

GASTRIC RETENTION AND MUCOADHESION: A KNOWLEDGE GUIDE TO IMPROVE PRE PROBIOTICS AND OTHER NUTRACEUTICALS ASSIMILATION

MARKET

Technical & Competitive Scanning Regulations

MARKET ANALYSE

- ▶ Trends and perspectives
- ▶ Usage of ingredients Volumes - value
- ▶ Dietetic & Medical manufacturers short profiles
- ▶ Importers
- ▶ Regulation

INGREDIENTS COVERED

- ▶ Probiotics
- ▶ Prebiotics
- ▶ Polysaccharides
- ▶ Glucosides, osides & sugars
- ▶ Glycoproteins

COUNTRIES COVERED

- ▶ United States
- ▶ Asia
- ▶ Europe
- ▶ Oceania

MARKET SEGMENTS

- ▶ Food industry
- ▶ Medical markets
- ▶ Pharmaceuticals
- ▶ Oral Care

UBIC
CONSULTING

UBIC USA
5020 Campus Drive
NEWPORT BEACH
CA- 92660
Phone : 1 702 355 8804
Fax : 1 949 752 2287

UBIC EUROPE
Techno-Pôle Sierre 3
CH 3960 SIERRE
Phone : + 41 (0) 27 456 1440
+ 41 (0) 27 456 1444
Fax : + 41 (0) 27 456 1447

IRELAND
45 Glencarraig
DUBLIN 13
Phone : 353 1 832 47 12
Fax : 353 1 832 12 77

FRANCE, PARIS
10, Rue du Colisée
75008 Paris
Phone : +33 1 400 600 86
Fax : +33 1 400 600 87
Skype Access: UbicEurope

ubic@ubic-consulting.com
www.ubic-consulting.com

PRESENTATION

The control of drug liberation profile has been the main concern of pharmaceutical industry during the last 25 years. We are facing another challenge which is the close control of the drug course inside the gastrointestinal tract (GIT). New drug discoveries are dramatically declining, while more and more "blockbuster" drugs will lose their patent protection.

New drugs are complex, have low solubility, high molecular weight causing important side effects and allergic response.

Better care with lower dosage could be obtained if drugs (old and new ones) would remain longer in the GIT. Lengthening of the gastrointestinal residence time (GRT) is achievable through formulation (galenic) improvement.

Gastroretention, Mucoadhesion (fixation to the intestine wall) and **Encapsulation** are the three main phenomena to combine and master. They would allow better compliance and acceptance.

Moreover, anyone concerned by the efficiency of probiotics should pay great attention to the phenomena involved in the mechanism of mucoadhesion and to the relevant polymers.

Immobilised bacteria perform much better than free ones because the polymers involved provide strong protection to the microorganisms in contact with the intestine wall. So, survival of

bacteria is directly linked to their adhesive capability.

Polysaccharides seem to be the best candidates because of their perfect compatibility with the gastro-intestinal mucus (mucopolysaccharides - also responsible for the adhesion of bacteria onto the teeth).

Associating some specific polysaccharides to probiotic bacteria could greatly help them survive in the gut flora and colonise the intestine wall.

Finally, only few polymers would promote mucoadhesion of alien microorganisms. Compatibility with the gastro-intestinal mucus is of greatest importance so their selection and evaluation are critical.

Various mechanisms are involved in this phenomenon but the main issues are the size of alien microcapsules ingested and the formation of specific and non-specific links between the intestinal mucus and the polymers coating the probiotic microcapsules.

**Part A
Science**

**Part B
Know How**

**Part C
Market**

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A SCIENCE

1. Assimilation of pre/probiotics
2. Interactions with intestinal flora
3. Optimum size of probiotic microcapsules and microbeads
4. Review of polymers promoting non-specific linking to the mucus
 - Natural origin:
 - o Cellulosic derivatives (CMC, HPMC,..)
 - o Natural gums (karaya, acacia, guar, adragant,...)
 - o Chitosans (derived from shellfish chitin)
 - o Dextrans
 - Synthetic origin:
 - o Acrylicpolymers
 - o PVP/PVA
5. Review of polymers promoting specific linking to the mucus
 - Fixation of lectins
 - o Vegetal origin (wheat germ agglutinin, concanavalin)
 - o Bacterial origin
 - o Viral origin
 - Monoclonal antibodies targeting the intestinal cells
6. Formulation
 - New oral formulations for "old" but efficient drugs
 - Gastro retentive dosage forms (GRDF)
 - o Low density or floating systems
 - o High density systems
 - o Plug-type systems

- Improvement of microcapsules & microgranules
- Potential for better compliance
- Potential for better acceptance
- Side effects reduction
- Main polymers to be used to improve the residence time
- Main effects to promote: buoyancy, adhesion, fragmentation, HL balance, interaction with intestinal villusities

B WHO IS DOING WHAT

- Research labs
- Universities

C MARKET

- Drugs already on the market or to be introduced
- Opportunities for patent extension
- New ingredients highlights

STEP 1

Preparation

- Desk search

Drawing-up of the questionnaire

STEP 2

Interviews of Experts, Research Labs and universities

- Interviews in Europe and in the U.S.

Product	Price	Total
Part A	€ 1,690	
Part B	€ 950	
Part C	€ 900	
Total		

COMPANY _____ NAME _____
 POSITION _____ ☒ _____

 ☎ _____ Date _____ Signature: _____