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Editor-in-chief:
Anders Hager
Coordinator, text, lay-out:
Dorthe Andersson

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Pearlitol®Flash: melt in the mouth magic with mannitol?

PEARLITOL®Flash, Roquette's innovative compound excipient for fast disintegrating solid dosage forms, is a mannitol based binary compound exhibiting robustness and rapid disintegration

By Elham Blouet, Pharmaceutical Project & Development Manager, Roquette.

Development of orally disintegrating tablets or orodispersible tablets (ODT) is becoming more and more attractive for the pharmaceutical industry. Orodispersible tablets (ODT) are defined by the Eur.Ph. as uncoated tablets intended to be placed in the mouth where they disperse rapidly before being swallowed.

Besides the fact that the ODT dosage form is one among other means to extend the product lifecycle, this modern medication delivery system offers various benefits:

- improving patient compliance (e.g. attractive mouth-feel)
- ease of swallowing (e.g. paediatric and geriatric population) without the need of taking water as for conventional tablets
- quick disintegration and consequently fast onset of action

Roquette launches PEARLITOL® Flash

Based on its wide experience with mannitol (PEARLITOL®), Roquette has developed an innovative binary compound excipient, PEARLITOL®Flash, composed of two well-known ingredients: mannitol and maize starch.

PEARLITOL®Flash offers an enabling technology to respond to a successful development of fast disintegrating formulations such as orodispersible tablets by providing:

- a uniquely pleasing taste experience
- a fast disintegration/melting in the mouth
- a robust DC binary compound excipient for a very good tableting performance
- a means of making tablet formulation very simple
- reliability for the pharmaceutical supplier

... continues on page 2 >>





Bulk density (g/ml)	0.52
Tapped density (g/ml)	0.62
Hausner ratio	1.19
Angle of repose (°)	43
Ability to settle (ml)	16
Flowability (funnel, s)	5.5
D ₁₀ (µm)	80
Mean diameter (µm)	200
D ₉₀ (µm)	300

Indicative values

>> **Uniquely pleasing taste experience for fast disintegrating and simple formulation tablets**

PEARLITOL® mannitol is a polyol well-known for its pleasant and mild sweet taste. PEARLITOL®Flash, a mannitol starch compound, provides a uniquely pleasing taste experience. The orodispersible tablets melt in the mouth with a very creamy and smooth texture.

Contrary to usual orodispersible formulation tablets no superdisintegrant is needed, since PEARLITOL®Flash mannitol compound exhibits self-disintegrating properties.

In addition, with PEARLITOL®Flash, a low lubricant level (0.4%) is sufficient to achieve good compression performance. This low level in lubricant is beneficial to maintain the pleasant taste of PEARLITOL®Flash, whereas a high level of lubricant could compromise it.

Orodispersible tablets formulated with PEARLITOL®Flash, 0.4% of lubricant (magnesium stearate) and active substances from 2% up to 30%, dis-

play a very quick disintegration time (Eur.Ph. method): approx. 50 sec to 80 sec. These disintegration times are far below the “within 3 min” disintegration time required by the Eur.Ph. for orodispersible tablets.

Excellent tableting performance

Thanks to its excellent compactibility, PEARLITOL®Flash enables the manufacture of good mechanical resistant tablets by direct compression. Under the studied conditions, Korsch XP1 press fitted with 13 mm diameter flat bevelled-edge punches, 15 kN compression force was sufficient to obtain 500 mg orodispersible tablets with acceptable hardness, friability and disintegration time characteristics as in graph 1. Moreover, remarkably, the disintegration time is not significantly impacted by the increase of the compression force and tablets hardness.

Finally, with PEARLITOL®Flash it is possible to produce robust tablets by direct compression incorporating high amount of active substance as shown in the example illustrated below (graph 2).

PEARLITOL®Flash, DC mannitol compound

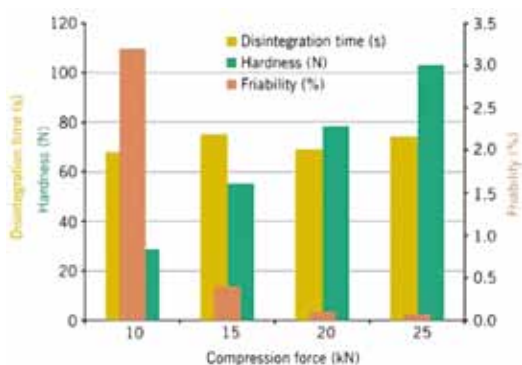
PEARLITOL®Flash mannitol compound developed as a DC compound excipient has the suitable pharmaceutical properties such as flow properties (flowability, Hausner ratio, angle of repose) required for a DC grade. As shown in the graph below (graph 3), PEARLITOL®Flash is a low hygroscopic compound. In addition, it displays a low loss on drying (1.1%).

Regulatory status

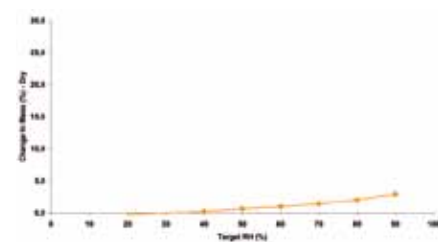
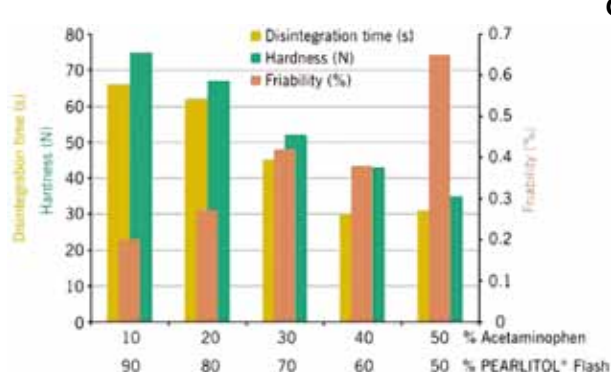
PEARLITOL®Flash is a compound of mannitol and extra white maize starch. Both ingredients comply with pharmaceutical compendial standards and food regulations. Therefore the use of PEARLITOL®Flash in fast disintegrating tablets or orodispersible formulation tablets is suitable for both pharmaceutical and nutraceutical applications.

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Graph 1 ↓



Graph 2 ↓



Graph 3 ↑

SEPIFILM™ Flavoured

SEPIFILM™ Flavoured gives taste and fragrance to your coated tablets

By Seppic

To meet the growing demand of nutraceutical and pharmaceutical markets for innovation that could improve treatment compliance, Seppic has developed a unique formulation: SEPIFILM™ Flavoured.

- This product is a ready-to-use film coating in granular form.
- As granules show high porosity and wettability, no lumps are generated during preparation.
- It offers residual and stable taste and fragrance to tablets.

Conditions of use:

SEPIFILM™ Flavoured can be used on uncoated cores, as a second layer or on coated tablets (white or coloured). The product can be dispersed up to 5% in water and thanks to SEPPIC's patented manufacturing process, the

dispersion time is only 15 minutes. The recommended tablet weight increase is 0.6% to 1%

SEPIFILM™ Flavoured guarantees a better and longer flavour stability compared to direct addition of liquid flavour in the dispersion

A study performed by an external company has compared tablets made with four different coating formulations. The results are listed in the table below.

All the tablets were submitted to accelerated stability conditions. These conditions reproduced a storage at ambient temperature for 6 months, 12 months, 18 months, and 24 months. At each step, fragrance and taste were analysed by an experimental panel:

Coating 1 (C1): one coating layer:
- SEPIFILM™ LP014 + SEPISPERSE™ DRY + addition of LIQUID flavour in the dispersion

Coating 2 (C2): two coating layers:
- SEPIFILM™ LP014 + SEPISPERSE™ DRY
- Hypromellose, Microcrystalline cellulose + addition of LIQUID flavour in the dispersion

Coating 3 (C3): one coating layer:
- SEPIFILM™ LP014 + SEPISPERSE™ DRY + SEPIFILM™ Flavoured

Coating 4 (C4): two coating layers:
- SEPIFILM™ LP014 + SEPISPERSE™ DRY
SEPIFILM™ Flavoured (Hypromellose, - Microcrystalline cellulose, stabilized flavour)

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OLFACTORY EVOLUTION				
	C1	C2	C3	C4
T = 0	Control	Control	Control	Control
T = 6 months	Difference	Difference	No difference	No difference
T = 12 months	Difference	Difference	No difference	No difference
T = 18 months	Difference	Difference	Difference	No difference
T = 24 months	Difference	Difference	Difference	No difference
	The fragrance becomes oily, unpleasant	The fragrance becomes oily, unpleasant	The fragrance becomes oily, unpleasant	The fragrance becomes oily, unpleasant
TASTE EVOLUTION				
	C1	C2	C3	C4
T = 0	Light orange, oily, rancid, piquant, bitter	Light orange, oily, rancid, piquant, bitter	Artificial orange	Pleasant orange
T = 6 months	Light orange, oily, rancid, piquant, bitter	Light orange, oily, rancid, piquant, bitter	Artificial orange	Pleasant orange
T = 12 months	Light orange, oily, rancid, piquant, bitter	Light orange, oily, rancid, piquant, bitter	Artificial orange	Pleasant orange
T = 18 months	Light orange, oily, rancid, piquant, bitter	Light orange, oily, rancid, piquant, bitter	Artificial orange	Pleasant orange
T = 24 months	Light orange, oily, rancid, piquant, bitter	Light orange, oily, rancid, piquant, bitter	Artificial orange	Pleasant orange
TASTE EVOLUTION* (relative ranking)				
	C1	C2	C3	C4
T = 0	3	4	1	2
T = 6 months	3	4	1	2
T = 12 months	3	4	1	2
T = 18 months	3	4	1	2
T = 24 months	3	4	2	1

*strength of the taste (1 the strongest, 4 the lightest)

- Film coating product
- unique process to stabilise the flavours
- Gives taste and fragrance to your tablets
- A better, stronger and longer taste and fragrance
- Easy to use

Creative and reliable DC formulations with Roquette's DC polyols portfolio

Roquette has expanded its range of DC polyols and offers now a comprehensive range allowing the creation of a multitude of tastes and textures for all types of tablets

By Cécile Dusautois, Technical Pharma Communication Manager, Roquette

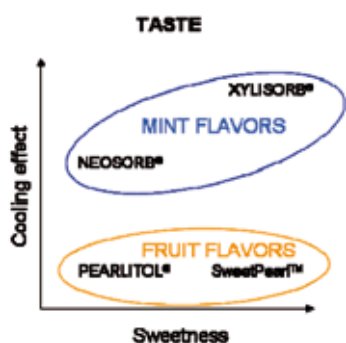
Roquette has enlarged its range of Directly Compressible (DC) polyols. In addition to already existing DC grades, the portfolio now contains new grades of DC mannitol and DC sorbitol. DC maltitol and DC xylitol have also been added.

Create new sensations!

There are many different types of tablets: chewable, orodispersible, suckable, swallowable and effervescent. For those required to remain in the mouth (from a few tens of seconds for the orodispersible to a few minutes for the suckable), mouthfeel is a key criterion for success. The overall sensation in the mouth is created by a combination of taste and texture.

Taste has to be pleasant to ensure patient compliance, whatever the tablet type and the active bitterness. Used in proportionately large amounts, DC polyols contribute significantly to tablet taste due to:

- Sweetness: mannitol < sorbitol < maltitol < xylitol
- Cooling effect: mannitol < maltitol < sorbitol < xylitol
- Aroma preference: mint flavours are reinforced with xylitol or sorbitol; fruit flavours combine well with maltitol



Texture is a key sensation for tablet takers and is an extremely important characteristic of suckable, chewable or orodispersible tablets. DC polyols, alone or in combination, offer a multitude of textures because they influence:

- Hardness: maltitol < xylitol < mannitol < sorbitol
- Dissolution time: mannitol < maltitol < xylitol < sorbitol
- Inherent texture: creamy with mannitol, crunchy with maltitol, smooth with sorbitol or xylitol

The full range at a glance

Roquette range of polyols includes:

- PEARLITOL® mannitol,
- NEOSORB® sorbitol,
- SweetPearl™ maltitol,
- XYLISORB® xylitol.

Listed in the figure below are the grades of Roquette polyols for direct compression, with the latest innovations in bold.

Focus on latest innovations

PEARLITOL® FLASH, for magic melt-in-the-mouth tablets

PEARLITOL® Flash, enabling orodispersible tablets technology:

- a uniquely pleasing taste experience
- a fast melting in the mouth
- an easy DC tableting process
- a robust DC excipient
- surprisingly simple formulation

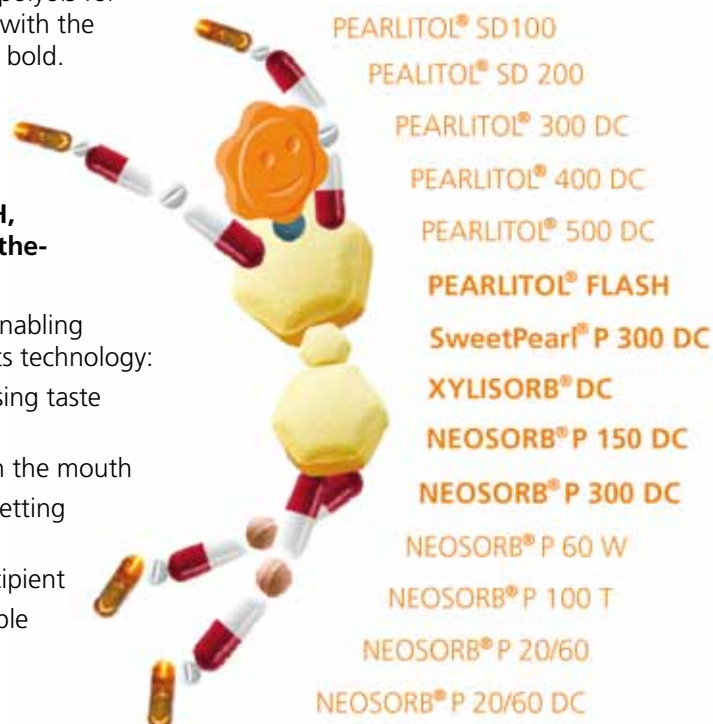


NEOSORB® P 300 DC and P 150 DC, for intense tasting suckable tablets

NEOSORB® P 150 DC or P 300 DC sorbitol enables suckable tablets with

- an intense cool taste
- a high adsorption capacity
- flexibility in formulation, with this robust DC excipient

... continues on page 5 >>



PEARLITOL® SD100

PEARLITOL® SD 200

PEARLITOL® 300 DC

PEARLITOL® 400 DC

PEARLITOL® 500 DC

PEARLITOL® FLASH

SweetPearl® P 300 DC

XYLISORB® DC

NEOSORB® P 150 DC

NEOSORB® P 300 DC

NEOSORB® P 60 W

NEOSORB® P 100 T

NEOSORB® P 20/60

NEOSORB® P 20/60 DC

Lynside® Forte Se +, selenium-enriched yeast

Lesaffre Human Care, the nutrition and health business unit of the Lesaffre Group, is proud to offer Lynside® Forte Se +, a highly bioavailable source of selenium

By Lesaffre Human Care

Selenium is a trace element. The human body does not produce selenium and therefore has to absorb it through the food chain. Selenium is found in low concentrations in food, and it plays a key role in your body.

Selenium intake is currently declining, especially in Europe. It varies widely from country to country which may be due to varying selenium concentrations in the soil.

A dietary supplement may be required in order to reach the recommended intake of 55 µg/day and thereby contribute to the body's proper functioning.

Selenium-enriched yeast: a highly bioavailable source of selenium

The different forms of selenium fall into two categories: organic selenium and inorganic selenium. Here are a couple of differences between the two forms:

- Organic selenium is approximately two times more bioavailable than the inorganic forms of selenium. The intestinal absorption of the selenium-enriched yeast's administered dose is estimated to be more than 90% in humans.
- The half-life of organic selenium is longer than that of the inorganic form, which means that



selenium levels are maintained in the body for longer periods.

Lynside® Forte Se (+1200, +2000): Lesaffre's selenium-enriched yeast

Culturing *Saccharomyces cerevisiae* yeast in the presence of sodium selenite using a specific process enriches the yeast with organic selenium. Approximately 84% of the total extractable selenium in Lynside® Forte Se+ is in the form of selenomethionine, stored inside the yeast.

Selenium-enriched yeast also provides proteins, vitamins, minerals, fibres and more.

What is organic selenium?

Organic selenium consists of a selenium atom bound to an amino acid. Selenium is metabolized by yeast in competition with sulphur to provide organic selenium in the form of selenomethionine.

Contrary to organic forms, inorganic forms of selenium (i.e. selenite, selenate) are obtained through chemical synthesis.

... continues on page 7 >>

>> SweetPearl™ 300 DC, the first DC maltitol on the market

SweetPearl™ P 300 DC maltitol gives crunchy chewable tablets with

- an attractive mouth texture, resulting in the combination of a sweet taste and crunchy texture
- flexibility in formulation, with this robust DC excipient

XYLISORB® DC

XYLISORB® DC gives smooth chewable tablets with

- an attractive mouthfeel resulting from the singular combination of its refreshing taste and smooth texture
- flexibility in formulation, with this robust DC ingredient

Whatever your product, Roquette's DC polyols offer the flexibility you need for formulations that open up markets. Aroma, texture, sweetness – whatever it takes, Roquette gives you the keys to creativity and reliability.

For more information visit www.roquettepharma.com

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Baobab – a new super-fruit

Baobab from Afriplex - the South African manufacturer of plant extracts - is a versatile super-fruit that can be used in product formulation to provide nutritional benefits in particular, but also flavour enhancement and texture



Novel food status

Baobab is now approved for sale in the EU and can with its novel food status be used in a range of food products, including cereal bars and smoothies.

Not only does this bring the unique tangy taste and nutritional benefits of baobab to consumers worldwide, but it will also help thousands of poor families in rural Africa. These people can secure life-changing income by harvesting and selling baobab fruit. The money they earn encourages them to protect their baobab trees and the surrounding woodlands. So not only could baobab be good for you, it is good for African people and the environment too.

Baobab fruit pulp – African traditional uses

The round, green fruit contains a cream coloured powder in which many small brown seeds are embedded. This naturally desiccated powder is the fruit pulp. Baobab fruit pulp has a long history of traditional use in Africa. Most commonly, it is eaten raw as a snack or mixed in with other foods as a flavouring. Its tangy tart flavour makes it especially popular with children and is used to make a refreshing cool drink widely consumed across the continent.

Baobab is also called "the tree of life"

Baobab has twice as many antioxidants as goji berries, and more calcium than milk. In fact, it may be the richest plant source of calcium on earth. It has more iron than red meat, more potassium than a banana and more magnesium than spinach.

Baobab is the fruit of the *Adansonia digitata*, (or 'upside-down') tree, which grows primarily in South Africa, Botswana, Namibia, Mozambique and Zimbabwe. The tree is also called "tree of life" since the tree has so many different uses that every part of it has a unique value. The fruit, which has a long history of use in Africa, is understood to have a high antioxidant content. The main nutrients include vitamin C, riboflavin, niacin, pectin and citric, malic and succinic acids, while the oil also contains the vitamins A, D and E – see table on nutritional values.

Applications

Baobab can be used in product formulations to provide nutritional benefits, flavour enhancement, viscosity and texture modification, and as a source of dietary fibre and nutrients. Applications could include:

- dietary supplements
- health drinks
- nutritional bars

due to the presence of health promoting ingredients including vitamins, fibres, minerals and proteins.

Studies carried out by Leatherhead Food International, UK, indicate the optimum levels for food and drink ... *continues on page 7*>>

Baobab fruit pulp nutritional values (in 100 g)

Carbohydrates	73.7 g
Proteins	2.7 g
Lipids	0.2 g
Water	8.7 g
Energy	1290 KJ (308 Kcal)
Fibre	8.9 g
Total sugars	23.2 g
Reduced sugars	18.9 g
Total pectin	56.2 +/- 0.9 g
Ascorbic acid (vitamin C)	Range 175-445.4 mg (average 306.2 mg)*
Thiamine	0.62 mg
Riboflavin	0.14 mg
Niacin	2.7 mg
Calcium	335 mg
Magnesium	167 mg
Phosphorous	76.2 mg
Iron	2.7 mg
Zinc	1.0 mg

*Recommended Daily Allowance (RDA) of ascorbic acid is 75 mg for women and 90 mg for men

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Source: PhytoTrade Africa & Afrilex

(continued from page 6)

products using baobab fruit pulp. For smoothies, the optimum level for using baobab fruit pulp would be between 6-8% by weight fruit pulp (6-10 g of baobab fruit pulp in 100 g smoothies).

For nutritional bar products, between 5-10% of baobab fruit pulp should be used. That gives nutritional bars with good flavour and chewy texture (10-15 g in a 100 g fruit bar and similar food products).



Product format

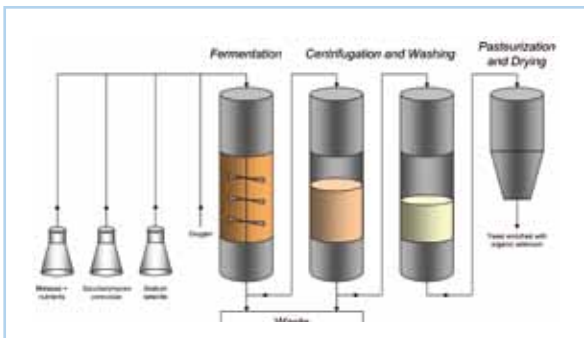
Baobab fruit pulp is available in the following formats:

- **Natural** (primarily for healthy drinks and nutritional bars): a milled and sifted, free-flowing light colour powder

- **De-pectinised extract** (primarily for dietary supplements): a free-flowing depectinised powder, water-soluble and clear in solution

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(continued from page 5)

Characteristics

- Applications: Lesaffre's selenium-enriched yeast may be used in food supplements (sachets, capsules, tablets ...).
- Instructions: The table below provides some examples of Lynside® Forte Se+ to be added to food supplements in order to reach the RDA of 55 µg/day.

Health claims associated with selenium (Europe, USA*)

Following a request from the European Commission, the EFSA was asked to provide a scientific opinion on a list of generic health claims in relation to selenium. The EFSA recognised the effects on selenium on:

- protection of DNA, proteins and lipids from oxidative damage.
- normal function of the immune system
- normal thyroid function and
- normal spermatogenesis

**This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.*

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References

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3. Commission Directive 2008/100/EC of 28 October 2008, amending Council Directive 90/496/EEC on nutrition labelling for foodstuffs as regards recommended daily allowances, energy conversion factors and definitions; O.J. L 285 (29/10/2008), p. 9-12
4. Institute of Medicine, Food and Nutrition Board. Dietary Reference Intakes: Vitamin C, Vitamin E, Selenium, and Carotenoids. National Academy Press, Washington, DC, 2000

Dosage examples for food supplements	Lynside® Forte Se +1200 (1200 µg/g)	Lynside® Forte Se +2000 (2000 µg/g)
Amount of product required to cover 100% of RDA (55 µg/day)	45.8 mg/day	27.5 mg/day
Assuming a dietary intake of 30 µg/day, amount of product required to supplement intake to RDA level (55 µg/day)	20.8 mg/day	12.5 mg/day

The Alsiano Healthcare team

Key accounts



Anders Hager

M.Sc. Chem.
Sales manager

E-mail: ahg@alsiano.com
Tel. dir.: +45 8230 0026
Mobile: +45 2618 8545

Pharmaceuticals - cosmetics health & nutrition



Lene Aarøe Nissen

B. Chem. Eng.
Area sales manager

E-mail: lan@alsiano.com
Tel. dir.: +45 8230 0025
Mobile: +45 2270 1002

Pharmaceuticals - cosmetics health & nutrition



Annette Strarup

B.Sc. (Hons.) Chem. Eng.
Area sales manager

E-mail: ask@alsiano.com
Tel. dir.: +45 8230 0049
Mobile: +45 2270 1015

Pharmaceuticals - cosmetics health & nutrition



Henrik A. Petersen

M.Sc. Pharm.
Area sales manager

E-mail: hap@alsiano.com
Tel. dir.: +45 8230 0009
Mobile: +45 2067 1231

Pharmaceuticals - Fermentation



Annette Jarlskov

M.Sc. Food Science
Area sales manager

E-mail: aja@alsiano.com
Tel. dir.: +45 8230 0072
Mobile: +45 2270 1017

Sales support



Signe Mørck

Sales assistant

E-mail: sm@alsiano.com
Tel. dir.: +45 8230 0042

Sales support



Birgitte Falkenstein

Sales assistant

E-mail: bf@alsiano.com
Tel. dir.: +45 8230 0006

Sales support



Malene Rask Harder

Sales assistant

E-mail: mrh@alsiano.com
Tel. dir.: +45 8230 0007

Logistics



Lene Baldasano del Valle

Logistics manager

E-mail: lb@alsiano.com
Tel. dir.: +45 8230 0015

Logistics



Christa Børgesen

Key accounts

E-mail: cb@alsiano.com
Tel. dir.: +45 8230 0002

It is always nice
to be able to put
a face on the
person you talk
to over the tele-
phone or e-mail.

So here we are ...

New inspiration guide

We are pleased to announce that we have launched a new leaflet on our range of bioactives.

If you would like to receive a copy, please let us know: we can either send it to you, or set up a meeting during which we can present it to you.

