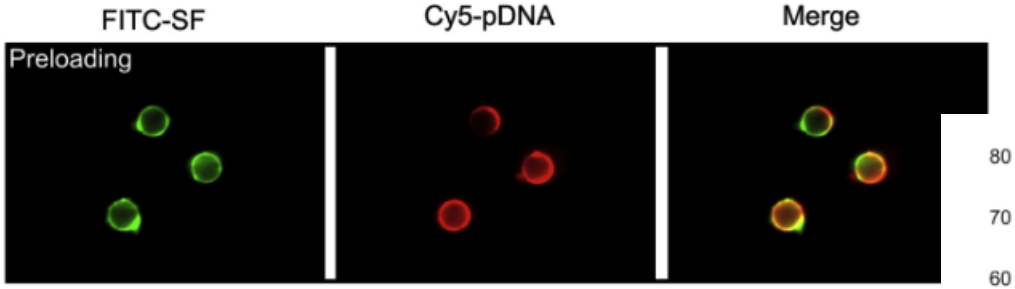


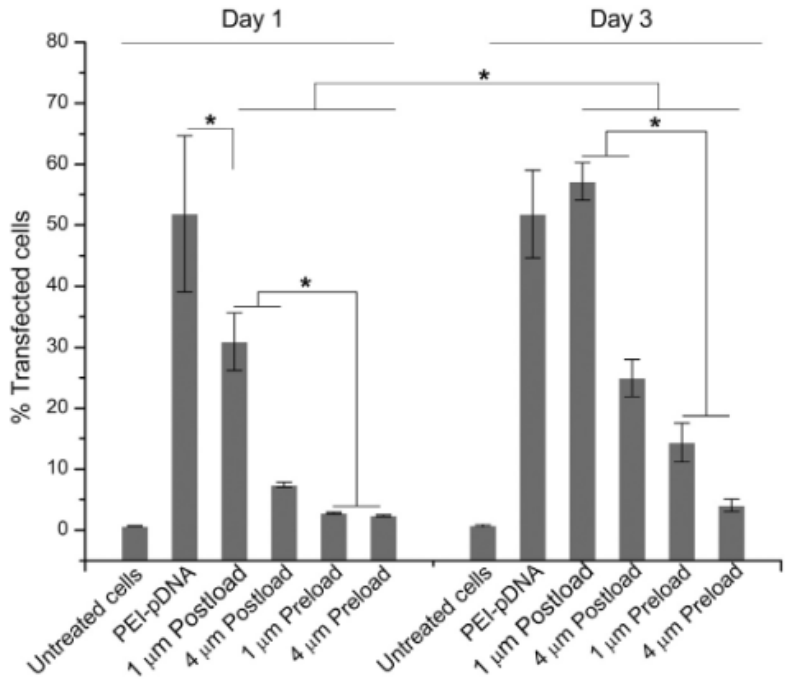




Silk fibroin for localized gene and protein delivery O. Germershaus

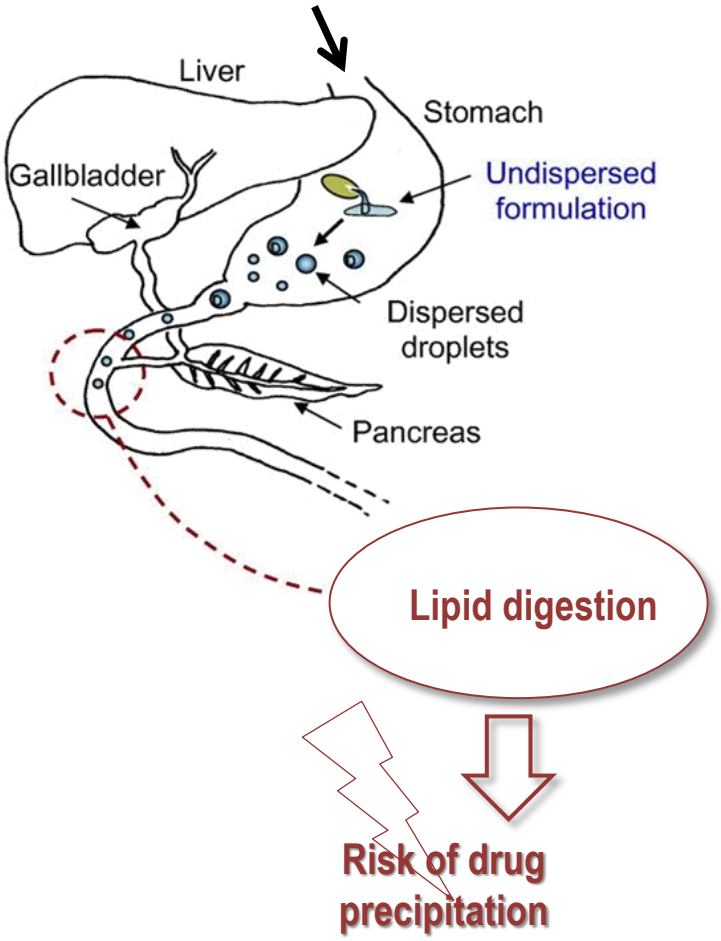




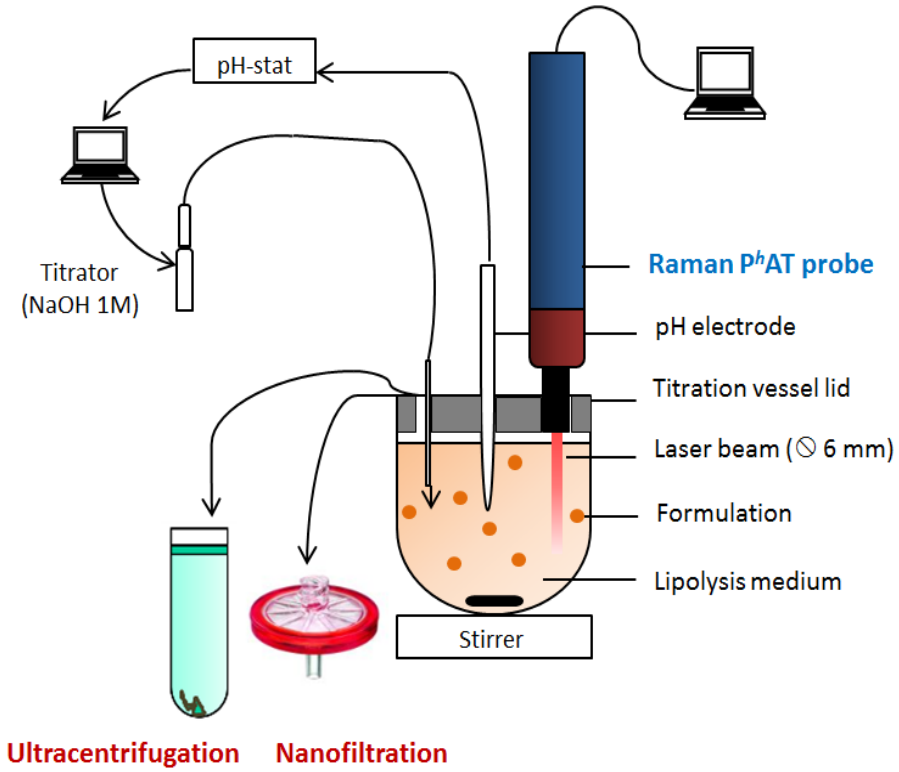


In vitro lipolysis testing of lipid-based formulations M. Kuentz

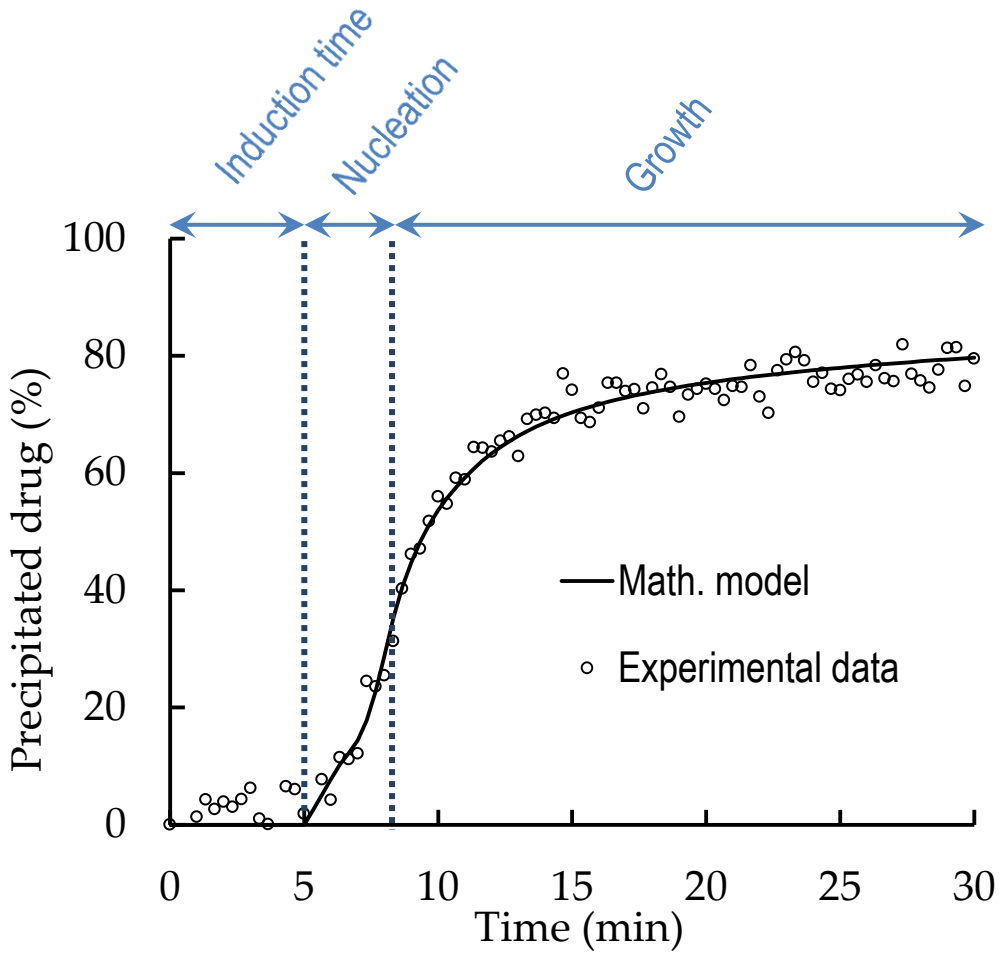
Drug dissolved in a lipid-based system



In vitro formulation digestion monitored with in-line Raman spectroscopy



Mathematical modeling of lipolysis-triggered drug precipitation G. Imanidis, M. Kuentz



Mathematical model of drug precipitation:

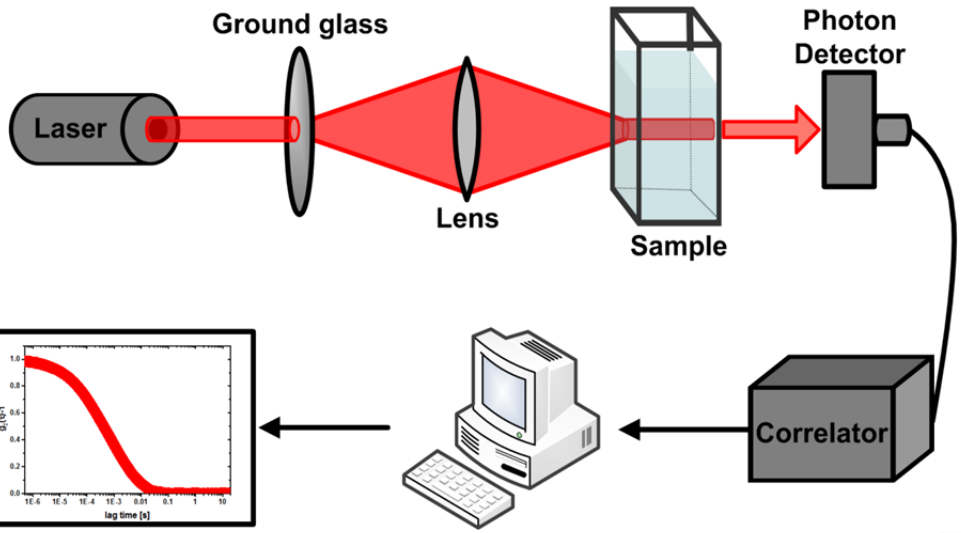
- Classical nucleation rate equation:

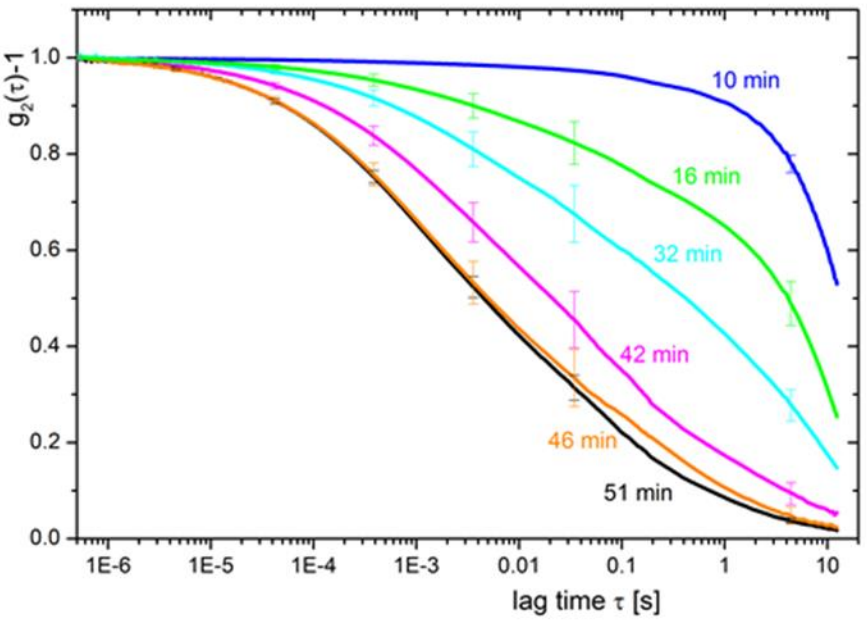
$$\frac{dC_{pr}}{dt} = A\,S\,e^{-\frac{B}{ln^2 S}}$$

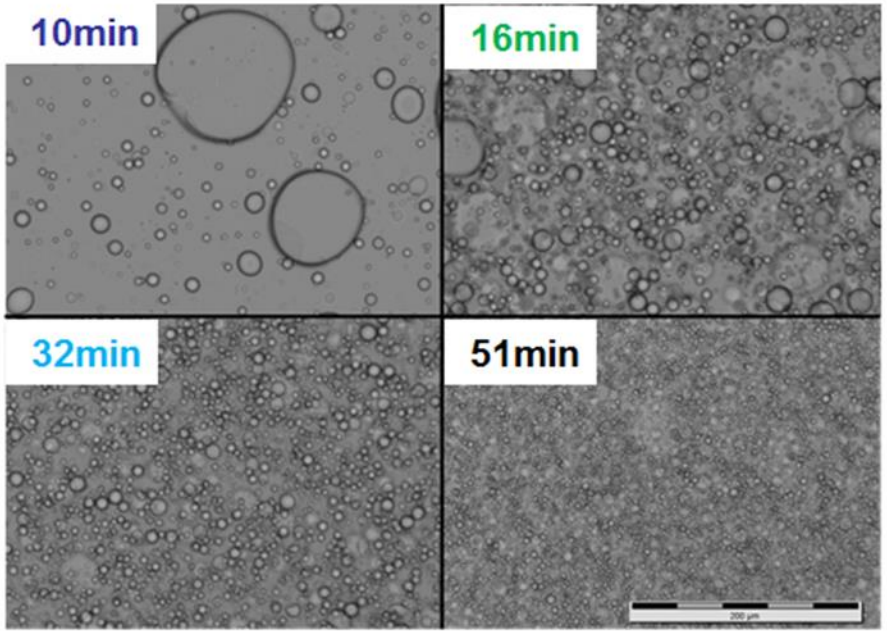
- Empirical growth rate equation:

$$\frac{dC_{pr}}{dt} = k_g(C - C^*)^g$$

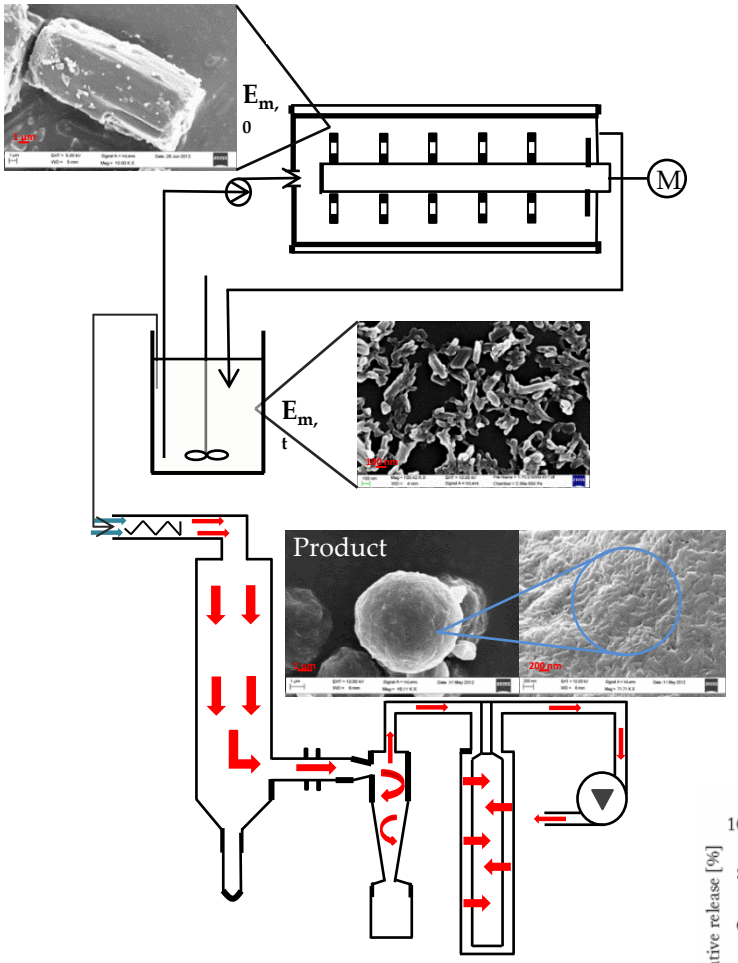
Diffusing wave spectroscopy as PAT for the homogenization process M. Kuentz

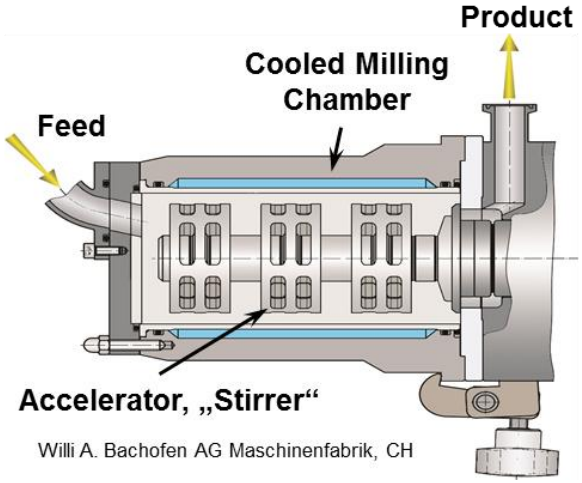


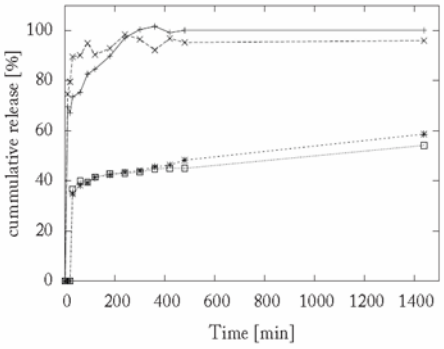


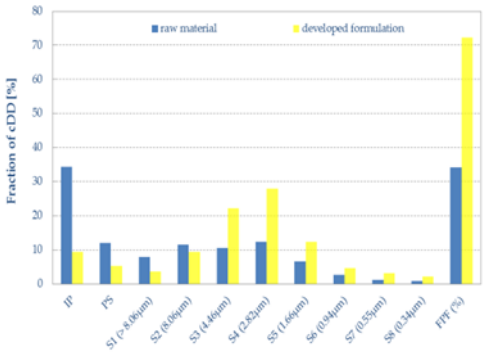


Nanomilled and spray-dried poorly water-soluble compounds B. Joost

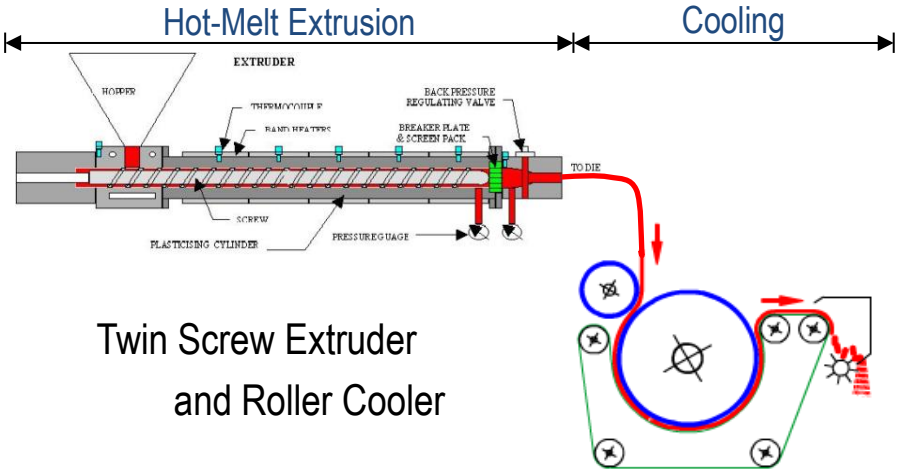




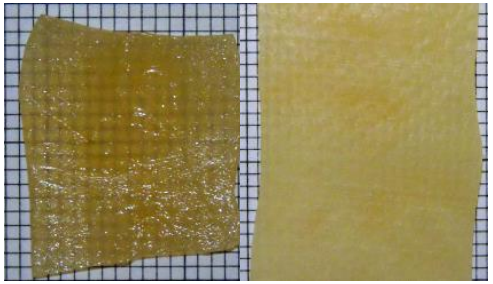




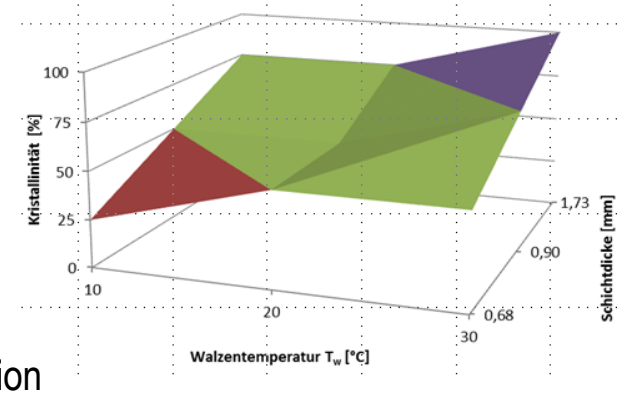
In line roller cooler for hot melt extrusion B. Joost



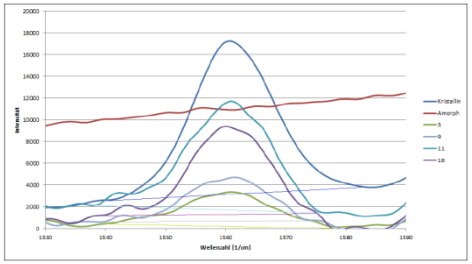
Twin Screw Extruder
and Roller Cooler



Amorphous (l) and crystalline (r) exdrudates depending on operation parameters of the cooler; paracetamol/eudragit® mixture

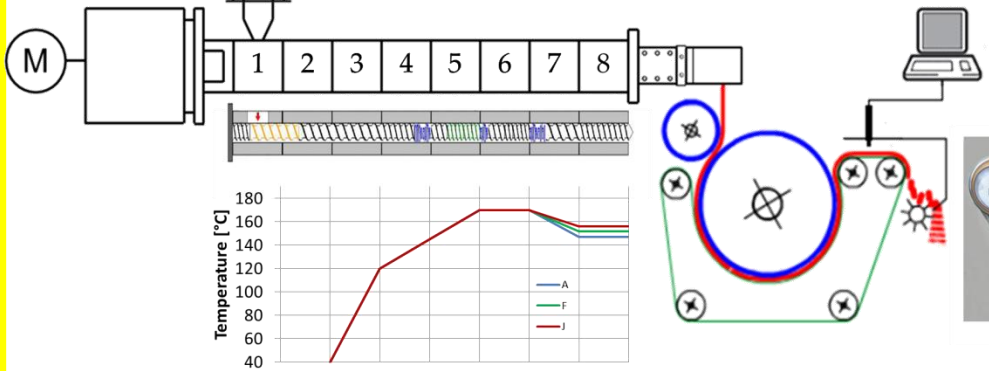


Development of an in-line process analytical technology

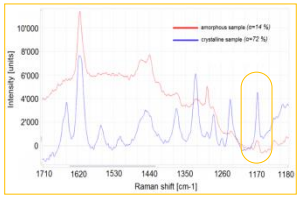


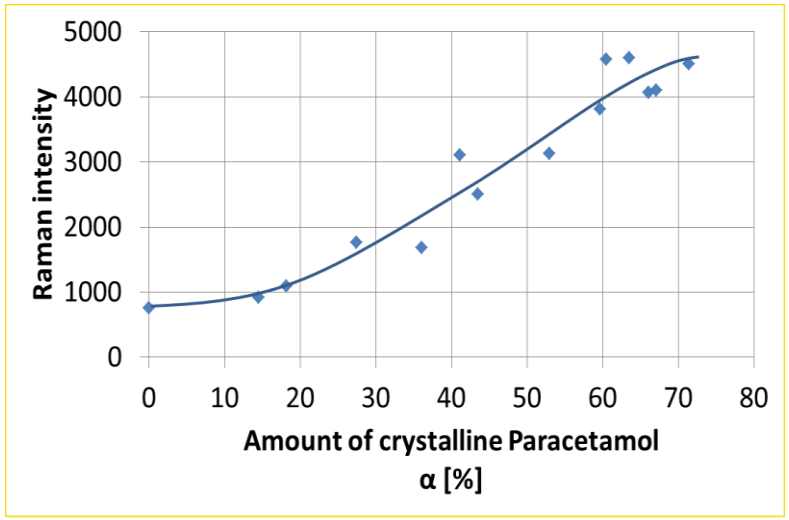
Crystallinity measurement in hot melt extrudates B. Joost

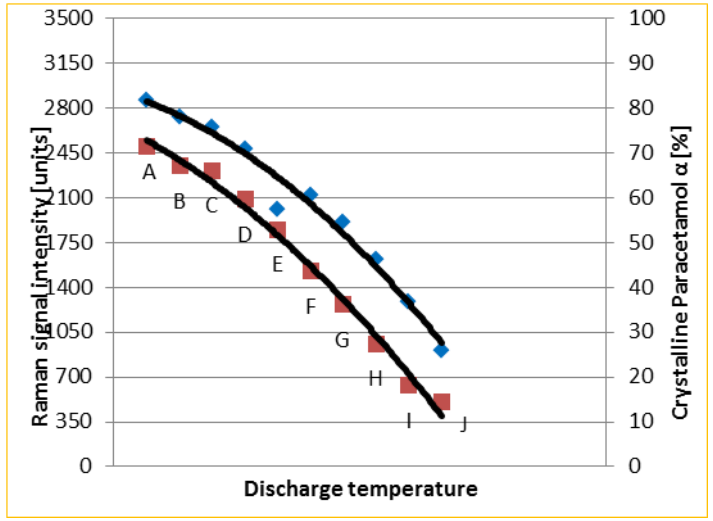
Extrusion of a 1:1 blend of Paracetamol and Eudragit® E PO



Raman spectrometer RXN 1-785
Kaiser Optical Systems, Inc.

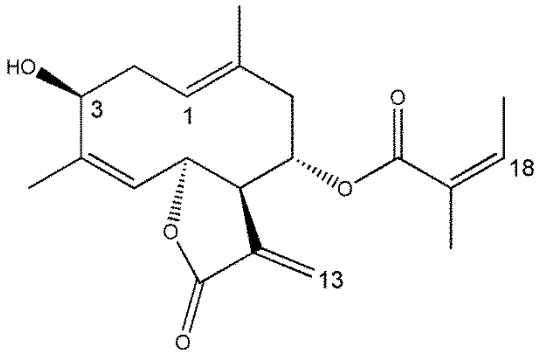


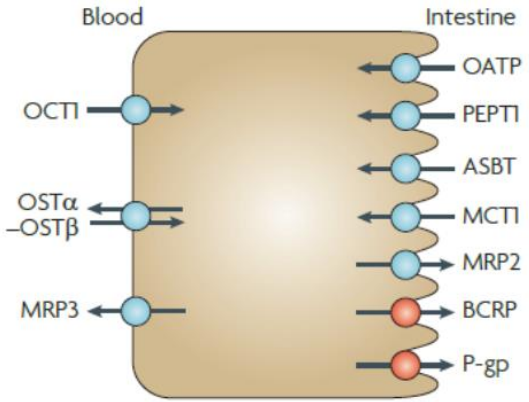


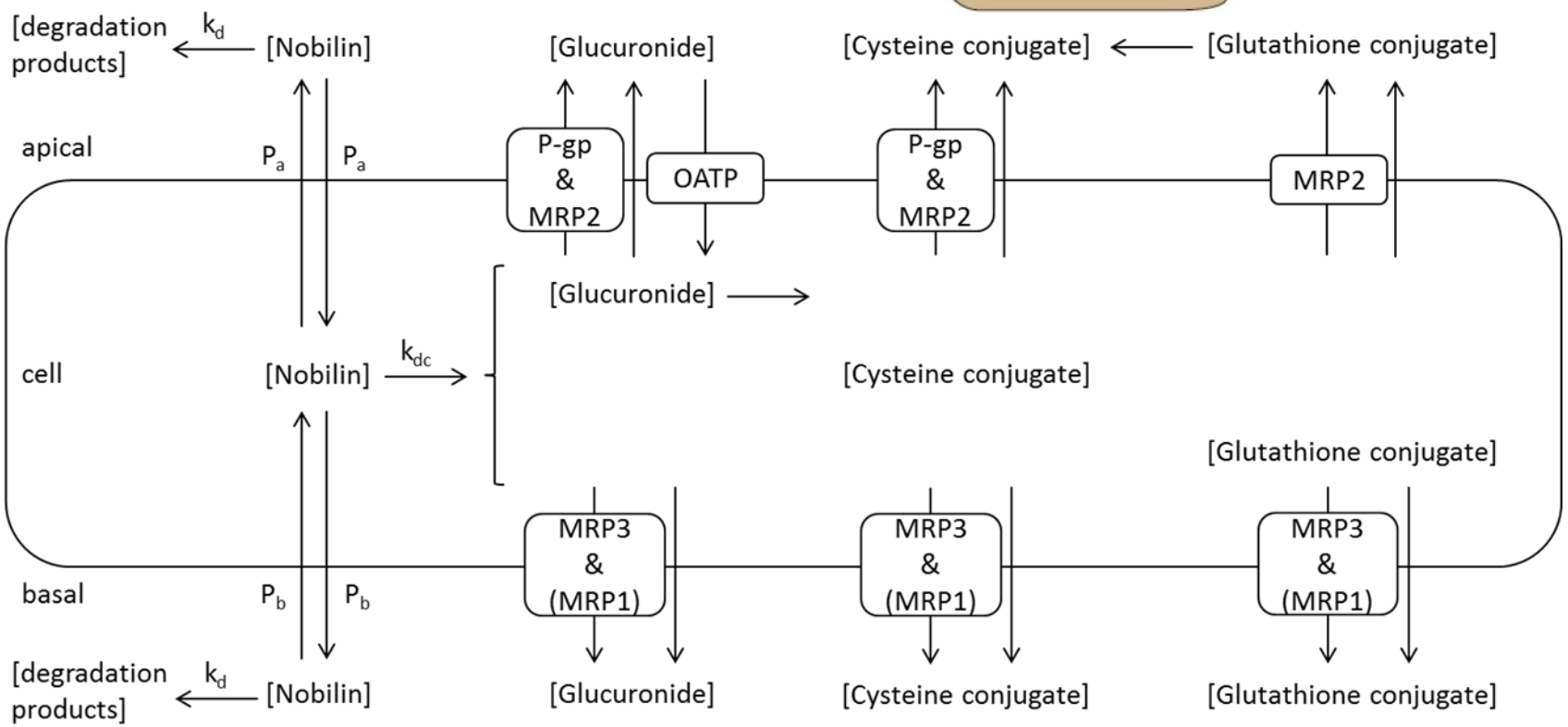


Raman Spec./online vs. DSC/offline

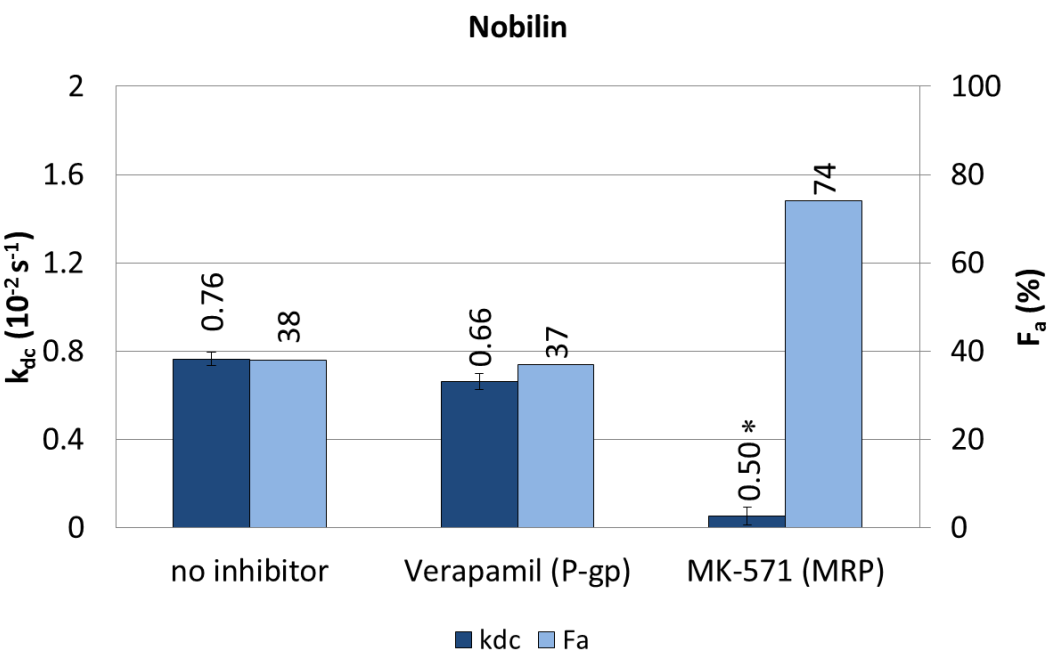
Transport processes influencing intestinal absorption G. Imanidis

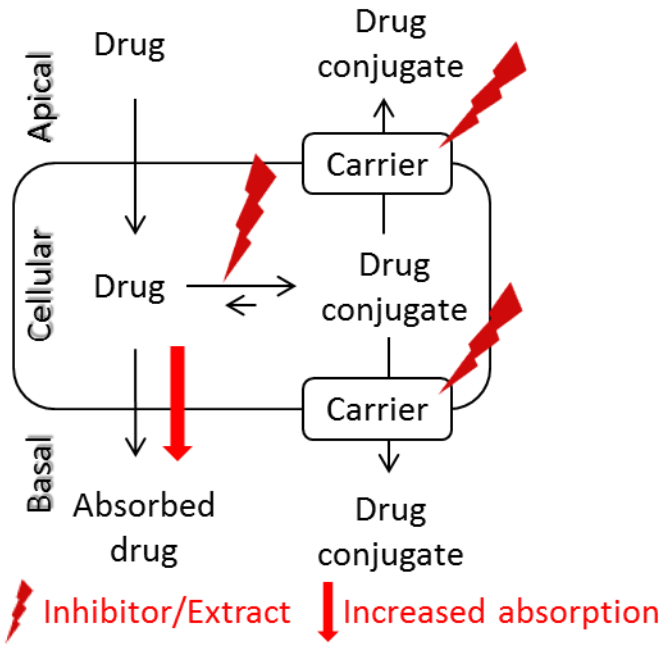




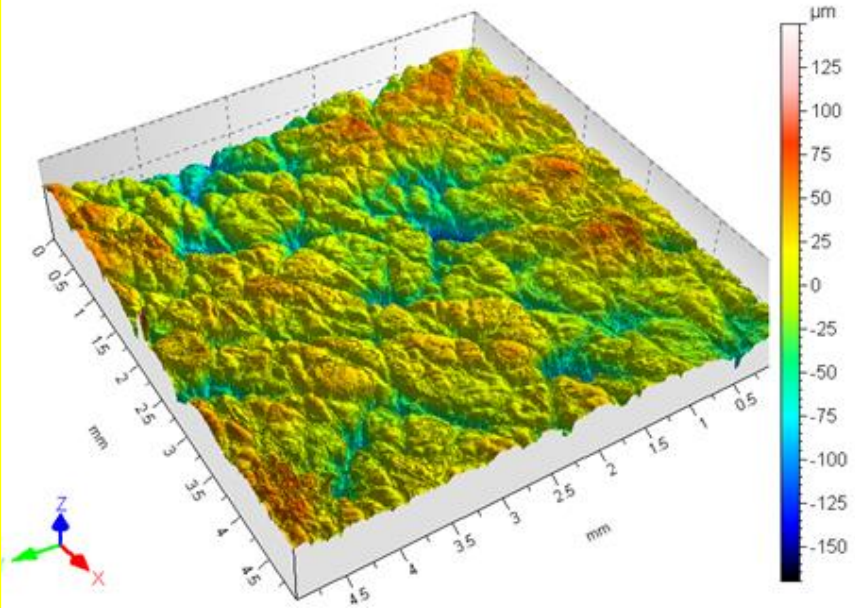


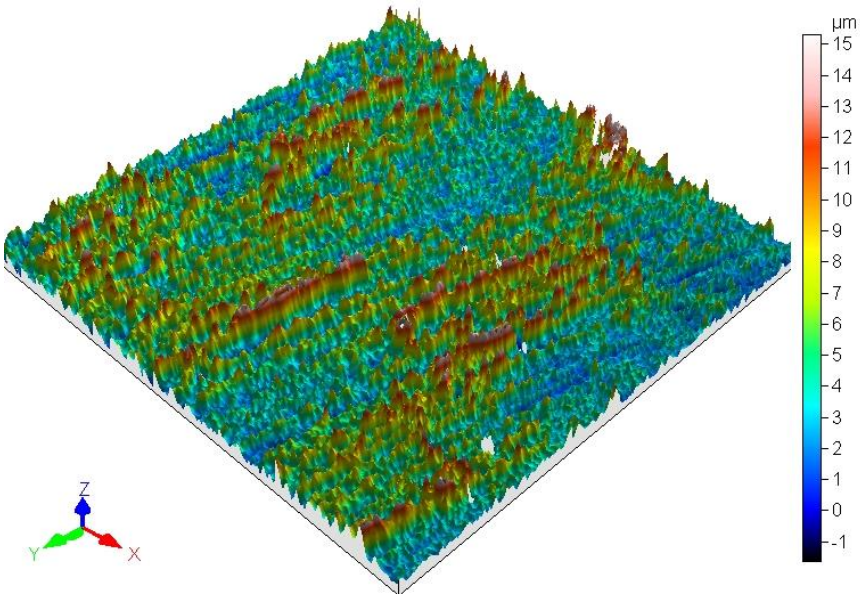
Absorption enhancement by bio-conjugation-efflux inhibition G. Imanidis





SwissSunScreen – Topography of skin and applied sunscreen G. Imanidis

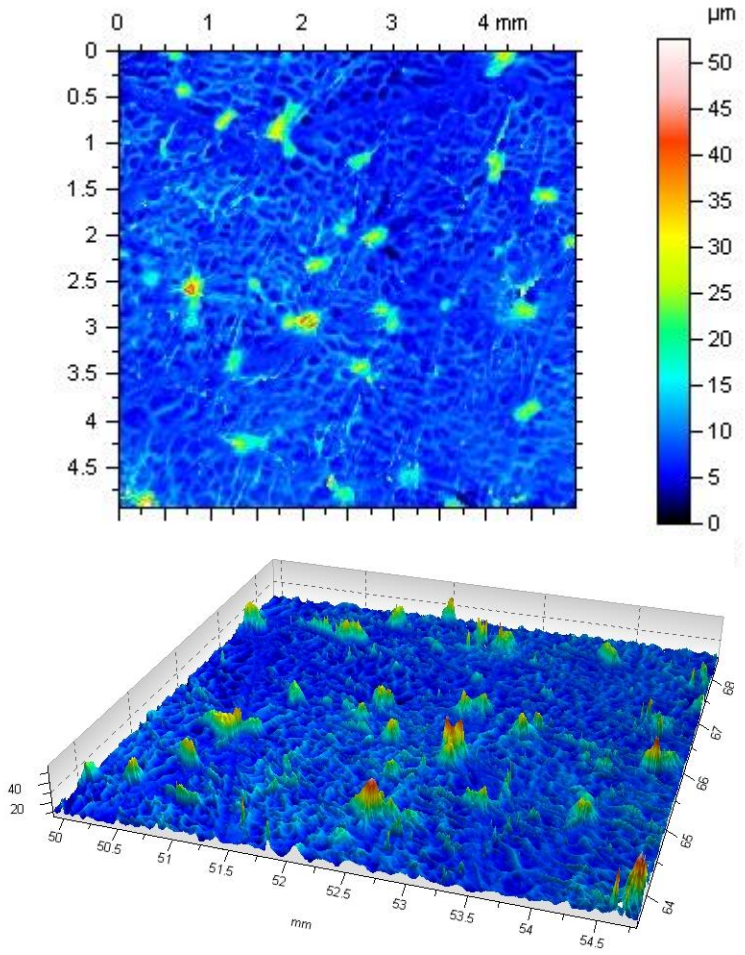




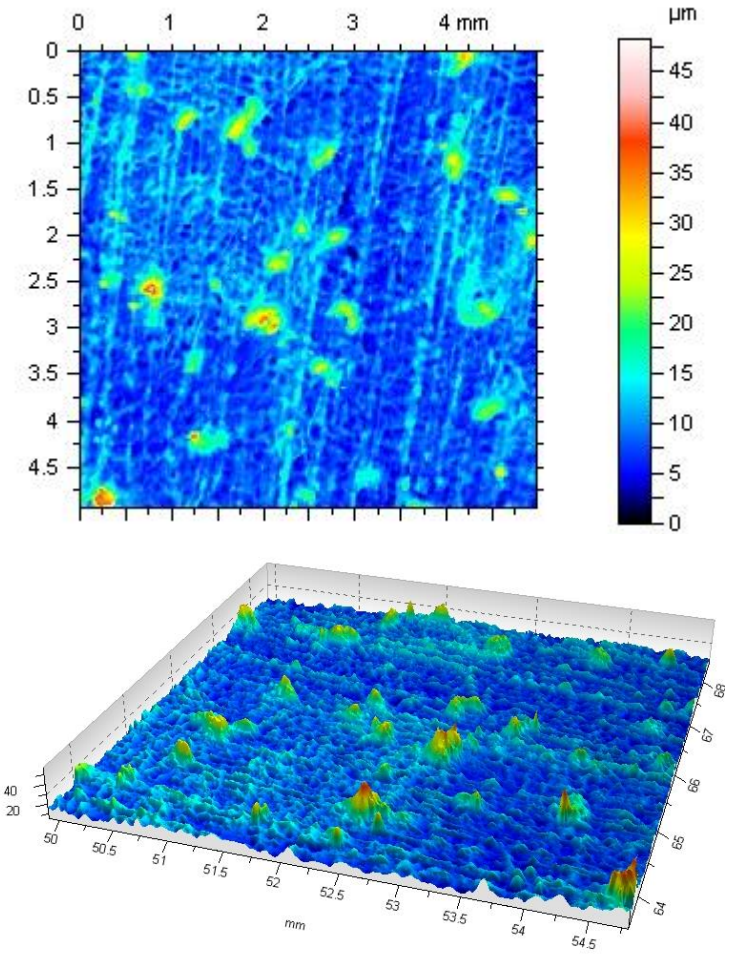
In vitro sun protection factor (SPF) – SwissSunScreen G.Imanidis

Topography of skin

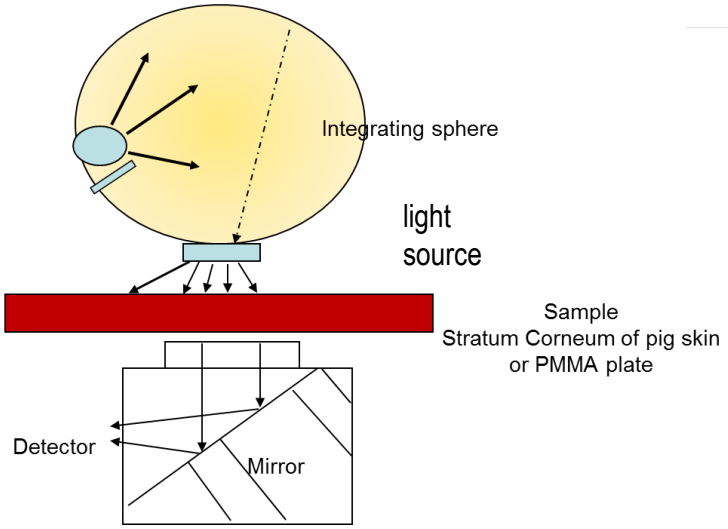
no product

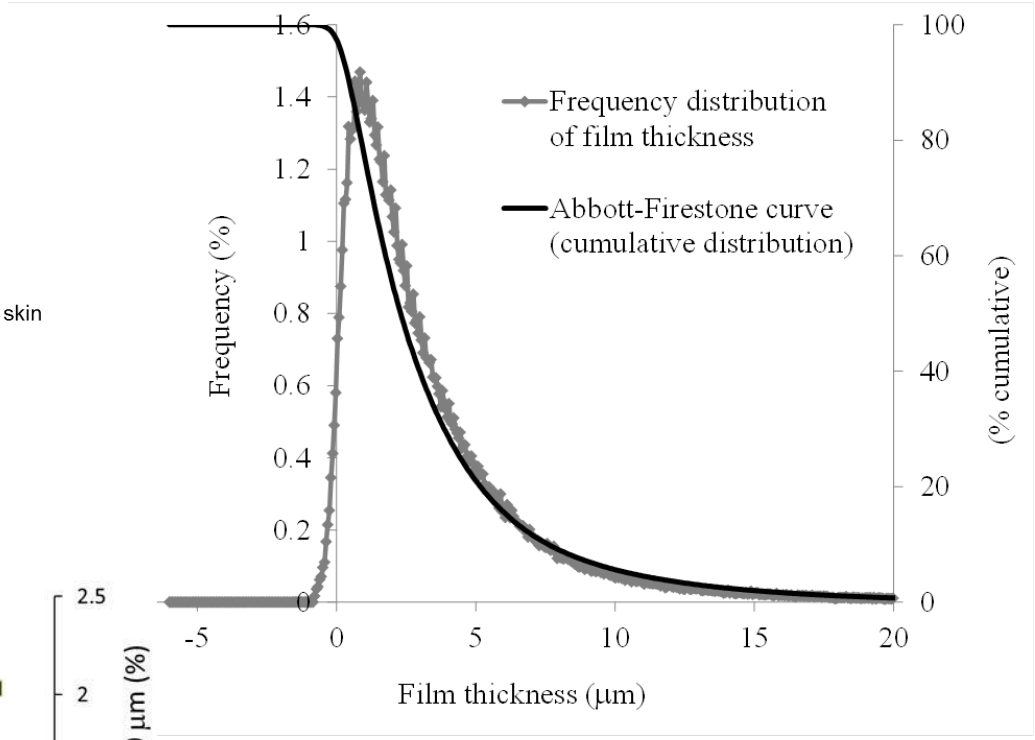


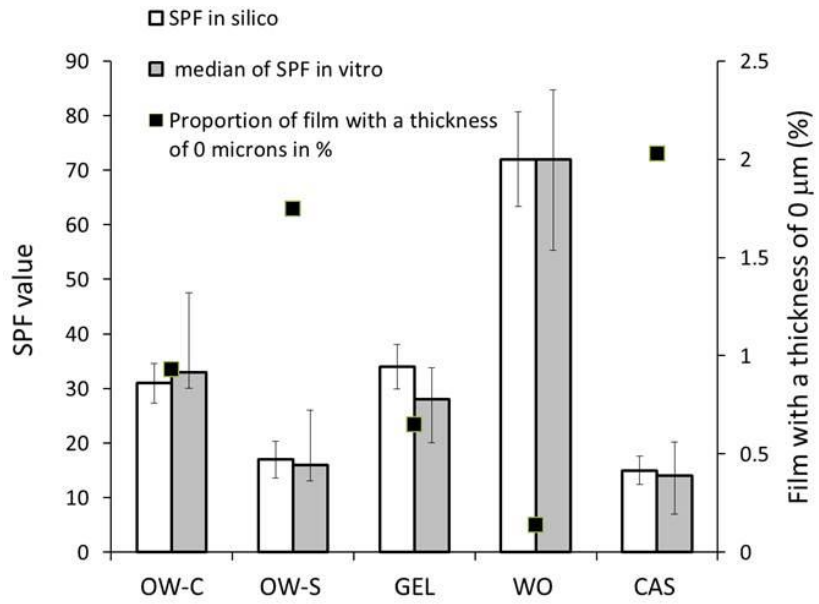
with product



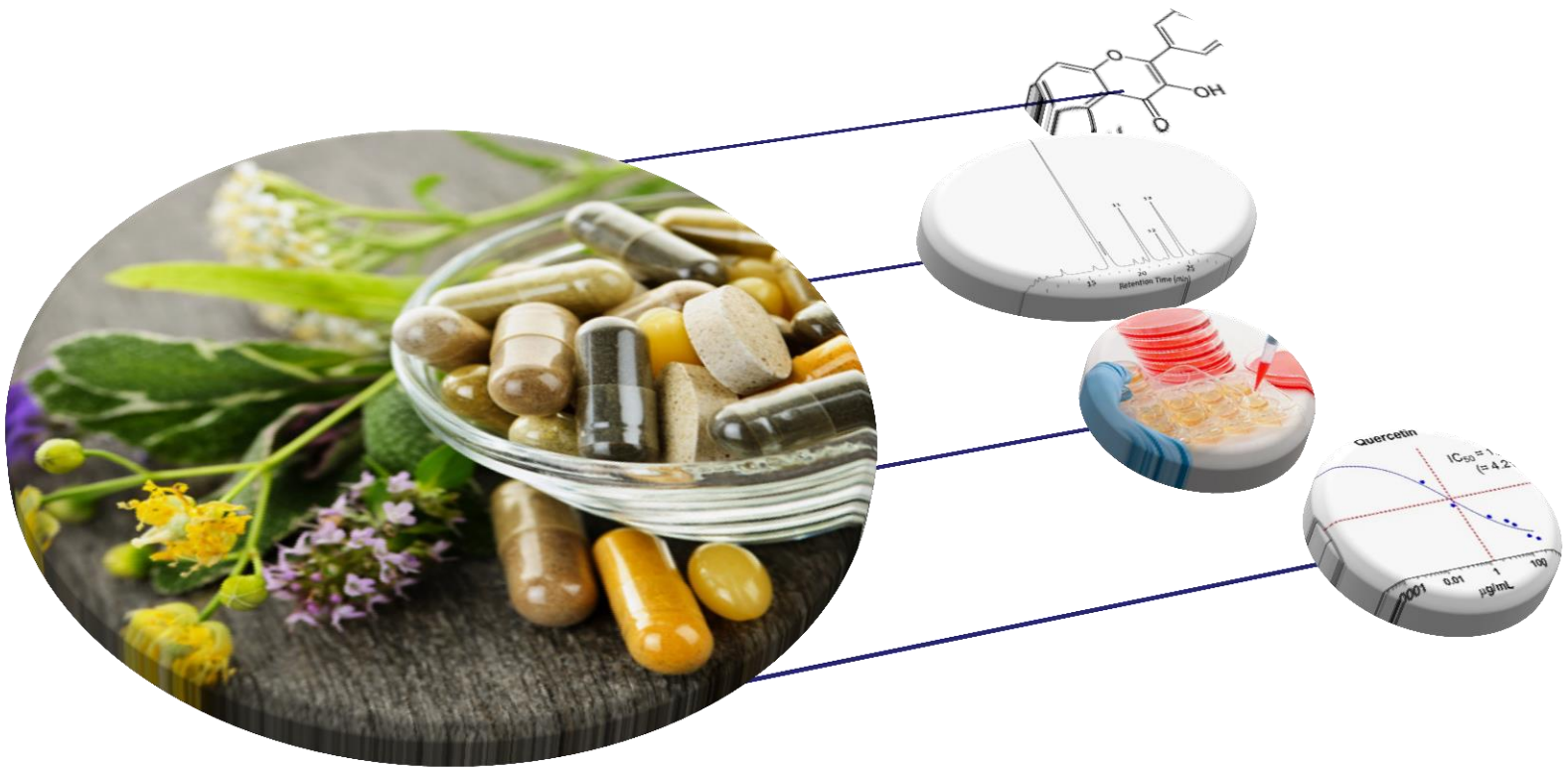
Experimental measurement and calculation of sun protection factor G. Imanidis







Phyto-pharmacology and pharmacokinetics V. Butterweck



In vitro ADME of natural products V. Butterweck

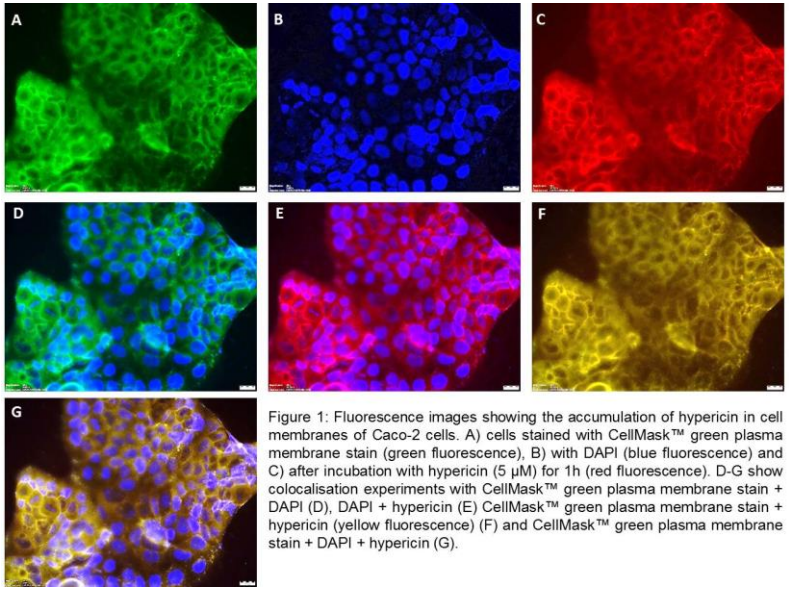
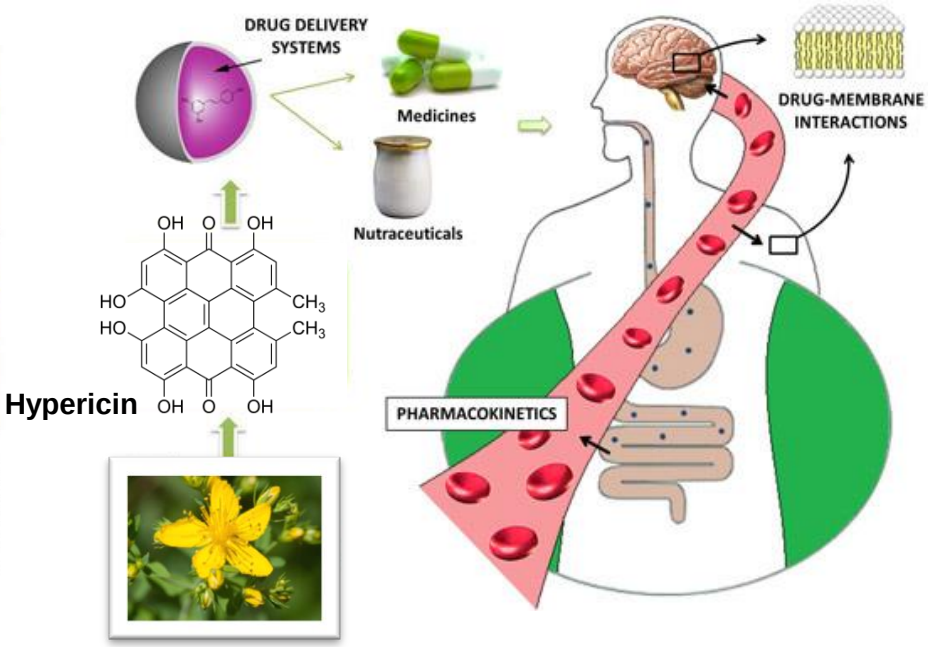


Figure 1: Fluorescence images showing the accumulation of hypericin in cell membranes of Caco-2 cells. A) cells stained with CellMask™ green plasma membrane stain (green fluorescence), B) with DAPI (blue fluorescence) and C) after incubation with hypericin (5 µM) for 1h (red fluorescence). D-G show colocalisation experiments with CellMask™ green plasma membrane stain + DAPI (D), DAPI + hypericin (E) CellMask™ green plasma membrane stain + hypericin (yellow fluorescence) (F) and CellMask™ green plasma membrane stain + DAPI + hypericin (G).

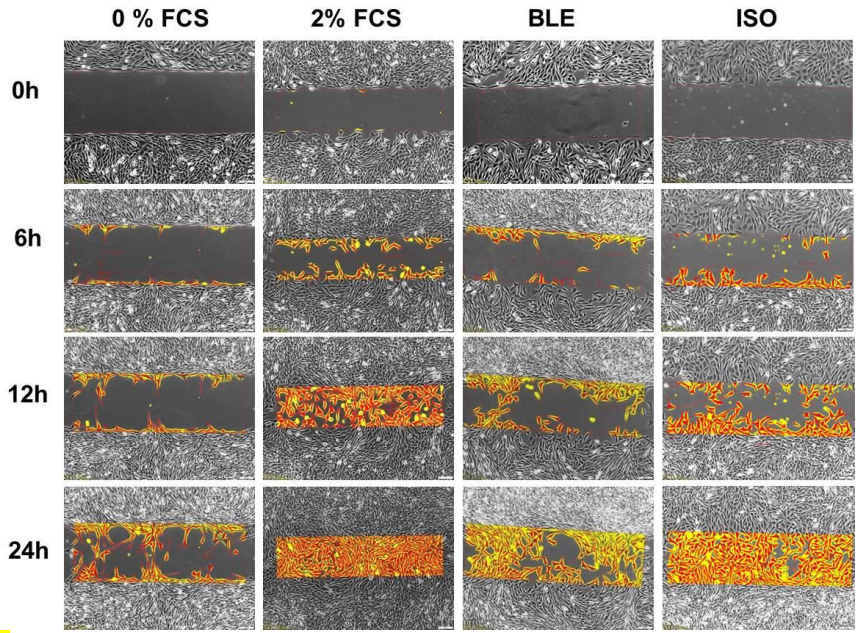


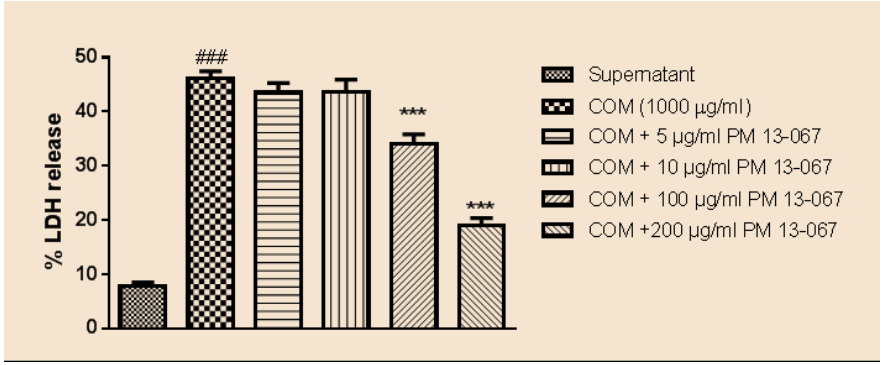
University of Applied Sciences Northwestern Switzerland
School of Life Sciences

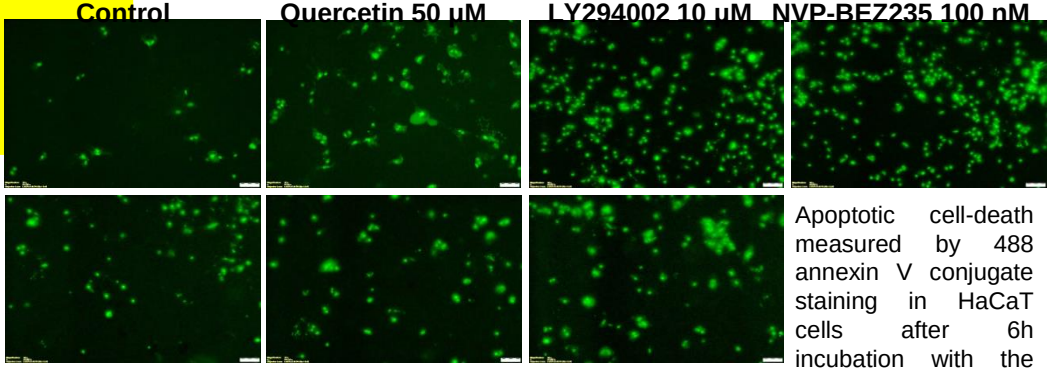
Institute of Pharma Technology

Plant extracts with potential anti-inflammatory, wound healing and UV protective properties

V. Butterweck







Apoptotic cell-death measured by 488 annexin V conjugate staining in HaCaT cells after 6h incubation with the compounds (40-fold magnification)