"The Practice of Dissolution Testing in Herbal Medicinal Products"

The impact of dosage forms

Anna Rita Bilia
Department of Pharmaceutical Sciences
University of Florence
E-mail: ar.bilia@unifi.it
Dissolution behaviours of Senna preparations

- freeze-dried extract
- powdered HD

"Herbal Drugs vs Herbal Drug Preparations"

Medium: Distilled water, 37°C±0.5°C,
Rotation speed: 50 rev/min

Taglioli, Bilia, et al. (2001) Pharmazie, 56 (11), 868-70
Dissolution behaviours of Passiflora preparations

- powdered HD
- Passiflora2
- freeze-dried extract

“Herbal Drugs vs Herbal Drug Preparations”

Medium: Distilled water, $37^\circ C \pm 0.5^\circ C$

Rotation speed: 50 rev/min

Taglioli, Bilia, et al. (2001) Pharmazie, 56 (11), 868-70
Dissolution behaviours of Ginkgo preparations

- freeze-dried extract
- granulate extract
- powdered HD

Audio: "Herbal Drugs vs Herbal Drug Preparations"

Medium: Distilled water, 37°C ± 0.5°C,
Rotation speed: 50 rev/min

Taglioli, Bilia, et al. (2001) Pharmazie, 56 (11), 868-70
“Herbal Drugs vs Herbal Drug Preparations”

- Differences in dissolution profiles could result from solubility, surface area, particle size, hydrodynamic or diffusivity differences.

- Passiflora preparations:
  “Passiflo2 and freeze-dried extract”
  >> powdered HD

- Excipients in the formulation could influence solubility and wettability of the constituents and perhaps exert a minor effect on their diffusivity
Solubility and rapid dissolution of an API is of superior importance than its permeability...

and...solubility and dissolution behaviour can be pharmaceutically controlled

NfG on the investigation of bioavailability and bioequivalence (intended mainly for chemically defined products, CPMP/EWP/QWP/1401/98)

Dissolution testing in the presence of polymers
Medium: Distilled water, 37°C ± 0.5°C, Rotation speed: 100 rev/min
40 mg silybin A+B / 600 ml, λ = 287 nm
Beta-cyclodextrin

"Which polymers?"

Crosscarmellose

The effect of polymers:
"activation of the solid state"

- Production of partial or total amorphous powders
- Formation of nanocrystals

GA Workshop of the PC
"Manufacturing and Quality Control of Herbal Remedies"
co-ground, w/w, extract : AcDS = 1 : 2

conground, w/w, extract : β-CD = 1 : 2

physical mixture with AcDS (1:2 w/w)

physical mixture with β-CD

Medium: Distilled water, 37°C±0.5°C,
Rotation speed: 50 rev/min
40 mg silybin A+B / 600 ml, λ = 287 nm
Solubility and rapid dissolution of an API is of superior importance.

**Dissolution of silymarin**

Co-lyophilised with β-Cd

Extract

Medium: Distilled water, 37°C ± 0.5°C,
Rotation speed: 50 rev/min

**Solubility studies of silymarin**

Medium: Distilled water, 27°C ± 0.5°C,
“Formulation impact is significant on the absorption”

Total Terpen lactones/50 rpm/pH 1 (HCl)

In vivo behaviour of product A vs. product B


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Selection of dissolution media

Standard compendial media
- Distilled Water
- Buffers at different pH
- Simulated Gastric Fluid according to USP 25b
- others

- FaSSIF (to simulate conditions in the fasted state in the proximal small intestine)
- FeSSIF (to simulate fed-state conditions in the proximal small intestine)

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„Manufacturing and Quality Control of Herbal Remedies“
Selection of dissolution media

Distilled water is very useful for the Dissolution Kinetic Test

....to differentiate activated mixtures
active substance/polymer
having different “grade of activation”

“it produces information which is useful to discriminate the
formulation with an expected better bioavailability”

But the reality surrounding HMPs
is more complicated!

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Dissolution profiles of hyperforin in different media

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**In-vitro dissolution testing (50 rpm)**

hyperforin (900 ml FeSSIF)

rutin (900 ml FeSSIF)

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...“Pharmaceutical equivalence does not necessarily imply bioequivalence...”

thus, differences in the excipients or the manufacturing process (or both) can lead to faster or slower dissolution and as a consequence of absorption.