Berechnet f. $(\text{CH}_3\text{S})_2\text{Hg}$	8.15	2.05	68.05
$(\text{C}_2\text{H}_5\text{S})_2\text{Hg}$	14.88	3.12	62.14
$(\text{C}_3\text{H}_7\text{S})_2\text{Hg}$	20.53	4.02	57.17

Also stimmt die Analysenzahl mit der des Quecksilbermethylmercaptans überein.

Das Vorkommen von Methylmercaptan in frischer Raphanuswurzel ist hiermit sicher festgestellt. Ob ein Teil desselben während der Destillation aus labiler Muttersubstanz gebildet wird, bleibt noch zu entscheiden. Es ist aber kaum zu bezweifeln, dass ein grosser Teil desselben in freiem zustande vorkommt. Aus 40 Kilo frischer Wurzeln wurden 3g. Rohquecksilberverbindungen und hieraus 1g. reines Quecksilbermethylmercaptan isoliert. Auf freies Mercaptan berechnet, entspräche es 0.32g.

*On the Buck Wheat Protein (*Fagopyrum esculentum* Moench.) and its Nutritive Value.*

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The three different samples of carefully prepared Japanese buck wheat flour were analyzed into their general constituents as follows:

	Sample no. I	II	III
H ₂ O	11.965%	12.432%	12.645%
Drymatter	88.035	87.568	87.355
Drymatter%			
Cr. protein (N×6.25)	13.606	13.337	14.250
Protein (")	10.250	10.019	9.381
Cr. fat	2.964	2.889	2.986
Cr. ash	2.276	2.278	2.623
N free extract	80.161	80.515	78.934
Cr. fibre	1.003	0.981	1.207
Total N	2.177	2.134	2.280
Alb. N	1.640	1.603	1.549
Non alb. N	0.537	0.531	0.731

In showing the characters of the buck wheat nitrogenous substances on the basis of solubility under different conditions, there are two processes; one is a fractional extraction method of protein and the another an individual extraction method.

The procedure of the former is as follows:—20g. of the flour is extracted in 500c.c. aqueous solution under agitation for 6 hours at room temperature and after being filtered, 300c.c. of water is added again to the residual, repeating agitation and filtration, then all filtrates are made up to 1 L. and estimated nitrogen content by Kjeldahl's method; 10% saline solution is secondarily added to the previous residue and treated in the same manner as stated above, at last time 0.2% NaOH solution is pursued in the same way, nitrogens estimated in each portion are as follows:

	Sample no. I	III
Water soluble N	30.75%	40.63%
10% NaCl soluble N... ..	5.35	4.61
0.2% NaOH soluble N	45.40	40.27
N remained in residue	18.50	14.48
Total N	100.00	100.00

The procedure of the latter consists in extracting samples with aqueous solution, 10% saline solution, 0.2% alkaline solution and 70% alcohol solution separately. Especially in the case of alcohol extraction, temperature is constantly kept at 60–70°C, filtration and estimation is carried out principally following the former process. The results of nitrogen determination is given as follows:

	Sample no. I	II	III
Water soluble N... ..	28.72%	21.27%	39.63%
10% NaCl soluble N	48.07	38.99	43.39
0.2% NaOH soluble N	81.89	78.81	61.53
70% alcohol soluble N	5.01	2.52	2.72
Total N	100.00	100.00	100.00

Above data show that alkaline solution could extract a main bulk of nitrogen from the flour but alcohol solution only a small quantity.

Properties of the extractions:

Solutions extracted by those solvents except alcohol give all protein colour reactions and have more or less viscous character, particularly being conspicuous in the case of alkaline solution which could not be easily filtered out in the clear state.

From the water extraction the coagulable protein is separated by heating at 60–70°C and adding dilute acetic acid and the protein thus obtained yielded as follows:

	Sample no. I
Airdrymatter obtained from original flour 100g.	3.35g.
N yielded for total N of flour	18.50% as drymatter
N content in this protein	13.95% " "

From the extraction of saline solution, globuline is separated by ordinary method of saturating with ammonium sulphate and is shown as follows:

Sample no. I	
Airdrymatter obtained from flour 100g.	1.85g.
N yielded for total N of flour	13.50% (drymatter)
N content in globuline... ..	15.50% (")

The aqueous alkali soluble protein is treated out of extraction obtained by afore mentioned procedure as follows:— from extracted solution, protein substance is precipitated by adding acetic acid drop by drop as far as solution becomes faintly acid. This precipitate is filtered and redissolved in alkaline solution, and after repeating precipitation and filtration the precipitate is washed by water, alcohol and ether, and dried. This crude protein is a dark brown substance and may be considered to contain glutelin chiefly and is to be albumin and globulin partly; but due to the difficulties of purification of individual simple protein, it is not easy to decide how much the latter two would or would not be actually involved in this substance.

Cotents of water, ash and nitrogen and yield of this substance are as follows:

	Sample no. I	II	III
H ₂ O	10.72%	4.98%	11.50%
N (drymatter)	14.874	15.820	13.481
Ash (")	0.74	0.84	1.08
P ₂ O ₅ (")	0.36	—	—
Tryptophane (separated)	0.4	—	—
Airdrymatter obtained from flour 100g.	8.57g.	9.79g.	8.19g.
N yielded for total N of flour... ..	60%	70%	49%(drymatter)

Nitrogen distribution of several groups of aminoacids is determined from this substance by Van Slyke's method as follows:

	Sample no. I		II	
	drymatter(%)	total N(%)	drymatter(%)	total N(%)
Total N... ..	14.892	100.00	15.820	100.00
20% HCl sol. N	14.352	93.37	14.958	94.55
" " insol. N	0.526	3.53	0.843	5.33
Fumin N	0.151	1.01	0.187	1.18
Amide N	1.679	11.28	1.167	7.38
Phosphotungstates N	4.586	30.80	4.654	29.42
Arginine N	2.247	15.09	2.228	14.08
Lysine N	0.732	4.92	0.830	5.26
Histidine N	1.416	9.51	1.371	8.67

Cystine N	0.191	1.12	0.225	1.42
Amino N	1.957	13.14	2.070	13.09
Nonamino N	2.629	17.66	2.584	16.33
Monoamino N	7.936	53.29	8.950	56.58

Investigation of nutritive value of protein.

For experiments aqueous alkali soluble protein is served as protein source, on account of its comparatively large yield, and casein is used as contrast.

Animals—Albino rat. 4 (♂) and 4 (♀).

Rations—Ratio of food mixtures as follows :

	Ration no. 1	2	3	4
Protein... ..	20%	15%	10%	(no. 3) + (buck wheat flour)
Butter	14	14	14	
Starch	58	65	70	
Nelson's saltmixture.	6	4	4	
Agar	2	2	2	

N. B. Vitamin A, B and C are supplied from butter, oryzanin and cabbage with this ration.

Periods—From March 20 to Dec. 14, 1924 (239 days totally).

Summary :—

1. Buck wheat flour contains a large portion of aqueous alkali soluble protein and small amount of coagurable protein and globulin, but none of alcohol soluble protein. All the extractive solution except that of alcohol show viscous character.

2. Aqueous alkali soluble protein contains a large quantity of arginine and histidine.

3. In spite of the denatured protein the aqueous alkali soluble protein can be regarded, to be a fairly preferable nutritive material better than casein as vegetable protein.

(Dec. 15, 1924.)