11524 P

Use of Sodium Hexametaphosphate as an Anticoagulant.

CLARENCE E. LARSON.

From the Chemistry Department, College of the Pacific.

Sodium hexametaphosphate has recently become established as an effective agent in reducing calcium ion concentration. Most of the research work on the compound has been done in the field of industrial chemistry where it has demonstrated its use as an outstanding water softener.

In this report we are concerned with the mechanism by which this compound reduces calcium ion concentration. The consensus seems to favor the formula $(NaPO_3)_6$ or $Na_6P_6O_{18}$. This compound can react with calcium ion to form $Na_2Ca_2P_6O_{18}$ thus leaving the calcium in the form of a complex since the compound ionizes into 2 sodium ions and the negatively charged $Ca_2P_6O_{18}$ ion. The dissociation of this complex ion to yield calcium ion is so slight that the addition of sodium hexametaphosphate depresses the calcium ion to such an extent that it will dissolve the most insoluble calcium salts such as the carbonate, the oxalate, and the phosphate. At present it is impossible to express mathematically the equilibrium constant for the dissociation of the complex ion but indications are that its effective value approaches 10^{-15}.

Comparatively little work has been done on the biochemical and physiological properties of the compound. This paper represents the first report of results of work in progress in our laboratories on the application of properties of sodium hexametaphosphate to the fields of biology and medicine.

The effect of this compound on the clotting of blood was tested by the following method. A stock solution of 20% sodium hexametaphosphate was made up. Varying quantities were added to calibrated tubes so that the final concentrations after blood was added ranged from 0.1 g per 100 cc to 2.0 g per 100 cc. Blood was allowed to flow directly from the sheep being used into the tubes. Each tube was rocked carefully to insure complete mixing. A control tube containing no reagent was treated in the same way. The control tube showed clotting in 5 minutes. All tubes containing sodium hexametaphosphate remained unclotted. Experiments were also performed on human blood with the same results. Concentrations of sodium hexametaphosphate less than 0.1 g per 100 cc slowed the process of clotting but did not prevent it entirely as was the case of the higher concentrations.

It is well known that the use of excess quantities of an anticoagulant such as sodium oxalate interferes with certain analytical procedures such as deproteinization. Folin-Wu filtrates were made on the samples but no interference with successful deproteinization was detected at any of the concentrations used.

These experiments indicate that sodium hexametaphosphate can be added to the list of blood anticoagulants, and may have certain advantages over existing agents.

11525 P

Barium in the Mammalian Retina.*

GORDON H. SCOTT AND BRUCE CANAGA, JR.

From the Department of Anatomy, Washington University School of Medicine, St. Louis.

Ramage and Sheldon[1] discovered the existence of Ba in the chorioid of ox eyes. They believed that Ba increased in quantity with age and report that it is not present in calves' eyes in sufficient quantity to be detected by their method of flame excitation of the spectrum. Furthermore they say that Ba is not present in the chorioids of human, sheep, pigs, horses, dogs and many sea fish. Ramage and Sheldon failed to find this element in the retina although they could detect it in the iris and the pigment of the chorioid. It is of some significance that they found Ba in the chorioids of all neat cattle beyond 3 years in age. Gerlach and Müller[2] examined eyes from a wide variety of animals including man and discovered Ba in the chorioid of most of them. It was not present uniformly in human chorioids and there appear to be no age peculiarities in its distribution. These writers also describe Ba in the retinæ of ostrichs, rabbits, cats, cattle and in one human.

The material in the present series consisted of 19 pigs, 17 ox, 24 sheep and 12 kitten eyes. The spectrographic method used was that described by us in an earlier paper (Scott and Canaga[3]). We used as identifying lines the 4535.5 and 4934.1 Å. These lines are quite sensitive and can be definitely located with little trouble. An

* Aided by a grant from the Josiah Macy, Jr., Foundation.

1 Ramage and Sheldon, *Nature*, 1931, **128**, 376.

2 Gerlach and Müller, *Arch. f. path. Anat. u. Physiol.*, 1936, **296**, 588.

3 Scott and Canaga, PROC. SOC. EXP. BIOL. AND MED., 1939, **40**, 275.