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Effect of Drying in Air on the Goiter-Producing Substance in Cabbage.

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It has been shown that fresh cabbage, steamed cabbage and cabbage from which 60% of its weight has been removed as press juice produce thyroid hyperplasia in rabbits when fed as their principal food.¹

It has also been shown that steamed hashed cabbage that has been kept exposed to air in a moist state for 4 to 5 days fully retains its goiter-producing quality. The goitrogenic substance was therefore heat stable and at least not readily lost when exposed to air in the moist state. As a further step in determining the nature of the goitrogenic substance in cabbage we have studied the effect of drying. No facilities were available for drying cabbage *in vacuo* in the amounts needed. Experiments were made with tested goitrogenic cabbage dried in 2 ways as follows:

1. Imported Holland winter cabbage was steamed for 30 minutes. The juice was pressed out under 450 lb. pressure and the pressed cake was then fed into an atmospheric double drum drier. Steam was introduced into the drums under 75 lb. pressure. The cabbage was in contact with the drums about 30 seconds and was automatically scraped off as nearly dry flakes. This material was at once transferred to covered containers in contact with solid CO₂ and kept over night, when it was stored in flasks and evacuated.

2. Northern New York winter cabbage (batch 21) was steamed for 35 minutes and 50% of its weight was removed as press juice. The leaves were then separated and put in trays in a current of air at room temperature. Drying was completed in about 36 hours and the product represented from 7 to 9% of the original whole steamed cabbage.

Both of these dry preparations were moistened with water before feeding and given to rabbits in proportion to body weight. The rabbits ate it readily, gained weight and maintained a sleek healthy

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¹ Marine, D., Baumann, E. J., and Cipra, A., *PROC. SOC. EXP. BIOL. AND MED.*, 1929, xxvi, 822.

appearance. Control rabbits were fed with steamed pressed cabbage cake from the same lot of cabbage without drying.

The principal data are given in Table I.

TABLE I.

Sex	Weight at Beginning	Preparation Number	Amount Fed per day gm.	No. days Fed	Weight at End	Condition of Thyroid
M	1200	1	41*	26	1365	Normal
F	1128	1	38*	26	1227	Normal
M	2260	2	53*	21	2206	Normal
F	2300	2	53*	21	2351	Normal
F	1845	Control	214*	18	1703	Moderate hyperplasia
F	2290	Control	266* Pressed cake	18	2175	Moderate hyperplasia

* Supplementary diet of 17 gm. oats and 20 gm. alfalfa hay twice weekly.

These experiments indicate that cabbage loses its goitrogenic quality when dried by the methods indicated.

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Effect of Acid and Alkaline Hydrolysis on the Goitrogenic Substance Contained in Cabbage.

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Further studies have been carried out in an effort to determine the nature of the goiter-producing substance contained in cabbage and other vegetables.^{1, 2}

It was first considered advisable to attempt to find out whether or not this goiter-producing factor was soluble in water. Cabbage was steamed for 30 minutes, hashed and pressed until 50% of the total weight had been removed. The residue thus obtained had previously been shown² to contain a considerable proportion of the goiter-producing substance. Samples of this residue were washed with one and two volumes of water respectively, at room temperature and the water removed by pressing. As shown in the accom-

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¹ Webster, Bruce, and Chesney, A. M., *Am. J. Path.*, 1930, vi, 275.

² Marine, D., Baumann, E. J., and Cipra, Anna, *Proc. Soc. Exp. Biol. and Med.*, 1929, xxvi, 822.