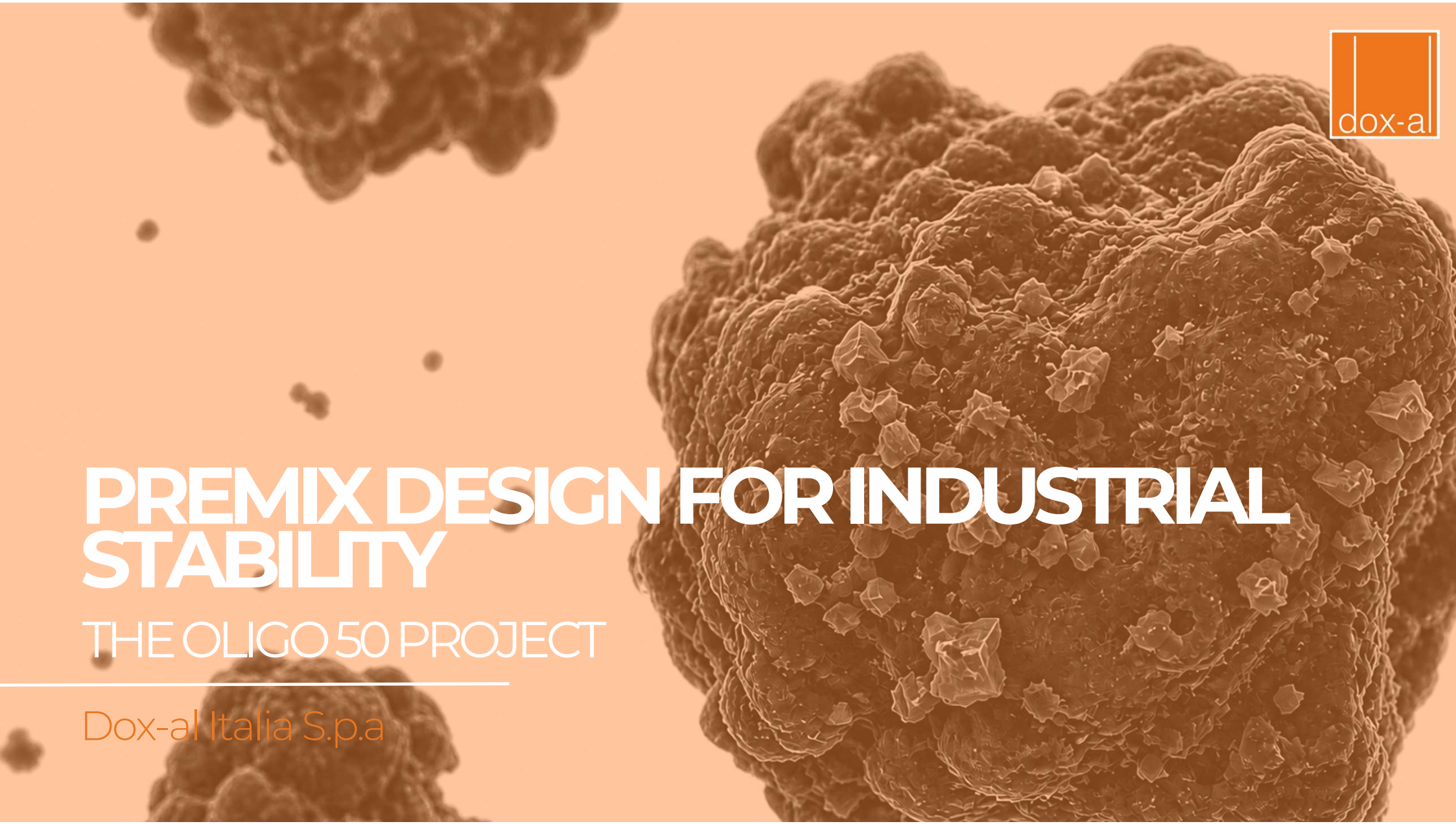

# PREMIX DESIGN FOR INDUSTRIAL STABILITY

## THE OLIGO 50 PROJECT

Dox-al Italia S.p.a

From physical safety to
**animal performance.**
"Engineering the future of trace minerals, vitamins and antibiotics"

# The role of the MANUFACTURER

Feed plant is the guarantor of quality. The goal is not just mixing, but also managing the homogeneous dispersion and control the risk of cross-contamination.

## THE PLANT IS «BLIND»

- **Plants don't know the names or value of active ingredients;** they only recognize chemical-physical specs (density, shape, electrostatic).

- **The physical specs(density, shape, electrostatic) decide the destiny of the products.**

BMP® technology *transforms chemistry into a technological solution perfectly suitable for the plant.*

# The dilution PARADOX

- Diluition does not equal safety

- Traditional diluition try to manage hazard without controlling it, increasing volatile particles.

- Studies shows that diluition breaks the physical binding forces, paradoxically increasing propensity to dust of the micro-ingredient.

- Without any technology diluition only creates more «toxic» dust.

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# BMP® TECHNOLOGY

Bi-modal **PROTECTION**

Engineering (Material Design) to eliminate dust issues and segregation while ensuring chemical stability.

Anchoring the active principle within the matrix (Core-Shell).

**BMP®** is a technological process to improve microingredients' properties in order to:

- **Improve workers' health & safety from premix factory to farm**
- **Improve feed performance by enhancing microingredients recovery and dispersion**
- **Improve feed safety by reducing cross-contamination**
- **Reduce exposure to potential risks**
- **Improve profitability**

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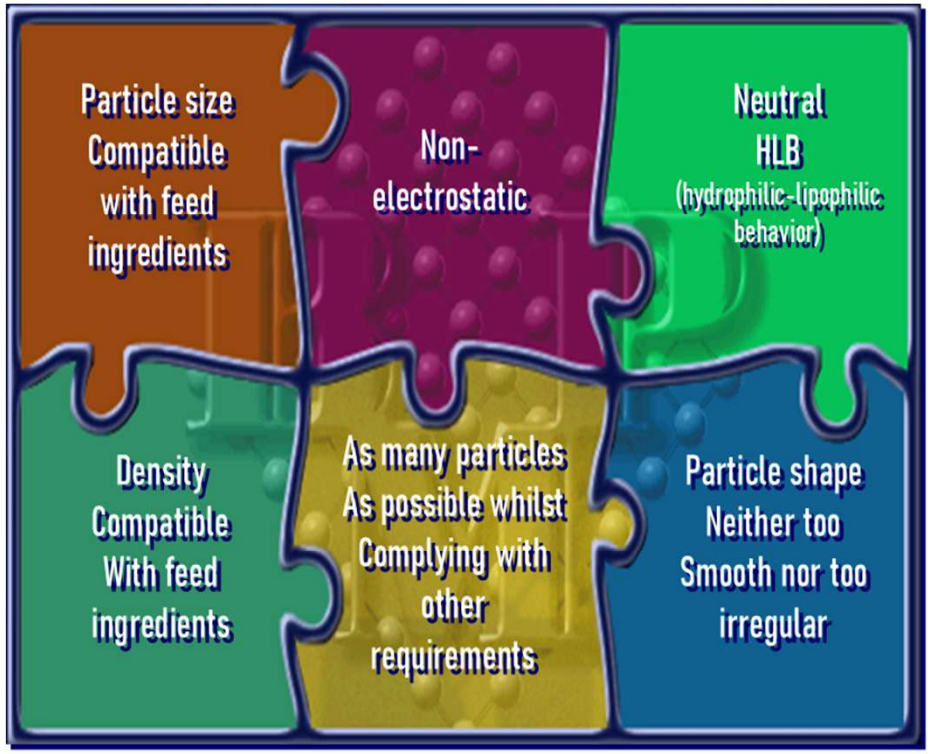
# BMP® FEATURES




| Standards | Value |
|---|---|
| Particles < 50 µg | absent |
| Particles < 100 µg | < 1% |
| Compression stress | 3 tons/cm2 |
| Temperature stress | 140°C |
| Smoothness | < 5 seconds/25 grams |
| Adhesiveness | < 0,25/25 grams |
| Emissions | < 0 ,1 mg/Heubach filter |

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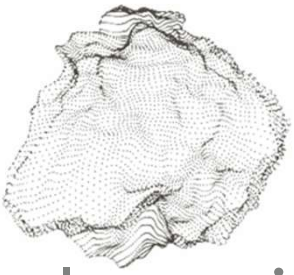
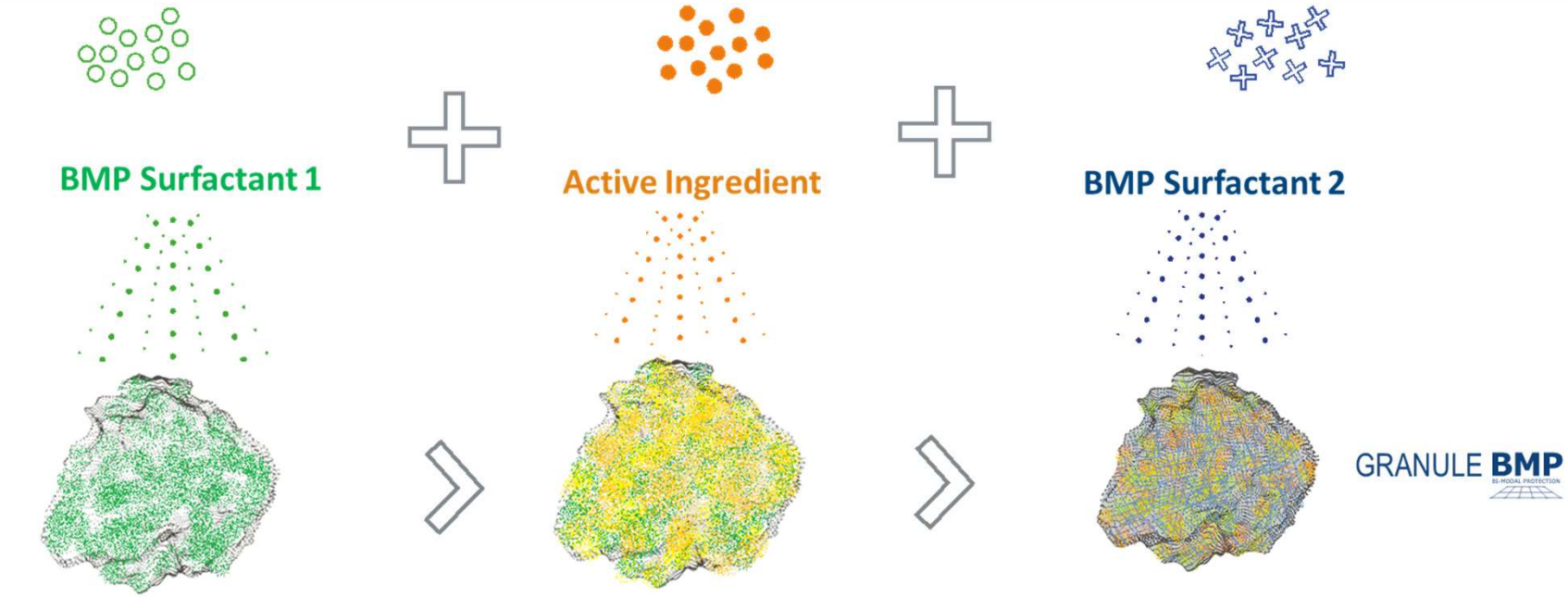
# BMP® technology
# PRODUCTION PHASES



Granular carrier

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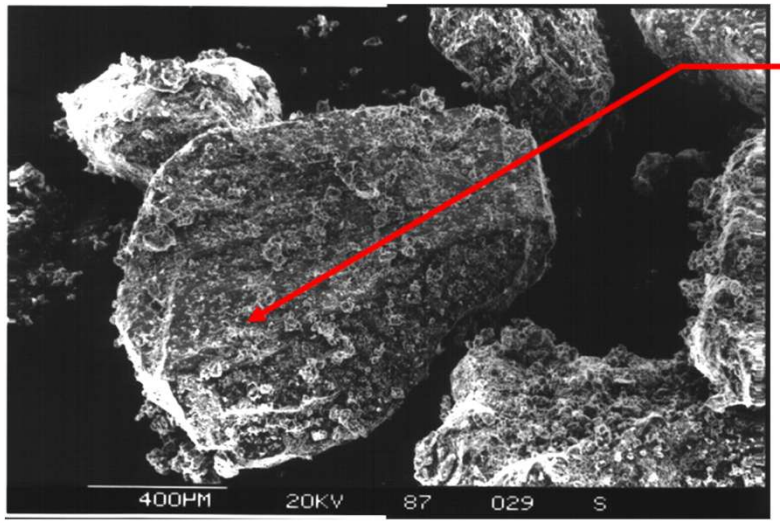
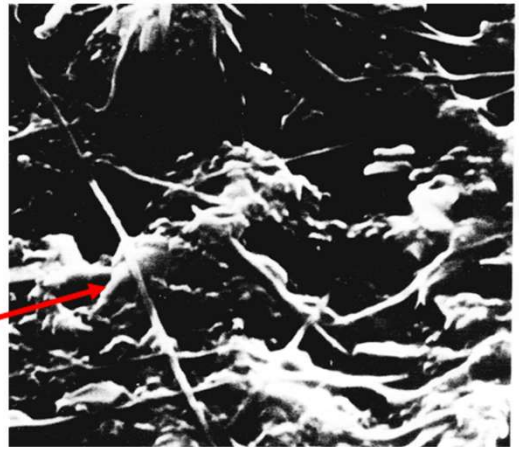
# BMP® granule STRUCTURE




Particles of active (sodium selenite) evenly fixed around carrier granule (calcium carbonate)



Net-like microlattice

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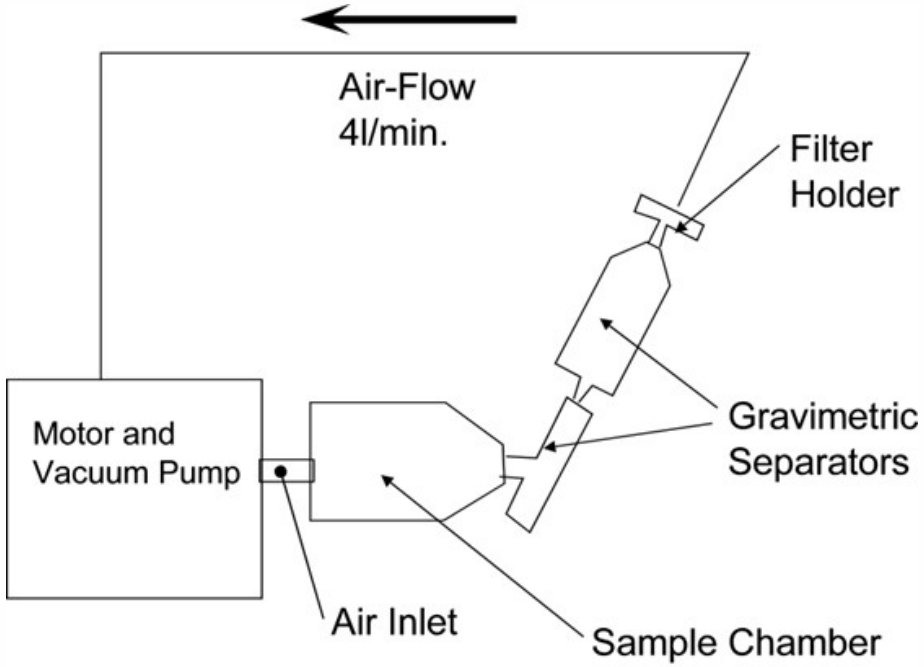
# Dust emissions: MEASUREMENT




- Allows reproducible comparisons
- Is a good model of a material handling situation

## The Stauber-Heubach Test

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# Heubach test
# EVIDENCE

cobalt 5% BMP®
Residues: <0,1 mg

cobalt 5% powder
Residues: 127 mg

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# Powder particle SIZE

## Powder particle size and health protection of workers in the preparation of feed for livestock

20 - 25 | Ital. J. Occup. Environ. Hyg., 2017, **8**(1) © The Italian Association of Industrial Hygienists - AIDII [2017]

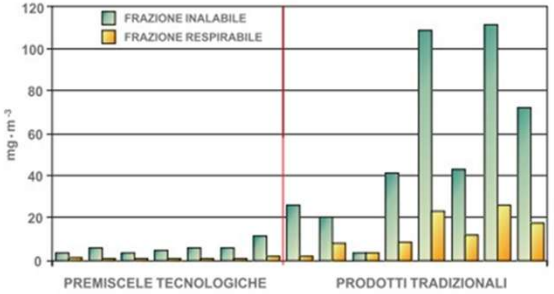


**Figura 1**: Frazioni granulometriche delle polveri in mangimi tradizionali e premiscele tecnologiche (Miscetti et al., 2011. *Chemical risk assessment from exposure to fine dust in workers of the feed industry*. Ital. J. Occup. Environ. Hyg., 2 (4).

**Tabella 1**: Concentrazioni ambientale di polvere inalabile e respirabile

| | *N.C.* | *M.A. (*)* | *D.S.* | *L.F. 95%* |
|---|---|---|---|---|
| Polvere inalabile (mg·m$^{-3}$) | 7 | 1,19 | 0,54 | 0,76 - 1,63 |
| Polvere respirabile (mg·m$^{-3}$) | 10 | 0,22 | 0,24 | 0,07 - 0,50 |

(*) t di student p<0,01; *N.C.* numero campioni; *M.A.* media aritmetica; *D.S.* deviazione standard; *L.F. 95%* limiti fiduciali al 95%

**Tabella 3**: Concentrazione media dei metalli e loro percentualemedia nella polvere respirabile (PR) ed inalabile (PI)

| | *N.C.* | *M.A. (mg·m$^{-3}$)* | *D.S.* | *% media su PR media* | *% media su PI media* |
|---|---|---|---|---|---|
| Cobalto | 7 | 0,0010 | 0,0011 | 0,50 | 0,09 |
| Selenio | 7 | 0,0139 | 0,0053 | 6,93 | 1,19 |
| Rame | 7 | 0,0172 | 0,0155 | 8,58 | 1,48 |
| Manganese | 7 | 0,0776 | 0,1143 | 38,80 | 6,69 |
| Zinco | 7 | 0,1388 | 0,2374 | 69,39 | 11,96 |

*N.C.* numero campioni; *M.A.* media aritmetica; *D.S.* deviazione standard; *L.F. 95%* limiti fiduciali al 95%

contained in it. The results showed that, during the normal production process, the use of technological premixes develops little dust, above all that consisting of ultrafine particles, with a respirable fraction of about 15% of the inhalable dust) and that this trend is also followed, though to a less homogeneous degree, by the respirable dust of the active ingredients taken into consideration. The authors thus conclude by underlining the fact that, in addition to all the other measures laid down in the occupational health and safety legislation, the use of technological premixes may represent a useful prevention measure against the chemical risk.

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# Emission study
# CASE

**ONE OF THE HUGE GLOBAL PLAYER:**
**REQUIREMENT 264 MT/YEAR of Selenium 1%**

- 264 MT of Se 1% = 5.800 kg of pure Sodium Selenite
- Heubach test for pure sodium selenite: 95 mg/filter x 50 grams of product that is equivalent to 1,9 g/kg of product.
- 1,9 x 5.800 = 11 kg of sodium selenite emitted into the atmosphere per year
- Heubach test Selenio 1% BMP®: 0,5 grams sodium selenite emitted into the atmosphere per year

## 11 kg Vs 0,5 grams

Using oral Letal Dose 50 for rat (7mg/kg) for human 70 kg live weight (+/- 500 mg/kg): consider that with 11 kg of sodium selenite emitted and inhalable you can kill 314 people.

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# "Oligo50" VALIDATION

- 610 batch analyzed
- 35 feed plant involved
- 4 years sperimentation

Zero non-compliance on cross contamination

Even just 1 non-compliance would have been enough to stop the exsperimentation

## HOW DID WE CHECK THE CROSS-CONTAMINATION?

### SURVEILLANCE SYSTEM

- Each batch containing the active target antibiotic
- Each following batch for non-sentitive species
- Each Second following batch(< 1 ppm)

### SUPERVISORY AUTHORITY INVOLVED

- Samples taken by localhealthy authority
- Analysis by Istituto Zooprofilattico

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# Stop over FEEDING

Homogeneus dispersion = right dosage

Elimination of safety margins used to compensate losses,
the BMP® technology ensures that all ingredients reach the animal at the proper dosage.

## HOMOGENEUS DISPERSION AND PERFORMANCE

Scientific Support:

- **McCoy et al. (1994):** Uniformity increases daily weight gain (+30%).
  *McCoy, R.A. (1994) - Poultry Science Vol. 73.*
- **Traylor et al. (1994):** Low CV% improves Feed Conversion Ratio (FCR).
- ***Traylor, S.L. (1994)*** *- Kansas State University Swine Day.*
- ***Behnke, K.C. (1996)*** *- Feed Manufacturing Technology IV.*

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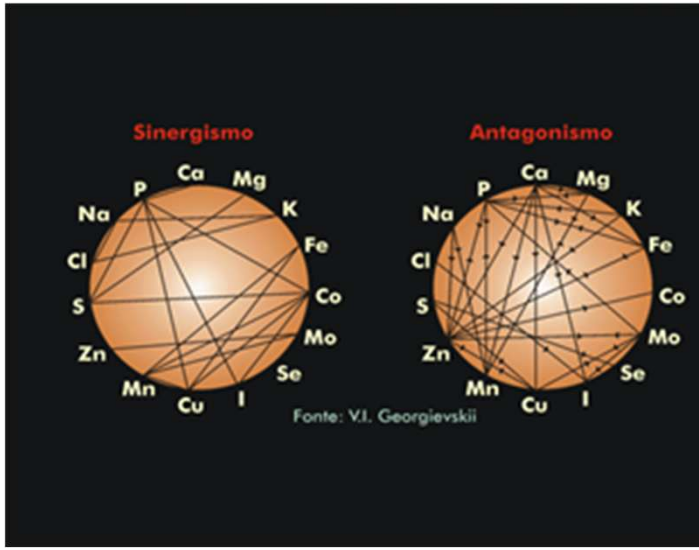
# The BMP® solution
# NEUTRAL BEHAVIOR

Bi-modal protection isolates the active core, eliminating unwanted electron exchanges.

## EFFECTS:

- Elimination of pro-oxidant effects on Vitamins (A, D, E, K) and fats
- Neutral behaviour means no interactions from minerals and trace elements.(Peynaud scheme)

- Maximum shelf-life stability without the need for over-fortification
- Integrity of nutritional value from production to the feeder

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# SUSTAINABILITY & HEALTH: Emission reduction and worker health protection as a corporate asset.

# THE ROI OF QUALITY

Choosing BMP® technology means choosing performance, legal safety, and real savings.

# The ROI of QUALITY

| Cost Factor | Traditional Model | BMP® Model | Impact |
|---|---|---|---|
| **Dosage** | Over-feeding (+5-10%) to compensate loses and instability. | **Total Precision:** no risks and chemical stability. | **Raw material savings.** |
| **Compliance** | High risk of Cross-Contamination and legal problems | **Conformity certified:** field test 610 batch 35 feed plants. | **Legal Safety.** |
| **Health** | Exposure to toxic dusts (OEL) and massive use of DPI. | **Risk reduced from the origin:** safe design material. | **Worker Protection.** |
| **Stability** | Pro-oxidant effects (Peynaud) and vitamins depletion. | **Neutral behaviour:** biochemical isolation of the actives. | **Extended Shelf-life.** |
| **Performance** | Not uniformity in performance and High CV. | **Higher uniformity:** high FCR | **Maximum Animal ROI.** |

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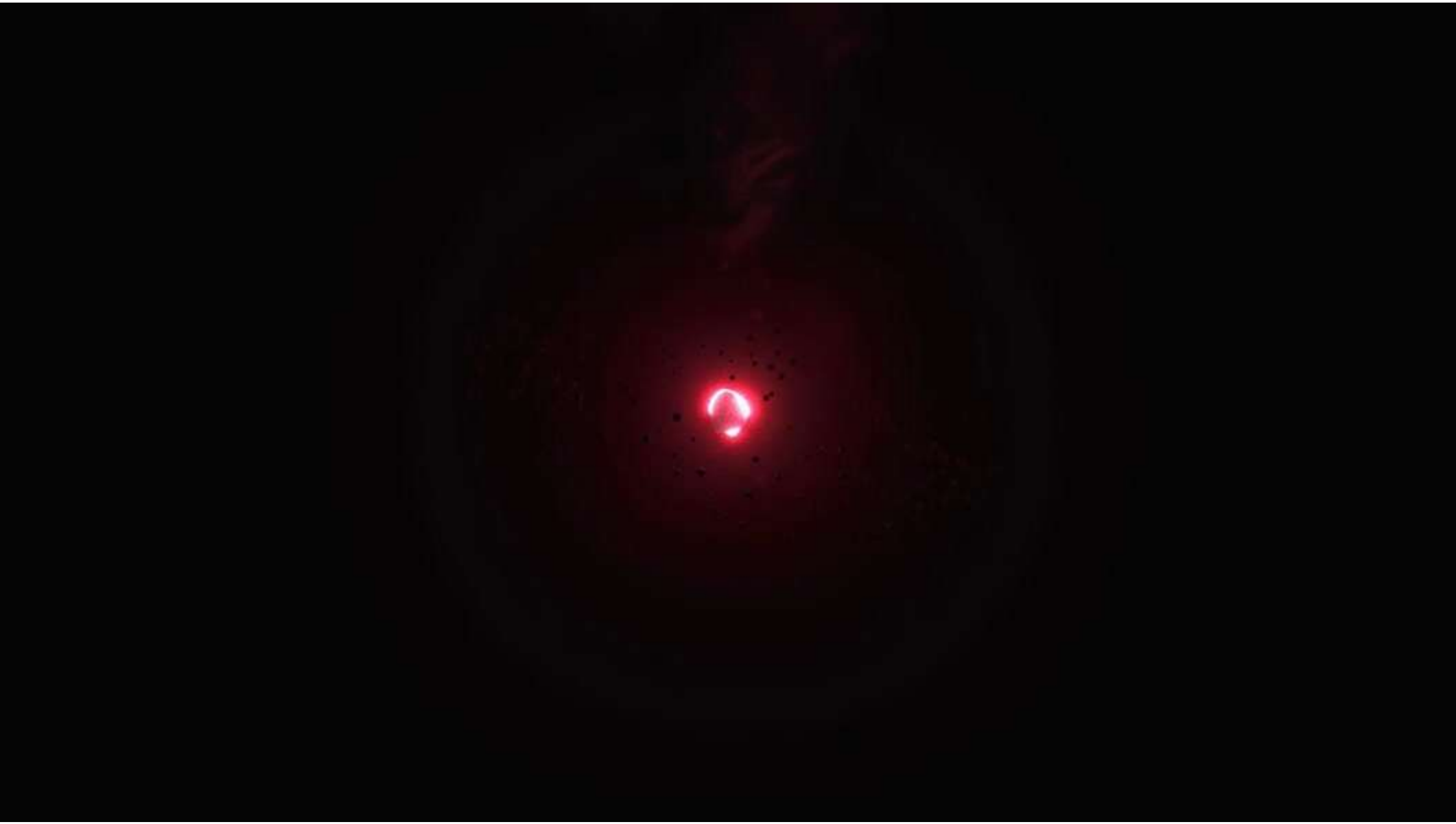

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# COMMISSION NOTICE

## Guidance document for the evaluation of homogeneity of feed and the cross-contamination

(C/2026/1807)

**PURPOSE OF THIS DOCUMENT**

To identify clear criteria for the competent authorities in the Member States to evaluate the methods used by Feed Business Operators (e.g. use of micro-tracers, sampling methods, etc.) to ensure the appropriate homogeneity of feed and to assess and control cross-contamination.

**NOTE**

This document is an evolving document and will be updated to take account of experiences and information from the Member States, from competent authorities, feed businesses operators and the Commission's Health and Food Audits and Analysis Directorate.

**WARNING**

The content of this document reflects the views of the European Commission and, as such, is not legally binding. It does not create any new legal provisions, nor rights or obligations. Only the Court of Justice of the European Union is competent to interpret European law authoritatively. The views expressed in this Notice cannot prejudge the position that the European Commission might take before the Court of Justice of the European Union and national courts.

# Thank you

Dox-Al Italia S.p.A.