

310 NO₂ NITRITE

0.05 -2 ppm \ 120 Tests

Synthesis of a magenta-red azo dye

- Fill 16mmØ tube with a fully extended syringe (3.2mℓ) of sample
- Add 3 drops of **NO₂-1** and mix
- Add 3 drops of **NO₂-2** and mix
- Set aside for 5'
- Switch on the Photometer 660
- Enter **310** and press **E** for 310 NO₂
- Set filter as indicated to 546nm and press **E**
- Insert tube with plain water and press **B**
- Insert tube with prepared sample and press **M**
- Record as Nitrite ppm (mg/ℓ) 1 ppm NO₂ ≡ 0.30 ppm NO₂-N

Nitrite is a metastable intermediate stage in the mineralization process of proteins to nitrate, and consequently a critical indicator for the recent contamination of water with domestic sewage or decomposing animal matter. At the same time it is an essential component in the most important of all reactions for synthesizing dyes. As described by *Griess* in 1864, the incorporation of nitrite permits certain weakly coloured or colourless aromatic amines to combine in an acid medium to highly coloured compound molecules. Their light absorption is due to the -N=N- resonance bridge created by nitrite, with an intensity proportional to the latter's concentration. The two-stage reaction depends on the formation of a diazonium salt of reagent NO₂-1 with nitrite and its consequent coupling with reagent NO₂-2 to give a magenta-red dye. Nitrite in water acts as a toxin as well as a pollution indicator. In the latter function it should not be detectable in water for consumption at all, as even the often cited limit of 0.1ppm can indicate a contaminated source. As a toxin its danger lies in the cause of cyanosis with infants, in which *Haemoglobin* is converted to *Nitrosohaemoglobin*, destroying the oxygen transport capacity of blood. The extent of this leading to infant deaths in former centuries due to subsurface linkages between cesspools and wells can only be guessed. The main source of adult intake is residual nitrite from cured meat products such as ham and salami which is often eliminated with added ascorbic acid. Pickling salt consists of sodium chloride with 0.5-0.6% sodium nitrite. This converts the *Myoglobin* in the meat to stable pink *Nitrosomyoglobin*, together with the synthesis of taste-enhancing substances related to those developed on roasting.

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