Food and Agriculture Organization of the United Nations

87th JECFA - Chemical and Technical Assessment (CTA), 2019

BRILLIANT BLACK PN

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1. Summary

This Chemical and Technical Assessment summarizes chemical and technical information for Brilliant Black PN (INS No. 151) evaluated at the 87th meeting of the Joint FAO/WHO Expert Committee on Food Additives (JECFA, 2019). Brilliant Black PN was placed on the agenda of the 87th meeting of JECFA at the request of the 49th session of the Codex Committee on Food Additives (CCFA49, 2017).

Brilliant Black PN was first evaluated at the 25th meeting of JECFA and an ADI of 0-1 mg/kg bw was established (JECFA, 1981). Specifications for Brilliant Black PN were prepared at the 28th meeting of JECFA (JECFA, 1984a) and published in FNP 31/1 (JECFA, 1984b) and in FNP 52 (JECFA, 1992). Metals and arsenic specifications were revised at the 59th meeting of JECFA (JECFA, 2002). At the 87th meeting, Brilliant Black PN was re-evaluated, the ADI established at the 25th meeting was retained, and the specifications were revised.

2. Description

Brilliant Black PN is a synthetic food colour produced as black powder or granules. It is classified as a secondary disazo dye (Hunger et al., 2017). The primary colouring component is tetrasodium 4-(acetylamino)-5-hydroxy-6-[2-[7-sulfo-4-[2-(4-sulfophenyl)diazenyl]-1-naphthalenyl]diazenyl]-1,7-naphthalenedisulfonate. The C.A.S. registry number is 2519-30-4 and the chemical formula is $C_{28}H_{17}N_5Na_4O_{14}S_4$. Other names for the food colour include CI Food Black 1, CI No. 28440, Brilliant Black BN, and Black PN (Colour Index, 1971; Colour Index, 2019).

3. Methods of manufacture

Brilliant Black PN is manufactured by diazotizing 4-aminobenzenesulfonic acid (sulfanilic acid), coupling with 8-aminonaphthalene-2-sulfonic acid (1,7-Cleve's acid), diazotizing the product, and coupling with 4-(acetylamino)-5-hydroxy-1,7-naphthalenedisulfonic acid (*N*-acetyl K acid) (Colour Index, 1971). The dye is purified and isolated as the tetrasodium salt. The calcium and potassium salts are also permitted (EU, 2012).

Brilliant Black PN may be converted to the corresponding aluminium lake under aqueous conditions by reacting aluminium oxide with the colouring matter (JECFA, 2004). Undried aluminium oxide is usually freshly prepared by reacting aluminium sulfate or aluminium chloride with sodium carbonate, sodium bicarbonate, or aqueous ammonia. Following lake formation, the product is filtered, washed with water, and dried.

4. Chemical characterization

4.1 Composition

Brilliant Black PN consists of the primary colouring component (Figure 1) and subsidiary colouring matters. Sodium chloride and/or sodium sulfate are the principal uncoloured components.

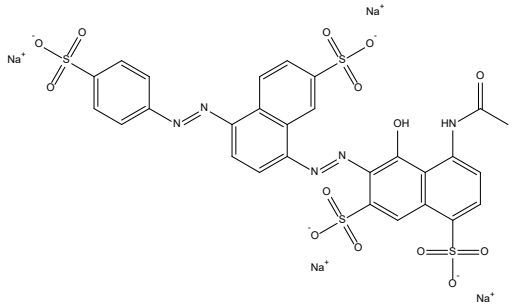


Figure 1. Chemical structure of Brilliant Black PN.

JECFA and the European Union have specified an assay of not less than 80% total colouring matters (calculated as the tetrasodium salt) for Brilliant Black PN (JECFA, 2006; JECFA, 2019; EU, 2012). Total volatile matter (loss on drying at 135º, 6 h, plus sodium chloride and sodium sulfate) is specified as not more than 20%.

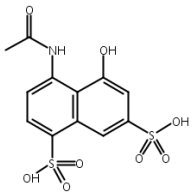
4.2 Possible impurities (including degradation products)

Impurities in Brilliant Black PN may include subsidiary colouring matters (not more than 4%), organic compounds other than colouring matters (not more than 0.8%), unsulfonated primary aromatic amines (not more than 0.01% calculated as aniline), and lead (not more than 2 mg/kg).

Brilliant Black PN contains four sulfonate groups. Several subsidiary colours are found in commercial samples of the dye and may include the de-acetylated subsidiary colour (JECFA, 1959). Other subsidiary colours such as the tri-, di-, or monosulfonated subsidiary colours have not been identified or characterized.

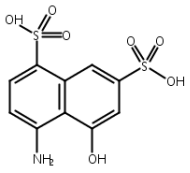
Organic compounds other than colouring matters include the following compounds:

- 4-(Acetylamino)-5-hydroxy-1,7-naphthalenedisulfonic acid (N-acetyl K acid, C.A.S. 6409-21-8):



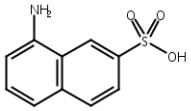
N-acetyl K acid

- 4-Amino-5-hydroxynaphthalene-1,7-disulfonic acid (K acid, C.A.S. 130-23-4):



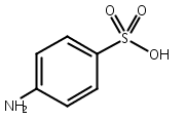
K acid

- 8-Amino-2-naphthalenesulfonic acid (1,7-Cleve's acid, C.A.S. 119-28-8):



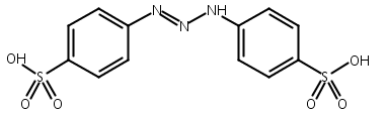
1,7-Cleve's acid

- Sulfanilic acid (4-aminobenzenesulfonic acid, C.A.S. 121-57-3):



Sulfanilic acid

- 4,4′-(diazoamino)dibenzenesulfonic acid (4,4'-(1e)-triaz-1-ene-1,3-diylbenzenesulfonic acid, C.A.S. 17596-06-4; this is diazotized sulfanilic acid coupled to sulfanilic acid):



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4.3 Analytical methods

The specifications monograph cites test methods for impurities in Brilliant Black PN which are included in volume 4 of the *Combined Compendium of Food Additive Specifications* (JECFA, 2006). Subsidiary colouring matters and organic compounds other than colouring matters are determined by high-performance liquid chromatography with photodiode array detection (JECFA, 2019).

Techniques applied to the determination of Brilliant Black PN in various food matrixes include liquid chromatography with photodiode array detection and liquid chromatography-mass spectrometry (Martin et al., 2016; Li et al., 2015; Yoshioka and Ichihashi, 2008; Yamjala et al., 2016).

5. Functional uses

Brilliant Black PN is used in various types of foods including confectionery, decorations and coatings, desserts including flavoured milk products, edible cheese rind, edible ices, fine bakery wares, fish and fish products, non-alcoholic flavoured drinks, non-dairy beverages, sauces and seasonings, and savoury snacks at use levels up to 500 mg/kg (EFSA, 2015).

6. Reactions and fate in foods

Brilliant Black PN is not light or air sensitive and is chemically stable when used in foods.

7. References

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