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## Abstract Papers

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# Physical Science

## THE DETERMINATION OF SPREADING COEFFICIENTS OF SURFACE ACTIVE SOLUTIONS BY MEASUREMENT OF DROP HEIGHT AND DENSITY

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### ABSTRACT

A slide is uniformly coated on one side with a hydrophobic substance, such as paraffin. A drop of the solution to be measured is placed on the prepared slide. The height of the drop is measured with a binocular microscope. The spreading coefficient,  $S$  is given by  $S = \frac{gDh^2}{2}$ , where  $g =$  gravitational constant  $D =$  density of solution, and  $h =$  height of drop.

## HEAT DAMAGE TO THE PROTEIN VALUE OF FOODS AND FEEDS

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### ABSTRACT

Little, if any, damage to the protein value of foods can be expected as a result of home cooking or commercial processing. Where such damage does occur, it has been shown that the amino acid lysine has been made unavailable for growth. Evidence has been presented to show that protein which has undergone a reaction with carbohydrate under the influence of heat is resistant to the action of trypsin in so far as the release of lysine is concerned. A lysine deficiency in humans, however, is not likely since other proteins consumed in the average diet can exert a supplementary effect.

Although a certain amount of heat treatment may be necessary to enhance the nutritive value of certain proteins used in animal feeds, such as soybean protein, excessive heat may result in an inactivation of lysine. In the case of animal feeds, however, a certain element of risk is involved because these proteins generally constitute the main source of protein. In such instances there exists a real possibility of an amino acid deficiency resulting in poor utilization of the feed.

## NUCLEIC ACID METABOLISM IN PROLIFERATING TISSUES

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### ABSTRACT

In resting tissues the desoxyribonucleic acid (DNA) is one of the few components that appears to be metabolically inert. While all other phosphorous containing compounds in such tissues incorporate administered  $P^{32}$  the DNA does not. In tissues showing active mitosis, however, the DNA does incorporate  $P^{32}$  and the amount incorporated appears to correlate with the mitotic rate of the tissue. This has been interpreted to mean that the new DNA formed becomes labelled but that the pre-existing DNA of the mother cell is passed on unchanged to the daughter cells.

A kinetic study designed to measure the rate of  $P^{32}$  incorporated into DNA in a rapidly proliferating tumor tissue has led to the conclusion that this rate is approximately twice the rate at which new DNA is being formed. This is tentatively interpreted to mean that at, or about, that point in the cell's life when it synthesizes an equivalent amount of new DNA preparatory to cell division the pre-existing DNA does become metabolically active and does incorporate  $P^{32}$  from its environment.

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## ELECTROPHORIC INVESTIGATION OF HUMAN SERUM PROTEIN: MEDICAL ASPECTS

MATTHEW A. KIESS

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### ABSTRACT

Electrophoric separations of serum proteins of healthy individuals and patients suffering from various diseases were made on paper at pH 8.8, using the technique of Tiselius and Kunkel (J. Gen. Physiol. 1, 89 (1951)) Chemical determination of total serum protein, albumin, and globulins involving precipitation by sodium sulfate served as a control in evaluating the percentages of protein components found by filter paper electrophoresis. Consistent results by this method were obtained only when the barbital buffer solution, current, paper quality and size, staining and washing of the protein-stained paper were carefully controlled.

The dye solution method (brom phenol blue) was used to determine the distribution of globulins and albumin in blood serum. By the use of a suitable factor to compensate for the unequal absorption of the dye by globulins and albumin, results were obtained similar to those recorded by the moving boundary method.

Results by the present method were given and compared with those obtained by sodium sulfate precipitation or by electrophoric separation of serum proteins of blood obtained by venipuncture.

## ELECTROPHORIC INVESTIGATION OF HUMAN SERUM PROTEIN: MEDICAL ASPECTS

ROBERT P. KOENIG

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ABSTRACT

A brief historical introduction was given of the background development of electrophoresis, beginning with the fundamental concept introduced by Tswett and leading to the present status of electrophoresis.

Remarks were made on the present medical application of electrophoresis, especially in the detection and study of abnormal human serum proteins.

Discussion of the present studies using this technique in a series of random cases in the general physician's office and some advantages of its more widespread use was given.

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## PROTECTION PROBLEMS IN THE MEDICAL USE OF RADIOISOTOPES

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ABSTRACT

The widespread use of radioactive isotopes in hospitals and clinics throughout the country has necessitated educating a large group of people with limited backgrounds in physics in the techniques of safe-handling of radioactive materials. Methods of dealing with specific problems which have arisen were discussed.

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## A METHOD FOR MEASURING VELOCITY OF FLUIDS WITH ULTRASOUND

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ABSTRACT

An ultrasonic wave is transmitted through the fluid in both directions in rapid succession. The difference in propagation time is a function of the velocity of the fluid. The circuitry for the ultrasonic flowmeter was described.