SUMMARY

Inorganic nitrite and organic nitrates have common properties to relax smooth muscles. Among the nitrates, glycerine trinitrate, isosorbide dinitrate, erythritol tetranitrate, pentaerythritol tetranitrate, mannitol hexanitrate and trolnitrate are widely used in therapy of cardiovascular diseases particularly Angina pectoris.

Various methods for the determination of nitrite are surveyed. The most commonly used procedure for the nitrite determination is based on diazotisation of an aromatic amine followed by coupling with a suitable coupling agent to form azo dye which is measured spectrophotometrically (Griess reaction).

In the present work, the Griess reaction is studied extensively. A variety of primary aromatic amines such as anthranilic acid, p-aminosalicylic acid, benzocaine, p-chloroaniline, o-nitroaniline, procaine, sulphanilic acid, m-aminophenol, sulfamethoxazole, metaclopropamidine, sulphanilamide and p-aminobenzoic acid were employed as nitrosable amines. Out of which procaine was found to be most suitable. 1-Naphthylamine, 2-naphthylamine, 1-naphthol, 2-naphthol and N-1-(naphthyl)ethylenediamine were used as coupling agent. Among these, N-1-(naphthyl)ethylenediamine was most satisfactory. Under the reaction conditions, Lambert-Beer's law is obeyed in the concentration range 0.1 to 0.75 mcg of nitrite per ml of reaction mixture.
Analysis of nitroesters requires prior hydrolysis. Effect of catalysts such as sodium hydroxide, potassium hydroxide, ammonium hydroxide, strontium hydroxide, calcium hydroxide, barium hydroxide, magnesium hydroxide, tetramethylammonium hydroxide and tetrabutylammonium hydroxide on hydrolysis was studied. Potassium hydroxide (0.1N) was found to be most satisfactory. Moreover, the effect of time, temperature and pressure on the rate of hydrolysis was investigated. The rate of hydrolysis was in following order: Nitroglycerine, isosorbide dinitrate, Pentaerythritol tetranitrate. Under the experimental conditions, each mole of nitroglycerine, isosorbide dinitrate and pentaerythritol tetranitrate yielded 2 moles, more than 1 mole and 1 mole of nitrite ion respectively.

Based on above observation, a spectrophotometric method for determination of nitroglycerine is worked. Nitroglycerine is hydrolyzed in presence of 0.1N potassium hydroxide solution. Procaine was diazotized with the liberated nitrite followed by coupling with N-1-(naphthyl)ethylenediamine. The absorbance was measured at 545 nm. The method is more sensitive than pharmacopeial method.

The method is applied successfully to analyze nitroglycerine and its dosage forms and in biological fluids.
The procedure is modified suitable for the analysis of isosorbide dinitrate, its dosage forms and in serum and urine.

The method suitably modified was applied to assay pentaerythritol tetranitrate and its dosage forms. The results compare favorably with those obtained by official method. Satisfactory recoveries of pentaerythritol tetranitrate was obtained in presence of serum and urine.