KEEP INGREDIENTS CO. LTD

No. 2019, Unit 1, Building 10, Yuexiucheng Phase 1, Guodu Xuefu Street, Chang'an District, Xi'an, Shaanxi, 710119, China

TECHNICAL DATA SHEET

Vitamin K2 (Menaquinone-7 / MK-7) Powder

1. PRODUCT DESCRIPTION

Vitamin K2 (Menaquinone-7, MK-7) Powder is a fermentation-sourced vitamin K2 ingredient supplied as a free-flowing powder. It is produced by microbial fermentation of Bacillus subtilis natto on a plant-based substrate (soybean powder, glucose, sugar and pure water), followed by membrane filtration, membrane concentration, extraction with soybean oil, and drying with carrier and accessory ingredients to obtain the finished powder.

This Technical Data Sheet documents the two standardized potencies for which technical documentation (product specification, certificate of analysis and production flow) is supplied, namely Vitamin K2 (MK-7) 1.0% (10,000 ppm) on corn starch (spray-dried) and Vitamin K2 (MK-7) 1.0% (10,000 ppm) on dicalcium phosphate (DCP). Lower-potency and alternative-carrier grades are also available and are supplied in accordance with the specifications agreed with the customer.

The production route comprises the following main steps: soybean powder, glucose, sugar and pure water → sterilization and fermentation (Bacillus subtilis natto) → membrane filtration → membrane concentration → extraction (soybean oil) → filtration → drying (with accessory ingredients) → Menaquinone-7 powder.

2. PRODUCT INFORMATION

Item	Information
Product name	Vitamin K2 (Menaquinone-7) Powder
Source	Fermentation (Bacillus subtilis natto)
Grades documented in this TDS	Vitamin K2 (MK-7) 1.0% (10,000 ppm) — Corn starch (spray-dried) Vitamin K2 (MK-7) 1.0% (10,000 ppm) — DCP (dicalcium phosphate)
Other available grades	Vitamin K2 (MK-7) 0.2% (2,000 ppm) — Composite carrier Vitamin K2 (MK-7) 0.2% (2,000 ppm) — Corn starch (spray-dried) Specifications confirmed per order.
Shelf life	24 months
Storage	Keep in a cool, dry place; keep the container tightly closed and protect from light and moisture.

3. PRODUCT SPECIFICATION

The specifications below correspond to the supplied Certificates of Analysis for each grade.

3.1 Vitamin K2 (MK-7) 1.0% (10,000 ppm) — Corn Starch (Spray-Dried)

Table 1 — Product specification, corn starch (spray-dried) grade

Item	Specification	Test method
Description (sensory properties)	White to light yellow powder, no visible impurities to the naked eye	Visual
Odour and taste	Characteristic odour and taste of the product, no off-odour	Organoleptic
Identification	Retention time of the main peak conforms to that of the reference standard	HPLC
Vitamin K2 (Menaquinone-7) content	≥ 10,000 μg/g	NHFPC No. 8 (2016) fermented MK-7 method
MK-6 content	≤ 10%	USP
Moisture	≤ 5%	USP
Ash content	≤ 3%	GB 5009.4
Total arsenic (as As)	≤ 2.0 mg/kg	GB 5009.11
Lead (Pb)	≤ 3.0 mg/kg	GB 5009.12
Mercury (Hg)	≤ 0.1 mg/kg	GB 5009.17
Cadmium (Cd)	≤ 1.0 mg/kg	GB 5009.15
Hexachlorocyclohexane (HCH)	≤ 0.05 mg/kg	GB/T 5009.19
DDT	≤ 0.05 mg/kg	GB/T 5009.19
Aflatoxin (B1+B2+G1+G2)	≤ 5.0 μg/kg	GB 5009.22
Total aerobic microbial count	≤ 1,000 CFU/g	USP
Total moulds & yeasts count	≤ 100 CFU/g	USP
Coliforms	< 3.0 MPN/g	GB 4789.3
Escherichia coli	Non-detectable	USP
Pathogenic bacteria (Salmonella, Staphylococcus aureus)	Non-detectable /25 g	USP

3.2 Vitamin K2 (MK-7) 1.0% (10,000 ppm) — DCP

Table 2 — Product specification, DCP grade

Item	Specification	Test method
Organoleptic properties	White to pale yellow powder, free of visible foreign impurities to the naked eye	NHFPC No. 8 (2016) fermented MK-7 method
Odour and taste	Inherent odour and taste of the product, no abnormal off-odour	Organoleptic
Identification	Retention time of the main peak matches that of the reference standard solution	HPLC
Vitamin K2 (MK-7) content	≥ 10,000 μg/g	NHFPC No. 8 (2016) fermented MK-7 method
MK-6 content	≤ 3%	Internal control standard
Moisture	≤ 5%	GB 5009.3
Total arsenic (as As)	≤ 0.1 mg/kg	GB 5009.11
Lead (Pb)	≤ 0.1 mg/kg	GB 5009.12
Mercury (Hg)	≤ 0.05 mg/kg	GB 5009.17
Cadmium (Cd)	≤ 0.1 mg/kg	GB 5009.15
Hexachlorocyclohexane (HCH)	≤ 0.05 mg/kg	GB/T 5009.19
DDT	≤ 0.05 mg/kg	GB/T 5009.19
Total aflatoxins (B1+B2+G1+G2)	≤ 5.0 μg/kg	GB 5009.22
Total aerobic bacterial count	≤ 1,000 CFU/g	GB 4789.2

Item	Specification	Test method
Mould & yeast count	≤ 100 CFU/g	GB 4789.15
Coliforms	< 3.0 MPN/g	GB 4789.3
Escherichia coli	< 3.0 MPN/g	GB 4789.38
Pathogens (Salmonella, Staphylococcus aureus)	Absent /25 g	GB 4789.4; GB 4789.10

Specification basis: supplied Certificate of Analysis. The supplied batches conform to the specified quality standards.

4. PRODUCTION PROCESS

4.1 General fermentation process

The upstream fermentation and extraction route is identical for all grades and is shown in Figure 1: fermentation of Bacillus subtilis natto on a soybean-based substrate, followed by membrane filtration, membrane concentration, extraction with soybean oil, filtration and drying to obtain the Menaquinone-7 powder.

Note: We could use MCT or Sunflower sourced to be instead of Soy, if you are worried the allergen, and have this request, pls notice.

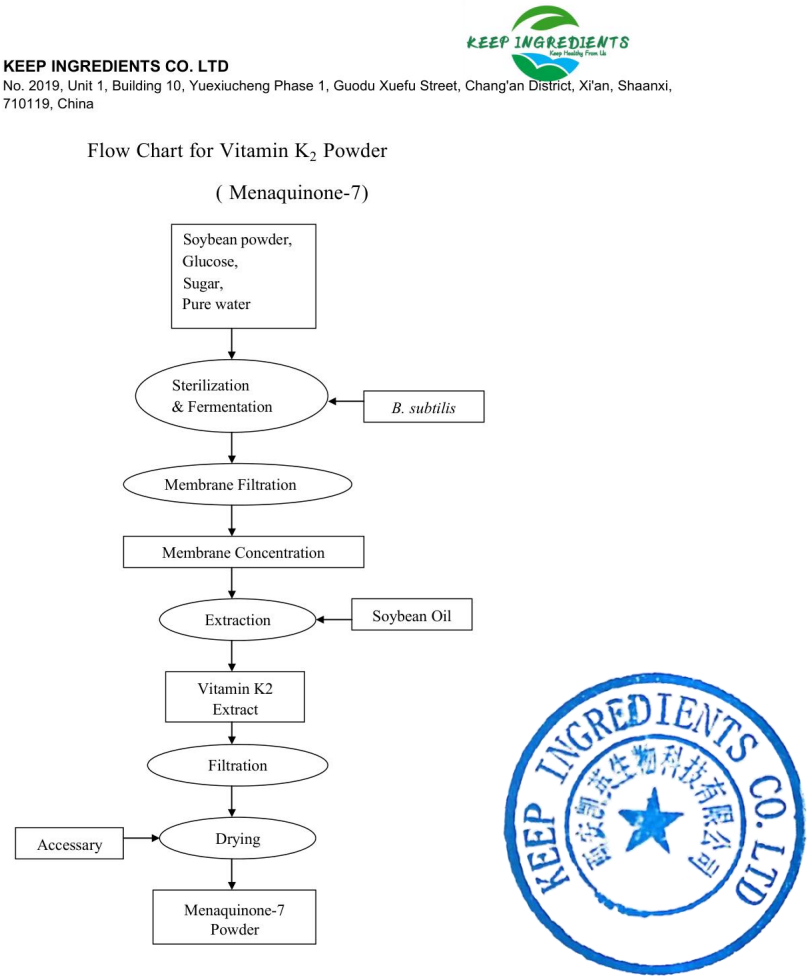

Figure 1 — Fermentation production flow chart of Vitamin K2 (Menaquinone-7) powder

4.2 Corn starch (spray-dried) grade

For the corn starch grade, the purified vitamin K2 is formulated with accessories into an emulsifier and converted into the powder by spray-drying onto a corn starch base, followed by subpackaging (Figure 2), **Note: We could use MCT or Sunflower sourced to be instead of Soy, if you are worried the allergen, and have this request, pls notice.**

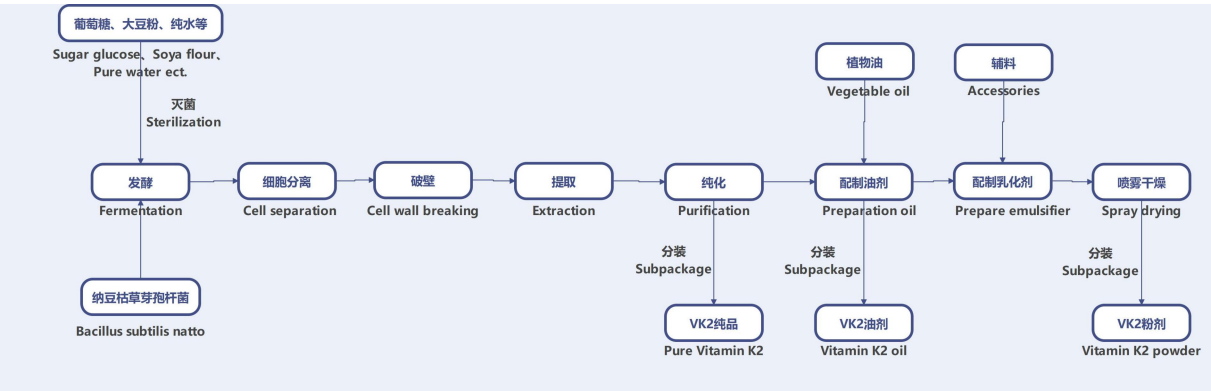

Figure 2 — Vitamin K2 production process flow diagram (corn starch, spray-dried)

4.3 DCP grade

The DCP grade follows the same upstream fermentation and refining route: raw material and strain preparation → seed culture → scale-up culture → fermentation → filtration / concentration / extraction → sterile filtration (performed in a 100,000-class cleanroom) → vitamin K2 refining. The refined vitamin K2 is then formulated onto dicalcium phosphate (DCP) as carrier, followed by weighing and internal packaging (a key control point), outer packaging and storage of the finished product.

Representative process control parameters: seed-tank sterilization at 105 °C for 15 minutes; fermentation at 35 ± 1 °C for ≥ 100 hours at pH 5–7 after cooling to 35 °C; membrane filtration at ≤ 25 °C at 0.3–0.5 MPa. Formulation and filling operations are carried out in a controlled (100,000-class) cleanroom environment.

A detailed process chart specific to the DCP formulation is available from the supplier on request.

5. STATEMENTS

5.1 Non-GMO Statement

We hereby confirm that the Vitamin K2 (MK-7) Powder supplied by KEEP INGREDIENTS CO. LTD is a non-GMO product, produced in a non-GMO factory, and will not cause any GMO cross-infection or cross-contamination.

5.2 Allergen Statement

KEEP INGREDIENTS CO. LTD hereby confirms that the Vitamin K2 MK7 Powder supplied does not contain the main allergens listed below (Except Soy-based).

Allergen	Presence in the product	Comments
Animal allergens	No	—
Soy protein	No	Soybean powder is used as substrate for B. subtilis natto; it is removed during the final extraction, purification and filtration processes. Total soybean proteins by ELISA < 5 ppm.

Allergen	Presence in the product	Comments
Nuts & nut oils — Almonds / Brazil nut / Cashew nut / Hazelnut & hazelnut oil / Peanut & peanut oil / Pecan nut / Pistachio nut / Sesame & sesame oil / Queensland or Macadamia nut / Walnut & walnut oil	No	—
Milk components — Milk / Lactose / Casein	No	—
Flour & grains — Barley / Corn / Gluten / Kamut / Oat / Rye / Spelt / Wheat / Whey	No	—
Soya products — Soya / Soya lecithin	No	—
Egg and egg components — Egg / Egg lysozyme	No	—
Fish and shellfish — Crustacea / Fish / Fish gelatin / Fish oil / Mollusc	No	—
Vegetables and spices — Celery / Mustard / White lupin	No	—
Other substances — Sulphites and anhydrous sulphurous acid / Lupin and products thereof	No	—
Tree and grass pollen	Not applicable	—



6. CERTIFICATE OF ANALYSIS

6.1 Vitamin K2 (MK-7) 1.0% (10,000 ppm) — Corn Starch (Spray-Dried)

Certificate of Analysis — Corn starch (spray-dried) grade

Field	Detail
Product name	Vitamin K2 (powder)
Batch No.	KYVK2026062901
Quantity	986 kg
Packing size	1 kg/bag
Manufacturing date	2026-06-29
Test date	2026-06-30
Date of issue	2026-07-06
Expiry / shelf life	24 months

Item	Standard	Test result	Decision
Sensory properties	White to light yellow powder, no visible impurities in normal vision	White to light yellow powder, no visible impurities in normal vision	Conforms
Smell, taste	The unique smell and taste of this product, no peculiar smell	The unique smell and taste of this product, no peculiar smell	Conforms
Identification (differential test)	Main peak retention time in the specimen is consistent with the standard	Main peak retention time in the specimen is consistent with the standard	Conforms
Vitamin K2 content (Menaquinone-7) / (μg/g)	≥ 10,000	10,879.73	Conforms

Item	Standard	Test result	Decision
MK-6 labeling amount / %	≤ 10	0.13	Conforms
Moisture content / %	≤ 5	3.46	Conforms
Ash content / %	≤ 3	0.02	Conforms
Total arsenic (as As) / (mg/kg)	≤ 2.0	Not detected	Conforms
Lead (Pb) / (mg/kg)	≤ 3.0	Not detected	Conforms
Mercury (Hg) / (mg/kg)	≤ 0.1	Not detected	Conforms
Cadmium (Cd) / (mg/kg)	≤ 1.0	Not detected	Conforms
HCH / (mg/kg)	≤ 0.05	Not detected	Conforms
DDT / (mg/kg)	≤ 0.05	Not detected	Conforms
Aflatoxin (B1+B2+G1+G2) / (μg/kg)	≤ 5.0	Not detected	Conforms
Aerobic plate count / (CFU/g)	≤ 1,000	< 10	Conforms
Mould and yeast / (CFU/g)	≤ 100	< 10	Conforms
Coliforms / (MPN/g)	< 3.0	Not detected	Conforms
E. coli / (MPN/g)	Non-detectable	Not detected	Conforms
Pathogenic bacteria (Salmonella, Staphylococcus aureus) / 25 g	Non-detectable	Not detected	Conforms

Conclusion: The product is qualified.

6.2 Vitamin K2 (MK-7) 1.0% (10,000 ppm) — DCP

Certificate of Analysis — DCP grade

Field	Detail
Product name	Vitamin K2 (powder)
Batch No.	KYVKPO2026052001
Net weight	1,500 kg
Packaging specification	5 kg per bag
Manufacturing date	2026-05-20
Inspection date	2026-05-21
Shelf life	24 months

Test item	Specification	Test result	Judgment
Organoleptic properties	White to pale yellow powder, free of visible foreign impurities to the naked eye	White to pale yellow powder, free of visible foreign impurities to the naked eye	Complies
Inherent odour and taste, no abnormal off-odour	Inherent odour and taste of the product, no abnormal off-odour	Inherent odour and taste of the product, no abnormal off-odour	Complies
Identification	Retention time of the main peak of the test sample matches that of the reference standard solution	Retention time of the main peak of the test sample matches that of the reference standard solution	Complies
Vitamin K2 (MK-7) content / (μg/g)	≥ 10,000	11,512.4	Complies
MK-6 content / %	≤ 3	0.20	Complies

Test item	Specification	Test result	Judgment
Moisture / %	≤ 5	0.10	Complies
Total arsenic (as As) / (mg/kg)	≤ 0.1	Not detected	Complies
Lead (Pb) / (mg/kg)	≤ 0.1	Not detected	Complies
Mercury (Hg) / (mg/kg)	≤ 0.05	Not detected	Complies
Cadmium (Cd) / (mg/kg)	≤ 0.1	Not detected	Complies
Hexachlorocyclohexane (HCH) / (mg/kg)	≤ 0.05	Not detected	Complies
DDT / (mg/kg)	≤ 0.05	Not detected	Complies
Total aflatoxins (B1+B2+G1+G2) / (μg/kg)	≤ 5.0	Not detected	Complies
Total aerobic bacterial count / (CFU/g)	≤ 1,000	< 10	Complies
Mould & yeast count / (CFU/g)	≤ 100	< 10	Complies
Coliforms / (MPN/g)	< 3.0	Not detected	Complies
Escherichia coli / (MPN/g)	< 3.0	Not detected	Complies
Pathogens (Salmonella, Staphylococcus aureus) / 25 g	Absent	Not detected	Complies

Conclusion: The above product complies with the specified quality standards.

This Technical Data Sheet should be read in conjunction with the supplied Certificate of Analysis and relevant statements. The information provided is based on the documents supplied by KEEP INGREDIENTS CO. LTD.