SOME MORE OBSERVATIONS ON INFLUENCE OF COOKING ON THE NUTRITIONAL VALUES OF FOODS. COBALT CONTENT OF SOME COOKED FOODS.

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(Received March 15, 1958)

Results of estimation of some of the vitamin content of cooked foods have been previously reported from this laboratory (Pai, 1957 (a), (b) and 1958 (a). The results of the mineral content of cooked foods were reported in a previons communication(Pai 1958 (b)). In this paper are presented the results of further analysis of cobalt content of twenty-six different items of cooked foods.

MATERIALS AND METHODS

The details of the procedure of the preparation of the items of foods analysed are reported elsewhere (Pai, loc. cit).

Cobalt—The ash obtained by the method already described (Pai, 1958 (a)) was further treated for analysis of the cobalt content by a slight modification of the method originally described by Pohl and Demmel (1954); Chilton (1954) and Saltzman (1955). Nitroso-R-salt was used as the colorimetric reagent to form a stable red compound between cobalt and nitroso-R-salt (nitroso derivative of 2-3-6 β-naphtrol disulphonate). The interference due to copper and iron was removed. The final readings were taken with the help of the photoelectric colorimeter, by using the green filter to measure the extinction at ± 520. The standard calibration curve was prepared by taking known amounts of cobalt and this curve was used for interpretation of the readings obtained for the unknown. The results of cobalt content are calculated on dry weight basis in order to have a comparable data for each of the items studied in their precooked and cooked forms respectively. Results are shown in the table.

RESULTS AND DISCUSSION

The importance of cobalt as essential element in the nutrition of sheep and cattle has been recognized since long. The so-called "coast disease", "bush sickness" or enzootic marasmus of sheep occurring in parts of Australia and New Zealand had been traced to the deficiency of this element and was

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successfully controlled by supplying cobalt in a suitable form to the feed or soil. In certain parts of the United States conditions were encountered which made it necessary to supply cobalt for the adequate nutrition of cattle. Very recently the role of cobalt as one of the constituents of vitamin B_{12} has been recognised and therefore its great importance in nutrition needs consideration. Very little work has been done on the survey of cobalt content of Indian foods.

Bashir Ahmed and McCollum (1939) presented the results of a distribution of cobalt in some eighteen different varieties of common foods collected

TABLE I

Showing the cobalt content in cooked foods on dry wt. basis.

Serial No	Name of the preparation	Moisture content in gms. %	Cobalt content in mcg. %
1.	Hospital diet-rice (cooked) ..	72.49	15.00
2.	Hospital diet 'chapati' made of wheat flour ..	20.75	20.00
3.	Rice raw milled ..	7.00	42.12
4.	Raw 'Kodri' (paspalum scrobiculatum) ..	5.2	68.73
5.	Green gram 'mug' without husk ..	8.4	49.74
6.	'Tuver' red gram 'dahl' without husk ..	11.0	66.81
7.	Radish white (roots & leaves taken together) .. (raw) ..	85.28	303.00
8.	do. (pre-cooked) ..	85.27	284.70
9.	do. (cooked with direct heat) ..	76.30	85.23
10.	do. (steam cooked) ..	86.40	324.60
11.	do. (cooked with pressure) ..	85.06	212.80
12.	Peas dried with outer husk (raw) ..	10.54	320.30
13.	do. (precooked) ..	42.08	384.70
14.	do. (cooked with direct heat) ..	48.23	114.00
15.	do. (steam cooked) ..	50.71	187.60
16.	do. (cooked with pressure) ..	53.36	165.90
17.	Bengal gram dried with outer husk (raw) ..	7.60	139.00
18.	do. (precooked) ..	43.42	114.40
19.	do. (cooked with direct heat) ..	36.42	30.21
20.	do. (steam cooked) ..	39.18	114.20
21.	do. (cooked with pressure) ..	45.27	74.40
22.	Bengal gram tender (raw) ..	44.84	93.20
23.	do. (precooked) ..	52.34	114.80
24.	do. (cooked with direct heat) ..	49.37	103.60
25.	do. (steam cooked) ..	57.12	142.10
26.	do. (cooked with pressure) ..	53.42	111.90

from various parts of the United States. The authors analysed beans of different varieties, peas, corn and wheat. These food grains were from the crop raised on or in the neighbourhood of the farms. Besides these, pancreas from animals raised on farms and samples of milk powder were also studied.

In the present series, food samples both in the raw or precooked forms and in the form which is cooked in various ways, are analysed. The range for the cobalt content, in twenty-six preparations studied, was from 15.00 mcg. to 384.70 mcg. per 100 gm. of the food on dry weight basis. From the table it may be seen that more cobalt content is found to occur in the fresh vegetables e. g. radish, peas and grams of either dried or tender varieties, as compared to other items studied. This finding is in agreement with that of Bashir Ahmed *et al* (loc. cit), who also had similarly found that the leguminous seeds, namely beans and peas are richer in cobalt than the cereal grains, corn and wheat. In the case of the former, they had obtained a range of 0.014 to 0.047 mg. of cobalt per 100 gm. of dry material, whereas in the latter, the range was from 0.006 to 0.015 mg. The values in the present series are, however, higher than the above mentioned figures. Such variations in case of the raw articles are possible because of the variations in the factors such as season, soil conditions, length of storage and maturity, etc., which play vital role in determining the nutritional value of various foods. In case of the cooked articles of foods, other factors besides those mentioned above such as the nature of the material of the utensils used in cooking, addition of table-salt in variable quantity to the food preparation to taste, leaching effect of cooking water, etc., will also be influencing the nutritional value of cooked foods. A wide variation is therefore seen in the values of the cobalt in the various items of foods studied, because of the above factors.

SUMMARY AND CONCLUSIONS

(1) Results of analysis of twenty - six items of articles of food for their cobalt content in their precooked and cooked stages are presented.

(2) A very wide range of cobalt content in the various items of food studied was found. The range varied from 15.00 mcg. to 384.70 mcg. per 100 gms. of dry material.

(3) Fresh vegetables such as radish and leguminous seeds, such as peas, grams of either dried or tender varieties are found to be richer in cobalt content than the cereal grains such as rice, wheat, etc.

(4) The findings have been compared with those of other workers and their significance has been discussed.

ACKNOWLEDGEMENT

Thanks are due to the Indian Council of Medical Research for their financial aid, to the Principal, Medical College, Baroda, for permission to work and the Professor of Physiology for his keen interest.

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