

efficiency. The further slight inhibition of growth with increased proportions of raw soybean meal is probably an effect of an entirely different nature and may be a manifestation of generally decreased availability of the nutrients in the raw meal.

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Distribution of Vitamin B₁₂ in the Organs and Tissues of the Chick.* (19351)

H. YACOWITZ,[†] C. H. HILL,[‡] L. C. NORRIS, AND G. F. HEUSER.

From the Agricultural Experiment Station and the School of Nutrition, Cornell University, Ithaca, N. Y.

The vit. B₁₂ content of various organs and tissues of the rat was first reported by Lewis, Register, and Elvehjem(1). These investigators used a rat growth assay to determine vit. B₁₂ content. Several laboratories have published microbiological data on the vit. B₁₂ content of some of the organs of the chick (2-4). Only a few organs were tested and no attempt was made to correct for desoxyribosides which interfere in the microbiological assay.

The purpose of this report is to present the results of studies of the vit. B₁₂ content of the tissues and organs of the chick using a microbiological assay procedure. Corrections were made for desoxyribosides present in the samples. The rat method was not used because its low sensitivity makes it unsuitable for assaying those tissues which contain small quantities of vit. B₁₂.

Experimental. Thirty day-old Single Comb White Leghorn cockerels, obtained from a commercial hatchery, were used in the experi-

ment. The chicks were housed in electrically heated battery brooders with wire-mesh floors. Food and water were supplied *ad libitum*. An alpha-protein-cerelose diet adequate in minerals and all known vitamins was used(5). The diet was supplemented with 50 µg of vit. B₁₂ (Cobione) per 100 g. After 30 days on this regime the chicks were sacrificed and the carcasses frozen. The carcasses were removed from the freezer in groups of 5 and the various organs and tissues removed and weighed. The samples were pooled, homogenized in a Waring Blendor and then autoclaved for 30 minutes in acetate buffer at pH 4.5. After autoclaving, the samples were cooled, adjusted to a convenient volume, filtered and the filtrates assayed. This method of treatment was found to yield consistent results and no further increase in vit. B₁₂ values was obtained by enzymatic digestion with pepsin, trypsin, or pancreatin. The assay medium of Peeler *et al.*(6) was employed using *Lactobacillus leichmannii* ATCC 4797. Duplicate assays were conducted on each sample. The alkali treatment used to correct for desoxyribosides was that of Hoffmann *et al.*(7).

Results and discussion. The vit. B₁₂ content of the tissues and organs is presented in Table I. The desoxyriboside correction was negligible in most samples. The high level of dietary vit. B₁₂ resulted in a very wide ratio between the vit. B₁₂ and desoxyriboside content of the organs, thus the interference of

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[†] Present address: Department of Poultry Husbandry, Ohio State Univ., Columbus, Ohio.

[‡] Present address: Department of Agricultural Chemistry, Univ. of Nebraska, Lincoln, Nebr.

TABLE I. Distribution of Vit. B₁₂ in the Chick.

Sample	Vit. B ₁₂ content of moist sample, mμg/g	Range, mμg/g
Kidney	1107 (3) *	1060-1145
Liver	444 (3)	402- 480
Pancreas	425 (3)	334- 479
Proventriculus	281 (4)	231- 332
Testicle	244 (3)	235- 257
Heart	201 (4)	188- 229
Adrenal	178 (6)	137- 242
Spleen	155 (3)	128- 191
Gall bladder	138 (3)	94- 172
Thyroid	115 (3)	101- 134
Thymus	109 (3)	98- 115
Small intestine	82 (5)	69- 100
Lung	60 (6)	43- 75
Brain	56 (4)	42- 77
Gizzard	45 (6)	33- 67
Leg muscle	36 (6)	30- 40
Breast muscle	29 (3)	24- 34
Eyeball	8 (5)	7- 8.4

* Figures in parentheses represent number of groups assayed.

Organs and tissues of 5 chicks were pooled in each group.

desoxyribosides in the microbiological assay was minimized. Kidney was found to contain the highest concentration of vit. B₁₂. Liver and pancreas are next in potency, followed by the proventriculus and testicles. Muscle tissue, except for the heart, is relatively low in vit. B₁₂. The eyeball contains the lowest concentration.

Because of the high level of dietary vit. B₁₂ used in this experiment, the vit. B₁₂ content of the tissues and organs is probably higher than the levels found in chicks receiving normal amounts of this vitamin. This is evident from the report by Couch and Olcese (4). These investigators employed a corn-soybean meal diet supplemented with 2 μg of vit. B₁₂ per 100 g. They obtained the following vit. B₁₂ values per g: liver, 186 mμg;

kidney, 83 mμg; pancreas, 73 mμg; and spleen, 124 mμg. The values reported in this paper are all higher than those obtained by Couch *et al.* This indicates that certain organs, particularly the kidney, liver, and pancreas, have the ability to store appreciable quantities of vit. B₁₂. The relative order of potency of the various organs and tissues of the chick observed in the work reported in this paper agrees fairly well with the results obtained by Lewis *et al.*(1) in the rat.

Summary. Microbiological data have been presented on the distribution of vit. B₁₂ in the tissues and organs of chicks fed a purified diet containing a high level of vit. B₁₂. Kidney was found to contain the most vit. B₁₂ while liver and pancreas contain lesser quantities. Muscle, except for the heart, is low in vit. B₁₂ under these conditions. A comparison of these results with other published data indicates that certain organs, particularly the kidney, liver and pancreas, have the ability to store appreciable quantities of vit. B₁₂.

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