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TEST REAGENT COMPOSITION

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1

The present invention relates to new and improved diagnostic compositions useful for the qualitative detection and quantitative estimation of ketone bodies in body fluids, particularly acetone bodies in the urine.

More specifically, the invention relates to diagnostic compositions in dry form, preferably tableted into suitable sized tablets, which compositions can readily be used even by unskilled persons rapidly to detect the presence of acetone in urine without evolution of ammonia, and without the use of equipment or apparatus other than some means for obtaining a drop of test fluid.

In the metabolism of fat, acetone bodies or ketone bodies are regarded as normal intermediate compounds which are subsequently oxidized to carbon dioxide and water. The ketone bodies include acetone, acetoacetic acid (beta-ketobutyric acid or diacetic acid) and beta-hydroxy-butyric acid. Under normal circumstances no significant quantity of these ketone substances appears in the urine. However, if there is an excessive metabolism of fat, the intermediate acetone bodies accumulate in the blood and are excreted in the urine in variable amounts. In diabetes mellitus, such an excessive fat metabolism occurs and many of the symptoms of the disease can be ascribed to the toxic effects of the acetone bodies. The medical practitioner is well aware of the usefulness of tests for acetone bodies in the urine in diabetes mellitus. Acetone bodies also occur in the urine in other well recognized disturbances of metabolism, and in such cases also it is important to carry out tests for these substances.

In the past a variety of reagents and techniques have been used for the demonstration of acetone bodies in urine. A number of such reagents and techniques have involved the use of a soluble nitroprusside as a reactive ingredient or agent. In one modification the nitroprusside reaction is carried out in the presence of ammonia in order to develop particular colorations. (See Patent No. 2,186,902 to Fortune.) Careful study of available reagents and techniques for detecting acetone indicates that they all are subject to one or more of the following drawbacks or disadvantages:

- 1. A plurality of reagents are required for most tests.
- 2. Most tests require the skill of a trained technician.
- 3. Reagents employed for most tests are unstable, poisonous and inconvenient to use.

2

4. Tests according to most techniques can only satisfactorily be performed in a laboratory.

5. Powder or dry reagent preparations which contain an ammonia yielding ingredient are inherently unstable and liberate ammonia and change color even when stored in air-tight containers.

6. Most dry preparations evolve noxious ammonia during the performance of the tests.

7. Most dry reagent preparations give a test with negative urines which may be confused with a positive even by a skilled operator.

The object of the present invention, generally stated, is the provision of diagnostic compositions in stable dry form, preferably tablets, which can be used even by an unskilled person conveniently and readily to give an accurate qualitative test for, and a quantitative estimation of, the presence of acetone bodies in urine, which test clearly distinguishes between positive and negative specimens.

An important object of the invention is the provision of a dry diagnostic composition for the detection of acetone bodies in urine which does not evolve ammonia either in the dry state or in the wet state. Certain other objects of the invention will, in part, be obvious and will in part appear hereinafter.

For a more complete understanding of the nature and scope of the invention, reference may now be had to the following detailed description thereof setting forth, by way of illustration, certain specific formulations which constitute the presently preferred embodiments of the invention.

According to the present invention it has been found that a soluble nitroprusside in the presence of an aliphatic amino acid under alkaline conditions, provides a diagnostic composition which is particularly adapted for the detection of acetone in urine. This diagnostic or reagent composition may be formulated in dry form, most suitably as tablets.

When acetone positive specimens are tested with this diagnostic composition, a very marked and definite purple reaction or coloration is produced. This coloration is highly characteristic and specific to acetone positive specimens.

An important property of the diagnostic compositions is the fact that acetone negative specimens give results which are substantially the same as those produced with distilled water. Thus, when one of the compositions of the invention is moistened with distilled water it assumes a pale yellow or brown color within a