

with nitro paraffins. Further investigations on the formation of these carbonyl compounds are in progress.

The analyses reported were carried out by A. A. Sirotenko of this Department. The nitro paraffins used in this study were obtained through the courtesy of the Commercial Solvents Corporation.

COMMUNICATION NO. 198 FROM THE
DEPARTMENT OF ORGANIC CHEMISTRY
AND ENZYMOLOGY
FORDHAM UNIVERSITY
NEW YORK 58, N. Y.

R. T. GILSDORF
F. F. NORD

RECEIVED JULY 27, 1950

**THE PREPARATION OF RADIOACTIVE
PROGESTERONE AND DESOXYCORTICOSTERONE
LABELED IN RING A¹**

Sir:

The usefulness of tagged progesterone (I) and DOCA (II) in the study of the metabolism of these hormones and of the etiology of certain diseases of mal-adaptation prompted their preparation from 3-keto- Δ^4 -etiocholenic acid methyl ester (III). Side chain labeled I has previously been reported.² Fission³ of III with ozone yields (55%) the corresponding open ring A keto-acid, *i. e.* 3,5-seco-5-oxo-17-carbomethoxy-etiocholan-3-oic acid (IV), which, as its methyl ester V, adds, under the usual Reformatsky conditions, the elements of methyl bromoacetate (VI). Simultaneously the intermediate products undergo dehydration and cyclization back to III. Respectively, with carboxyl and methylene labeled VI, the products are III-3-C¹⁴ and III-4-C¹⁴. Both series of reactions have been conducted; that with the more readily available VI-1-C¹⁴ is reported herewith. From III-3-C¹⁴, 21-diazoprogestosterone-3-C¹⁴ (VII) was obtained in the usual manner,^{4,5} and converted, as described, to both I-3-C¹⁴ and II-3-C¹⁴ with a specific activity of approximately 250,000 counts per milligram per minute. All counts were determined in the windowless flow counter operating at 40-50% efficiency, and are expressed below as disintegrations registered per minute per millimole.

V (formed with diazomethane from 3.17 g. of IV) was subjected to the Reformatsky reaction with 2 molar proportions of VI-1-C¹⁴ (2.8 g., containing approximately 3 millicuries of C¹⁴).⁶ The ether soluble neutral reaction products were refluxed (5 hours) in 20% concentrated hydrochloric acid in acetic acid, and then absorbed on

alumina (90 g.). Fractional elution gave 300 mg. of III-3-C¹⁴, melting at 130-132° (no depression on admixture with III) and counting 1.5×10^8 . To the mother liquors of the above, 300 mg. of carrier III was added, and the mixture was recrystallized to yield a further 300 mg. of III-3-C¹⁴ counting at 7.3×10^6 . The two were combined and saponified (4 hours reflux in 6% methanolic KOH) to the free etio acid (400 mg.). Its acid chloride, formed through the action of oxalyl chloride on the sodium salt,⁵ was subjected to the usual Arndt-Eistert reaction^{4,5} with diazomethane to give 240 mg. of 21-diazoprogestosterone-3-C¹⁴ (VII), m. p. and mixture m. p. 163-170°.

Desoxycorticosterone-3-C¹⁴ 21-acetate (65 mg.) was obtained from VII (125 mg.) on hydrolysis with acetic acid.^{4,5} The final product, separated and purified by sublimation, had m. p. and mixture m. p. 151-153°, count 8.4×10^7 .

Progesterone-3-C¹⁴ was derived from VII through the general reaction between a diazoketone and HI described by Wolfrom and Brown.⁷ VII (100 mg.), in chloroform, was shaken with concentrated hydriodic acid (liberation of iodine). Evaporation and crystallization yielded 70 mg. of I-3-C¹⁴, m. p. and mixture m. p. 122-125°, count, 8.4×10^7 .

Full experimental details will be reported later.

(7) Wolfrom and Brown, *THIS JOURNAL*, **65**, 1516 (1943).

DEPARTMENT OF BIOCHEMISTRY
MCGILL UNIVERSITY
MONTREAL, CANADA

R. D. H. HEARD
P. ZIEGLER

RECEIVED JULY 17, 1950

**THE CHEMICAL NATURE OF A UNIQUE
FATTY ACID**

Sir:

In connection with studies on the relation between biotin and fatty acids¹ we investigated the chemical nature of the fatty acids of *Lactobacillus arabinosus*. Distillation of the methyl esters, derived from the saponifiable fraction from 1.3 kg. of this organism, yielded, in addition to other materials, a fraction boiling at 187-188° at 3 mm. Saponification of this fraction gave an optically inactive, "branched chain" fatty acid (I), melting at 28-30°, of the composition C₁₉H₃₆O₂ (*Anal.* Calcd.: C, 76.96; H, 12.24; neut. eq., 296; C-methyl, 2. Found: C, 76.83; H, 12.54; N.E., 300; C-methyl, 1.3). The fatty acid exhibited an X-ray diffraction pattern indicating a chain length in the range of a C₁₈ acid. The pattern was clearly distinguishable from those of known C₁₈ fatty acids.² The compound failed to react with potassium permanganate in acetone and remained unchanged upon exposure to monoperphthalic acid. However, one mole of hydrogen was absorbed on catalytic hydrogenation

(1) Hofmann and Axelrod, *Arch. Biochem.*, **14**, 482 (1947).

(2) We are indebted to Dr. E. S. Lutton, The Procter & Gamble Company, for the X-ray work.

(1) Aided by grants from the National Cancer Institute, U. S. Public Health Service, the Medical Research Division of the National Research Council (Ottawa), and Charles E. Frosst & Co., Montreal.

(2) Riegel and Prout, *J. Org. Chem.*, **13**, 933 (1948); MacPhail and Scholz, *J. Biol. Chem.*, **178**, 37 (1949).

(3) Reichstein and Fuchs, *Helv. chim. acta*, **23**, 676 (1940).

(4) Steiger and Reichstein, *ibid.*, **30**, 1184 (1937).

(5) Wilds and Shunk, *THIS JOURNAL*, **70**, 2427 (1948).

(6) Kindly prepared by Mr. B. Belleau.