

Microencapsulation Excellence: BASF's Beadlet Technology

High-quality ingredients for human nutrition

In the human nutrition industry, using oily products in water-soluble consumer solutions is a major challenge. Nutritional ingredients like vitamins and carotenoids are commonly used to fortify foods, beverages and dietary supplements, and cannot simply be “added”. To ensure their solubility in beverages, miscibility with foods and stability during tableting, nutritional ingredients need to be microencapsulated.

Microencapsulation is a state-of-the-art technology that coats the sensitive nutritional ingredients with a matrix of food ingredients (e.g., starch) to facilitate their solubility and miscibility. Moreover, microencapsulation also protects nutritional ingredients from oxygen and increases their stability during application and storage.

One specific way of microencapsulating nutritional ingredients is by producing beadlets. Beadlet powders are very stable thanks to the large protective matrix (e.g., against contact with oxygen) and have excellent properties (e.g., flowability). This makes them ideal for stressful applications (e.g., direct compression of tablets) and they allow us to control the nutrient's physical properties (e.g., release time).

BASF is a global leader in the microencapsulation of nutrition ingredients enabling high-quality, tasty consumer products.

Product Benefits

Increased stability when exposed to

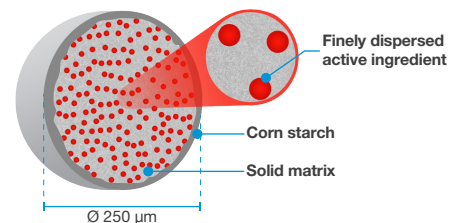
- Oxygen
- Heat
- Humidity

Easy product handling by providing

- Excellent flowability
- Reduced dustiness
- Cold-water dispersibility
- Direct compressibility/suitability for tableting

Adjustment of physical properties





- Release time
- Flavor masking
- Color adjustment



Beadlets

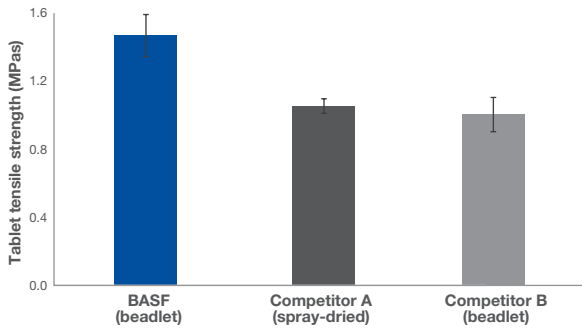
- Nutritional ingredient embedded in a protective matrix
- Small size, spherical shape
- Produced by state-of-the-art microencapsulation technology

Specific characteristics of beadlet powders cater for diverse applications

Application	Dietary Supplements	Dry Foods	Foods & Beverages	Staple Food Fortification
Example	 Tablets and hard capsules	 Powder-based foods and dry premixes	 Coloration and fortification of lemonades, lifestyle drinks, and others	 Fortification of flour, sugar and rice
Beadlet Characteristics	Mechanical stability during direct compression High chemical stability	Good mixability High chemical stability	High dispersibility in water and food matrices	Good mixability High chemical stability in humid conditions

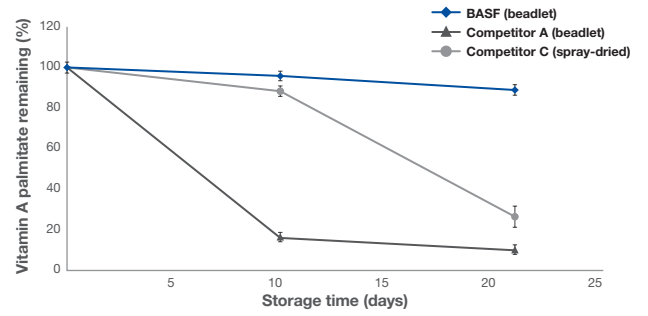
Our beadlet powders show excellent properties in application tests

Vitamin E acetate shows superior tablet strength



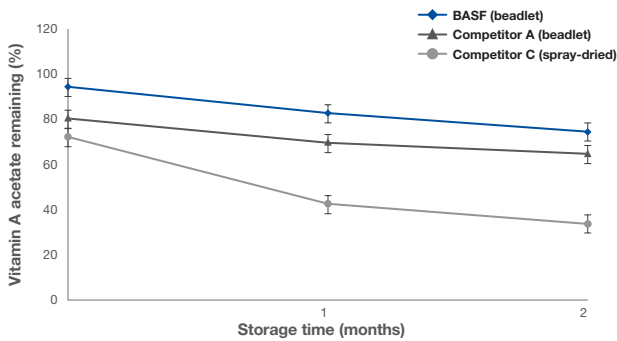
Values are means \pm SD (n=10 from one batch). BASF's Dry Vitamin E Acetate 50% DC/GFP was tested along with comparable vitamin E acetate products from competitors. Processability was assessed by measuring tablet tensile strength with a tablet hardness tester (USP 1217). BASF study no. U-1937 (unpublished)

Vitamin A palmitate provides excellent stability in flour during storage



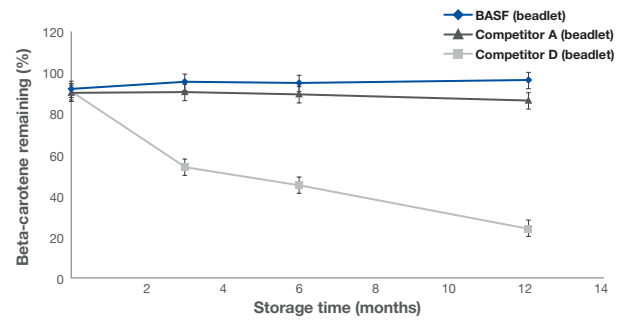
Values are means \pm SD (n=3, BASF product three batches; n=2, competitor products one batch each). BASF's Dry Vitamin A Palmitate 250 FP CWD was tested along with comparable vitamin A palmitate powders from competitors. The flour mixture was stored in closed glass vials for up to 21 days at 45°C (no external humidity control). Prior to testing, the flour was conditioned to have a water content of ~14%. BASF study no. S-1119, S-911 (unpublished)

Vitamin A acetate demonstrates outstanding retention during tableting



Values are means \pm SD (n=2 from one batch). BASF's Dry Vitamin A Acetate 500 (60 mesh) was tested along with comparable vitamin A acetate powders from competitors. The tablets were prepared by BASF using a model tablet formulation on a rotary tablet press (Korsch PH 106-DMS) and were left uncoated. They were stored in sealed PE bottles at 40°C, 75% r.h. for up to 3 months. BASF study no. S-1183 (unpublished)

Beta-carotene delivers high long-term stability in tablets



Values are means \pm SD (n=2 from one batch). BASF's Beta-carotene 20% GFP was tested along with two comparable beta-carotene products from competitors. The tablets were prepared by BASF using a model tablet formulation on a rotary tablet press (Korsch PH 106-DMS) and were left uncoated. The tablets were stored in sealed PE bottles at 25°C, 60% r.h. for up to 12 months. BASF study no. S-1130 (unpublished)

Our beadlet powders are suitable for a broad range of applications

Active Ingredient	Dietary Supplements	Dry Foods	Foods & Beverages	Staple Food Fortification	Cold Water Dispersible Product
Vitamin A	✓	✓	✓	✓	✓
Vitamin D ₃	✓	✓	✓	✓	✓
Vitamin E	✓	✓	✓		✓
Beta-carotene	✓	✓	✓		✓
Lutein	✓	✓	✓		✓
Lycopene	✓	✓	✓		

Contact us to learn how our products and services can help you develop your products and innovations!



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