Beet Red

Definition	Beet Red is a pigment by extracting roots of beet (Beta vulgaris L.) of chenopodiaceae with water or ethyl alcohol. The major component is betanine ($C_{24}H_{26}O_{13}N_2$ = 550.48) of betaines. Dilutant, stabilizer, or solvent can be added for the purpose of color value adjustment and quality preservation.
[Compositional Specifications of Beet Red]	
Content	Color value (E 10%, 1cm)of Beet Red should be higher than the indicated value.
Description	Beet Red is reddish violet ~ dark violet liquid, lump, powder, or paste with a slight characteristic scent.
Identification	(1) Test Solution of Beet Red in Color Value section shows reddish violet and a maximum absorption at 535 nm. (2) When 1 ml of sodium hydroxide solution(1→10) is added to 5 ml of Test Solution in (1), it turns yellow.
Purity	(1) Arsenic : 0.25 g of Beet Red is placed in a platinum, quartz, or porcelain crucible. 10 ml of magnesium nitrate in ethyl alcohol (1→50) is added to the crucible and then alcohol is ignited. It is then reduced to ash by heating at 450~550°. If carbonaceous substance persists, it is wetted with minute amount of nitric acid, which is further heat treated at 450~550°. After cooling, 3 ml of hydrochloric acid is added to the residue, which is then dissolved by heating in a water bath. When test for arsenic is carried out with this test solution, it should not be more than 4ppm (2) Heavy Metals : 1 g of Beet Red is carbonized by heating mildly in a quartz or porcelain crucible. After cooling, add 2 ml of nitric acid and 5 drops of sulfuric acid, it is heated until white smoke disappears, which is then reduced to ash by further heating at 450~550°. After cooling, 2 ml of hydrochloric acid is added, which is then evaporated to dryness in a water bath. 3 drops of hydrochloric acid and 10 ml of hot water are added to the resulting residue, which is then heated for 2 minutes. After cooling, 1 drop of phenolphthalein indicator solution is added, then ammonia solution is added until the color of the solution becomes pale red. The resulting solution is transferred into a Nestler cylinder by rinsing with water. 50 ml of test solution is prepared by adding 2 ml of diluted acetic acid (1→20) and water. When this solution tested for heavy metals, the content should not be more than 20ppm. Color standard solution is prepared by the following procedure. 2 ml of nitric acid, 5 drops of sulfuric acid, and 2 ml of hydrochloric acid are added and evaporated to dryness in a crucible that is made of the same material used for test solution preparation. 3 drops of hydrochloric acid are added to the residue, which is then transferred into another Nestler cylinder as described above. Finally, 2 ml of lead standard solution, 2 ml of diluted acetic acid (1→20), and water are added to bring the total volume to 50 ml.
Assay	Appropriate amount of Beet Red is precisely weighed so that the absorption is within 0.3 ~ 0.7 and dissolved in acetic acid·sodium acetate buffer solution with pH 5.4 (total volume 100 ml). 1 ml of this solution is diluted to 100 ml with acetic acid sodium acetate buffer solution with pH 5.4 (Test Solution). If necessary, the solution is centrifuged and the supernatant is used. Using acetic acid sodium acetate buffer solution with pH 5.4 as a reference solution, absorption A is measured at the maximum absorption near 535 nm with 1 cm path length. Color value is obtained using the following equation. $$\text{Color Value (E 10\%, 1cm)} = \frac{A \times 1{,}000}{\text{Weight of sample(g)}}$$ Acetic acid · sodium acetate buffer solution (pH 5.4) Solution 1 : 1,000 ml of solution containing 13.6 g of sodium acetate. Solution 2 : 1,000 ml of solution containing 6 ml of glacial acetic. Solution 1 and Solution 2 are mixed well (8:2) and its pH is adjusted to 5.4.

Permitted Use Level of Beet Red	Beet Red should not be used for the food items listed below. 1. Natural food [Natural food[meat, seafood (whale meat included), vegetables, fruits, marine algae, bean, and their simply processed food (peeled or cut)] 2. Tea 3. Hot pepper powder, red pepper powder or shredded red pepper 4. Kimchi 5. Fermented hot pepper soybean paste 6. Vinegar