Brilliant Blue FCF (E 133)

Catalogue No. ASD-627

1. Identification

Chemical name	Disodium 2-[[4-[ethyl-[(3-sulfonatophenyl)methyl]amino]phenyl]-[4-[ethyl-[(3-sulfonatophenyl)methyl]azaniumylidene]cyclohexa-2,5-dien-1-ylidene]methyl]benzenesulfonate
Synonyms	Brilliant Blue FCF; Acid Blue 9; CI Food Blue 2; Erioglaucine disodium salt; FD&C Blue No. 1 (US name for FDA-certified batches)
C.I. number	42090
E number	E 133
CAS number	3844-45-9
EC number	223-339-8
Molecular formula	$C_{37}H_{34}N_2Na_2O_9S_3$
Molecular weight	792.85 g/mol
Dye class	Triarylmethane, anionic (acid) dye

2. Intended Use

Dye tracer for soil and hydrology studies, feeding-assay dye, E 133 reference colour, spectrophotometric standard and teaching reagent.

For laboratory, research, education and quality-control use. Not intended for human or veterinary therapeutic use, diagnosis, or direct consumption. Food-grade (E 133) material. For food-industry supply, contact Ausamics for suitability and regulatory documentation.

3. Mode of Action

The three sulfonate groups make Brilliant Blue FCF anionic and freely water-soluble. Its triarylmethane chromophore absorbs orange-red light at about 630 nm, which gives the blue colour.

4. Physical & Chemical Properties

Appearance	Violet-blue powder
Colour of 1 % aqueous solution	Turquoise blue
Absorption maximum (λmax)	approx. 630 nm in water
Solubility	Freely soluble in water; soluble in glycerol; slightly soluble in ethanol
Moisture at 110 °C	Max. 2.0 %
Stability	Good stability in normal laboratory conditions; protect from sunlight, heat and moisture

5. Specifications

Parameter	Specification
Pure dye content (E 1 %, 1 cm at 630 nm)	Min. 85.0 %
Appearance	Bright violet-blue powder
Hue of 1 % solution	Turquoise blue
Loss on drying at 135 °C (as sodium salts)	Max. 15.0 %
Moisture at 110 °C	Max. 2.0 %
Water-insoluble matter	Max. 0.20 %
Subsidiary colouring matters	Max. 1.0 %
Organic compounds other than colouring matters	Max. 0.5 %
Unsulfonated primary aromatic amines (as aniline)	Max. 0.01 %
Ether-extractable matter	Max. 0.2 %
Arsenic (As)	Max. 1 ppm
Lead (Pb)	Max. 1 ppm
Mercury (Hg)	Max. 0.05 ppm
Cadmium (Cd)	Max. 0.1 ppm
Chromium (Cr)	Max. 2 ppm
Copper (Cu)	Max. 30 ppm
Zinc (Zn)	Max. 50 ppm
Heavy metals (as Pb)	Max. 5 ppm

6. Solution Preparation

1. Stock solution (1 % w/v): weigh 1.0 g of Brilliant Blue FCF.
2. Add to about 80 mL of purified water and stir until fully dissolved.
3. Make up to 100 mL with purified water.
4. Store closed at room temperature, away from light. Dilute for use according to your method.

7. Applications

- Soil & Hydrology Tracer: Standard dye tracer for visualising water flow paths and preferential flow in soils and porous media.
- Intestinal Barrier Assays: Blue food dye used in feeding assays such as the Drosophila “Smurf” test of gut barrier integrity.
- Plant & Tissue Tracing: Water-soluble blue tracer for xylem uptake, staining contrast and visual marking in research models.
- Food Colour QC: Reference material for E 133 identification, HPLC and spectrophotometric assay of blue and green food colours.
- Spectrophotometry: Stable blue dye (λmax ≈ 630 nm) for absorbance calibration and Beer–Lambert teaching.
- Education: Intense, water-soluble blue for chromatography, colour-mixing and diffusion practicals.

8. Storage & Shelf Life

Store at 15–25 °C, dry, tightly closed and protected from sunlight, heat and moisture. Shelf life 36 months from the date of manufacture.

9. Literature / References

5. Commission Regulation (EU) No 231/2012, Annex: E 133 Brilliant Blue FCF. Specifications for food additives.
6. FAO/WHO JECFA. Brilliant Blue FCF: Combined Compendium of Food Additive Specifications.
7. EFSA ANS Panel (2010). Scientific Opinion on the re-evaluation of Brilliant Blue FCF (E 133) as a food additive. EFSA Journal 8(11):1853.
8. Flury M., Flühler H. (1994). Brilliant Blue FCF as a dye tracer for solute transport studies: a toxicological overview. J. Environ. Qual. 23:1108–1112.
9. Rera M., Clark R.I., Walker D.W. (2012). Intestinal barrier dysfunction links metabolic and inflammatory markers of aging to death in Drosophila. PNAS 109:21528–21533.
10. US Code of Federal Regulations, 21 CFR 74.101: FD&C Blue No. 1 (batch certification required).

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