

Agricultural Research Institute, Pusa

The Composition of some Indian Feeding Stuffs.

BY

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CALCUTTA
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1917

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PREFACE.

THE object of this publication is to place, in a comprehensive form, before cattle-owners and those interested in the preparation of cattle food, the composition of such of the feeding stuffs available in India as have so far been analysed in the laboratory of the Imperial Agricultural Chemist. In referring to this Bulletin, one should remember that the relative production values of different feeding stuffs depend more on digestible fractions than on total amounts of nutrients and that the results of the analyses here given have not been supplemented by feeding tests but that they are intended to serve only as a general guide to the making of suitable rations.

The analyses are entered against the botanical names of the plants from which the products analysed were obtained. The English and the chief vernacular names of the plants have also been given. The nomenclature followed is that used in Sir George Watt's "Commercial Products of India." For easy reference an index is given at the end.

The figures have been checked carefully, but should any readers come across any undetected errors and kindly bring them to the notice of the undersigned, he will be very grateful.

The credit for a very large number of analyses of the food-stuffs dealt with in this book is due to Major J. W. Leather, late Imperial Agricultural Chemist. He published some of the analyses in the *Agricultural Ledgers*, No. 10 of 1901 and No. 7 of 1903. As these Ledgers are now out of print and as it will facilitate reference, most of these analyses have been incorporated in this volume. These are marked with the letter "L" in the book.

J. SEN.

The Composition of some Indian Feeding Stuffs.

[Received for publication on 20th November, 1916.]

Introduction.

Mr. Mackenna in his book on "Agriculture in India" observes, at page 97, that the prosperity of Indian agriculture depends greatly on the maintenance in health of the cattle of the country. The maintenance of cattle in a healthy state, in its turn, depends largely on the supply of proper food—a problem of no small importance. The poorer cultivators have so long been depending mainly on grass supplemented by straw and odds and ends from their farm produce. Circumstances are, however, changing and at least some of them have now got to buy commercial feeding stuffs. The problem is of great importance to the dairyman too, whose aim is to get the best possible return for the money laid out in feeding his stock.

How to feed cattle in the proper way cannot be learnt from books alone. A knowledge of the composition of feeding stuffs coupled with practical knowledge of stock-keeping, however, leads a long way towards a judicious blending of the foods and thereby obtaining a well-balanced and economical ration.

The functions of a feeding stuff.

Food is necessary to an animal—

1. To maintain the temperature of the body. The nutritive constituents of a food are oxidized in the body and thus produce heat which serves to keep the animal warm.
2. To provide energy for doing internal work. Even when an animal is not doing any external work, there is involuntarily going on work inside its body to carry out the different physiological functions incidental to vital activities.
3. To replace wear and tear in the body. As a result of the vital processes going on in the body of an animal effete chemical products are constantly being removed from

the system. Fresh materials must be given to the animal to replace this waste.

4. To produce new growth. This holds specially in the case of young animals which have not reached their limit of growth. Milch cattle must also be provided with nutrients from which they can synthesize the constituents of milk. In the case of other adult animals, while they cannot put on flesh beyond a certain limit, they can increase the store of their fat.
5. To produce the energy required for performing external work, as in the case of work cattle.

The constituents of a feeding stuff.

The usual chemical analysis of a feeding stuff consists in the determination of the contents of moisture, crude fat, albuminoids, soluble carbohydrates, woody fibre and ash. Short explanations are given below of these constituents and of the parts they play in animal economy.

Moisture. All feeding stuffs contain considerable proportions of water, even when apparently dry. The amount varies with the condition of the weather and the nature of the food.

Water is no doubt of great physiological importance in the economy of animal life but since it is furnished for the most part in liquid form, the moisture in feeding stuffs cannot be considered as having any special nutritive value. Other things being equal, moist foods should be correspondingly low in price. Besides this, the presence of too much moisture in a feeding stuff makes it liable to "heat" and to be spoilt by moulds, etc.

Ether extract or crude fat. The so-called "oil" or "fat" is generally estimated by treating the feeding stuff with ether. The extract is composed mainly of fats and oils in the case of concentrated feeding stuffs, but with fodders and hays, ether dissolves also other substances (*e.g.*, waxes, colouring matter, organic acids, etc.)

The injected fat is oxidized in the body to produce heat and energy and, when there is a sufficiency, acts as a source of animal fat. Ordinarily this latter is stored in the body but is excreted in large quantities by milch cattle in the milk they yield.

Albuminoids or crude proteins refer to a group of substances which contain nitrogen as one of the essential elements. These are estimated from the percentage of nitrogen, which is multiplied by the factor 6.25 to give the content of albuminoids. For this purpose the

"albuminoid" nitrogen content is to be taken into account but the calculation is based sometimes on the total nitrogen figure.

It is thus seen that albuminoids are supposed always to contain 16 per cent. nitrogen, an assumption which is not quite correct. The nitrogen which is present in a feeding stuff is moreover not present wholly as pure protein. The younger and tenderer parts of a plant, germinated seeds, roots, berries, juicy fruits as well as feeding stuffs which have undergone acid fermentation or have been acted upon by yeasts and bacteria, contain appreciable amounts of non-protein nitrogenous substances.

No animal can live unless it gets a certain amount of protein which is indispensably necessary to repair the nitrogenous waste in the tissues. Growing animals and milch cattle must also be supplied with protein over and above that required for repairing the tissues. This holds to a lesser extent in the case of animals which yield wool. Fully grown animals lack the power of increasing their store of protein or flesh beyond a certain limit and the excess of protein supplied to them with their food gets oxidized in their body or is utilized in maintaining the body heat and supplying energy, a part being also utilized for the formation of body fat.

Many non-protein nitrogenous substances have a much smaller food value than proteins. They serve as fuel and can save waste of the proteins. Ruminants, however, can to a certain extent utilize nitrogenous substances of a non-protein character towards forming flesh, the change being brought about by the help of bacteria in the partly digested food.

Soluble carbohydrates. In the analysis of foods all matters not included in moisture, crude fat, albuminoids, woody fibre, and ash are classed as soluble carbohydrates. These are therefore composed of a number of different substances. Their function is in the main the same as that of fat, although they are less efficient than the latter.

Woody fibre. The cell walls and woody fibres of a plant are entered under this head. It is mostly indigestible and the fraction which is digestible requires the spending of a relatively large amount of energy to assimilate it. In the presence of much woody fibre in the food, animals can utilize the nutrients only to a smaller extent. Though of not much direct value as a food to the animal, a certain amount of woody fibre is however required in the food to give it bulk and thus to have the stomach properly filled. Feeding materials of low value, such as straw, hulls, etc., contain a high percentage of woody fibre and their addition to a concentrated feeding stuff adds to the amount of woody fibre in the latter. The determination of the amount of woody

fibre thus often serves to detect adulteration of concentrated feeding stuffs.

Ash consists of the mineral constituents of the feeding stuffs. A part of the ash is soluble in acids, and the rest consisting mainly of sand is insoluble. An excessive amount of sand in a feeding stuff indicates contamination with dust, etc.

For the growth of bones animals require lime and phosphoric acid. The blood contains iron and other mineral substances. Again, phosphorus and sulphur are essential constituents of the animal cell. Hence the food of an animal must contain a certain amount of these inorganic constituents to keep the animals in good condition. In some cases it may even be necessary to specially provide for mineral food in the shape of cattle licks containing specific salts.

It is thus seen that the constituents of a feeding stuff which practically determine its value for purposes of animal nutrition are the fats, the proteids and the soluble carbohydrates.

The digestibility of feeding stuffs.

Only that part of the food is of direct value which the animal assimilates. Digestibility experiments have been carried out in Europe and America, but unfortunately none has yet been done in India.

Feeding stuffs can be divided into two classes :--(1) concentrated foods, which include cakes and grains, and (2) roughages in which may be included grass, straw and hay. The concentrates are poor in woody fibre and the nutrients contained in the food are of a high degree of digestibility. On the other hand, the roughages are rich in woody fibre and the nutrients contained in the food have a low digestive coefficient. A comparison of the feeding values of substances of the *same* class of feeding stuffs, on the assumption that similar constituents are equally assimilable, is not likely to lead to any serious error. A concentrated feeding stuff cannot, however, be compared with a coarse fodder merely from figures about their chemical analyses.

Albuminoid ratio.

As already pointed out, for the purposes of generating heat and energy and for production of fat, animals can utilize either albumi-

noids, fats or carbohydrates. But for the production or repair of the tissues, etc., of its body the animal must have some albuminoids in its food. Fats or carbohydrates cannot discharge this function.

Fat is a relatively concentrated nutrient as will be evident from the fact that one pound of fat gives, on oxidation, about 2.3 times as much heat as is given by a pound of albuminoids or of carbohydrates. Hence, the percentage of fat in a feeding stuff should be multiplied by the factor 2.3 to indicate the efficiency of the content of fat as measured by the same standard as is applicable to the albuminoids and the carbohydrates.

The ratio of albuminoids to the soluble carbohydrates and fat (as calculated to its carbohydrate equivalent) is known as the albuminoid ratio. For instance, if a sample of feeding stuff contains 4.2 per cent. fat, 17.0 per cent. albuminoids, and 60.0 per cent. soluble carbohydrates, the albuminoid ratio may be calculated thus:—

Fat = 4.0 × 2.3	=	9.2	equivalents
Soluble carbohydrates	=	60.0	,,
—————			
Sum	=	69.2	,,
Therefore albuminoid ratio	=	$\frac{17.0}{69.2}$	= 1 : 4.1

If the proportion of albuminoids in the food falls below the proper limits, the animal will not get the necessary amount of nitrogenous material to repair the waste going on within its body and consequently the growth of the body will be restricted. On the other hand, when the food contains more albuminoids than are required, the extra amount of albuminoids, which are more costly than the other ingredients, will in the animal's body merely perform the functions which can more cheaply be performed by fats and carbohydrates, and simultaneously there will be a larger excretion of nitrogenous matter. It is thus seen that the proportion of albuminoids in the food of cattle is fixed by considerations of the health of the animals and of the higher cost of albuminoids for heat production as compared with fats and carbohydrates. From the practical point it is therefore advisable to supply just a little more than the required amount of albuminoids.

Feeding standards.

The following albuminoid ratio has been found to be the most suitable for different kinds of stock :—

Albuminoid ratio.

Oxen at rest	1 : 12
Oxen at work	1 : 7
Fattening cattle	1 : 6
Milch cows	1 : 6
Dry cows	1 : 7
Sheep (wool)	1 : 9
Breeding ewes (with lamb)	1 : 6
Fattening sheep	1 : 5
Horses at work	1 : 6
Brood sows	1 : 7
Fattening swine	1 : 6
Growing animals, very young	1 : 4
Growing animals, half-grown	1 : 6

The figures quoted above have been found out by feeding experiments and practical experience, and represent what in general, and under average conditions, constitute suitable rations for the particular purposes in view. They need not, however, be accepted as absolute standards and may be varied according to circumstances. For instance, it may after all be economically better, under a given set of conditions, to deviate to a certain extent from the standard. And in particular cases the figure quoted above may not exactly suit the requirements of an individual animal. The palatability of a ration is a very important factor. But the taste and general specific characters of food-stuffs for particular animals can only be found out by experience. In general animals flourish better on a ration which they like, even if it does not correspond to the standard, than on one which, although scientifically made up, they do not like, and the feeder has to study the individual whims of the animal.

Nevertheless the figures given above have an importance as a matter of guidance, and it may be laid down that in general the object of the feeder should be to secure a mixture of feeds in which the proportion of albuminoids in the total rations must not be below one-seventh or exceed one-fifth part of the soluble carbohydrates and fat (calculated as its carbohydrate equivalent).

Besides a proper nutritive ratio in the feed, its bulkiness must be taken into consideration. If the food is too bulky the animal cannot eat enough of it to get proper nutrition. On the other hand if the food is not bulky enough, the digestive organs of the animal will not be sufficiently distended to permit the maximum possible assimilation.

Computing rations.

It is a simple matter to calculate what the albuminoid ratio in a given mixed feed is. As an example the following ration may be taken :—

Green juar	20 lb.
Wheat straw	20 „
Rahar chuni	3 „
Wheat bran	2 „

An examination of the tables at the end of this book shows the average composition of the above feeding stuffs to be :—

	Crude fat per cent.	Albuminoids per cent.	Soluble Carbohydrates per cent.
Green juar	0.5	1.2	9.0
Wheat straw	1.3	3.2	38.0
Rahar chuni	1.5	18.0	50.0
Wheat bran	3.5	12.0	60.0

The nutrients contained in the mixed feed are therefore :—

	Fat lb.	Albuminoids lb.	Soluble Carbohydrates lb.
In 20 lb. green juar	0.10	0.24	1.80
In 20 „ wheat straw	0.26	0.64	7.60
In 3 „ rahar chuni	0.05	0.54	1.50
In 2 „ wheat bran	0.07	0.24	1.20
TOTAL	0.48	1.66	12.10

Hence the albuminoid ratio is $1.66 : \{ (0.48 \times 2.3) + 12.10 \}$ or $1 : 8.0$.

The ration is thus seen to be rather poor in albuminoids. In order to make good this deficiency the addition of a food rich in albuminoids should be made. If one pound of wheat bran is substituted by one pound of groundnut cake (containing about 10 per cent. fat, 40 per cent. albuminoids and 25 per cent. soluble carbohydrates) the composition of the feed will be :—

	Fat lb.	Albuminoids lb.	Soluble Carbohydrates lb.
In 20 lb. green juar	0.10	0.24	1.80
In 20 „ wheat straw	0.26	0.64	7.60
In 3 „ rahar chuni	0.05	0.54	1.50
In 1 „ wheat bran	0.04	0.12	0.60
In 1 „ groundnut cake	0.10	0.40	0.25
TOTAL	0.55	1.94	11.75

Therefore the albuminoid ratio in this feed is :—

$$1.94 : \{ (0.55 \times 2.3) + 11.75 \}$$

or $1 : 6.7$

The ration now corresponds as closely to the standard ration as can be reasonably expected in practice.

Food units.

It is very desirable to ascertain the feeding values of different feeding stuffs on an uniform basis. The difficulty is, however, in the choice of a proper standard.

As has been noted before, the valuable constituents of a feeding stuff are the fat, albuminoids, and soluble carbohydrates. Fat is more costly to buy than soluble carbohydrates. Moreover, it is about 2.3 times as efficient as carbohydrates considered as sources of energy and heat. Albuminoids, although about equal in fuel value to soluble carbohydrates, are in other respects valuable in as much as they alone are capable of repairing nitrogenous waste going on in the body of an animal. Moreover, the products voided by an animal getting an excess of albuminoids in its food is of direct manurial value. Apart from these considerations, albuminoids are more costly to buy. For all these reasons it may be assumed that fats and albuminoids are about equal in value and are two and a half times as valuable as soluble carbohydrates. There is a general agreement between the market values of the concentrated feeding stuffs and the figures obtained on the basis of these calculations.

In such a system no account is taken of the digestibility co-efficients of the feeding stuffs in question. Moreover, it is assumed that woody fibre has no feeding value and that the constituents of the same class (*e.g.*, fats), though derived from different sources, have the same feeding value.

This method of valuation though not scientifically accurate will probably be useful to the practical man and will help him to find out which, of a number of foods, is *relatively* the cheapest.

Tables of analyses.

Below are given the results of analyses of various feeding stuffs which have been made in the laboratory of the Imperial Agricultural Chemist.

It may be noted here that the albuminoids have been calculated by multiplying the albuminoid nitrogen figure by the factor 6.25. In some cases, however, only the total nitrogen was estimated and the albuminoids calculated from this. These figures are marked with an asterisk in the tables. The samples, the analyses of which have been published in the *Agricultural Ledgers* No. 10 of 1901 and No. 7 of 1903, are marked with the letter "L."

COMPOSITION OF SOME INDIAN FEEDING STUFFS

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ACACIA ARABICA, *Willd.*

English.—Indian Gum Arabic.

Vernacular.—Babúl, Kikar.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Crushed Kikar seed, Karnal	10.80	2.91	<i>Crushed seed</i>			5.11	1.52	2.09	1.90	5.17	61.5
			11.86	54.00	13.20						

ARACHIS HYPOGÆA, *Linn.*

English.—Groundnut, Earthnut, Peanut.

Vernacular.—Munghali, China-badam, Vilayeti-mung, Bhui-mung.

Description of samples	%	<i>Kernel</i>					%	%	%	%	%	%
		%	%	%	%	%						
Groundnut kernel	4.00	49.25	20.00*	13.21	1.05	2.15	0.05	4.65	..	4.35	209.1	
Groundnut seed from Elziri	5.08	46.48	32.25	12.83	1.15	2.16	0.03	5.16	5.18	3.71	209.7	
Groundnut grown at Bhagoda, Desur	4.62	50.10	20.09	13.25	1.21	1.66	0.07	4.79	4.63	4.42	211.2	
Groundnut grown at Kinnapur	4.51	50.72	27.03	14.38	1.29	2.01	0.06	4.50	4.33	4.85	208.8	
Groundnut shell	7.35	2.80	7.57*	13.73	55.95	0.45	3.75	1.21	..	2.66	39.7	
				<i>Shell</i>								
				<i>Cake</i>								
Ckt, Satara	5.42	9.87	32.13	24.08	22.08	4.23	1.29	5.31	5.14	1.48	130.0	
Do. Kirkee	7.47	11.78	43.01	27.65	3.04	4.40	1.75	7.33	7.03	1.25	166.7	

COMPOSITION OF SOME INDIAN FEEDING STUFFS

AVENA SATIVA, *Linn.**English.—Oats.**Vernacular.—Jai.*

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain</i>											
179 1893 L	Cape oats, Cawnpore	10.80	5.93	8.77*	57.95	12.50	1.25	2.80	1.40	..	8.16
6 1898 L	Oats, Dehra Dun	10.17	5.27	6.39	61.57	11.29	1.89	3.42	1.18	1.02	11.32
427 1900 L	Cape oats, Cawnpore	10.43	5.86	7.87	58.62	13.20	1.44	2.58	1.37	1.26	9.16
277 1914	Oats, Kirkee	5.99	5.87	8.64	62.34	12.11	1.85	3.20	1.51	1.38	8.70
<i>Kernel</i>											
592 1907	Oats, Motipur	10.06	8.71	15.15*	62.37	1.88	1.67	0.16	2.41	..	5.41
593 1907	Do. Birauli	9.84	9.47	20.44*	57.04	1.84	1.37	0.00	3.27	..	3.59
594 1907	Do. Pusa	9.25	8.57	13.81*	59.66	1.91	1.77	0.03	3.01	..	4.22
<i>Husk</i>											
595 1907	Oat husk, Motipur	11.22	0.80	2.49*	44.31	35.80	0.97	4.32	0.40	..	1.42
596 1907	Do. Birauli	11.43	0.89	2.65*	42.16	37.30	0.76	4.81	0.42	..	1.68
597 1907	Do. Pusa	11.46	0.75	2.02*	43.57	35.70	1.04	4.86	0.42	..	1.50
<i>Straw</i>											
203 1894 L	Oat straw, Cawnpore	9.53	..	1.37	43.48	36.09	3.72	5.81	..	0.22	31.71
447 1900 L	Cape oat straw, Cawnpore	9.88	1.97	3.00	41.31	30.13	6.45	7.26	0.53	0.49	15.23
<i>Green fodder</i>											
230 1900 L	Green oats, Punjab	88.51	0.37	0.91	9.00	3.99	1.47	0.72	0.19	0.15	10.48
	Do. do. (dried)	10.00	2.02	6.13	49.14	21.78	8.00	3.93	1.04	0.82	10.43
4 1916	Green oats (dried)	4.75	1.94	6.25	45.69	30.10	7.23	3.95	1.30	1.00	8.02
107 1916	Do. do.	3.36	1.94	4.97	45.47	32.19	10.73	1.54	2.22	0.80	10.45

*BASSIA LATIFOLIA, Roxb.**Vernacular—Mohua, Illupei.*

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Mohua cake . . .	21.48	8.06	14.19	42.86	4.20	4.25	4.28	2.40	2.27	4.47	100.7
Do., Sambal- pur	15.75	19.30	13.68	40.23	4.08	4.04	2.04	2.23	2.19	6.19	122.7

*BRASSICA CAMPESTRIS, Linn.**English.—Indian colza.**Vernacular.—Sarson.*

Description of samples	Moisture	Ether extract	Albuminoids	Grain						Albuminoid ratio	Food units
				Soluble carbohydrates	Woody fibre	Soluble mineral matter	Sand and silica	Total nitrogen	Albuminoid nitrogen		
Yellow Sarson, Cawnpore	6.15	41.37	23.61*	22.25	2.97	3.40	0.25	3.76	..	4.97	184.7
Black Sarson, Cawnpore	7.15	33.87	25.89*	22.04	6.40	4.30	0.35	4.14	..	3.86	171.4
Red Sarson, Cawnpore	7.50	28.90	18.29*	31.87	5.43	6.16	3.85	2.61	..	6.04	144.8
Piraka Teri, Dumraon, Bengal.	7.18	41.51	22.25	20.30	4.44	3.90	0.42	3.87	3.56	5.20	170.7
Lalaka Teri, Dumraon, Bengal.	7.10	39.73	19.94	20.91	8.16	4.07	0.69	3.56	3.19	5.83	170.1
Lalaki Teri, Dumraon, Bengal.	7.93	41.42	20.88	22.31	3.32	3.67	0.43	3.50	3.34	5.63	178.1
Lalaka Sarson, Raigarh	7.14	42.62	18.63	23.52	3.43	4.02	0.64	3.26	2.97	6.52	176.6
Lalaka Sarson, Arrah	6.71	43.92	18.75	23.17	2.99	4.12	0.34	3.34	3.00	6.62	173.3
				Green fodder							
Lalaka Sarson, Punjab	80.13	0.47	2.00	4.64	3.14	2.51	1.11	0.41	0.32	2.36	19.8
Green Sarson (dried)	10.00	3.05	13.00	30.16	20.41	16.31	7.07	2.66	2.08	2.86	70.3

BRASSICA JUNCEA, *H.*, *J.*, & *T.**English.*—Indian mustard.*Vernacular.*—Asl rai, Rai.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio		
390 1900	L "Kajli Sarsa," Bengal.	7.61	40.22	18.44	Grain		22.79	5.60	4.01	1.43	3.11	2.95	6.25
395 1900	L Lalai tori, Dumraon	8.48	39.46	18.10	24.07	5.75	3.67	0.18	3.18	2.91	3.21	6.21	
518 1900	L Rai, Nadia . . .	7.68	32.51	21.94	20.07	5.50	4.89	1.35	3.84	3.51	4.00	6.11	
520 1900	L Rai, Arraria . . .	6.95	40.84	18.00	23.47	5.12	4.34	1.28	3.10	2.88	6.52	6.52	
518 1903	Mustard, Cawnpore	8.35	41.84	18.57	22.29	4.25	4.82	0.38	3.23	2.97	6.38	6.38	
310 1903	Mustard straw, Cawnpore	13.50	1.64	1.94	Straw		41.10	32.79	8.24	0.79	0.36	0.31	23.13
261 1902	Mustard cake, Saugor	6.33	12.59	30.00	Cake		33.46	8.84	7.08	1.10	5.24	4.80	2.68
944 1902	Mustard cake . . .	8.33	10.91	34.12*	33.30	5.34	7.06	0.88	5.46	..	1.71	1.71	
2 1911	Ditto. Military Farm, Agra	0.29	8.47	34.43	37.85	0.84	5.45	0.67	6.14	5.51	1.67	1.67	
44 1912	Ditto.	9.05	8.60	32.88	36.78	5.04	5.68	1.97	6.02	5.26	1.72	1.72	
3 1915	Country mill-pressed yellow mustard cake, Cawnpore	10.04	12.17	31.13	36.33	2.89	6.35	1.04	5.60	4.99	2.33	2.33	
13 1916	Mustard green . . .	5.94	7.49	8.27	Green fodder		41.58	26.82	8.10	1.74	1.34	1.32	7.31
108 1916	Do. (Lahi)	3.27	5.84	6.42	37.74	40.10	6.16	0.47	1.20	1.03	1.47	1.47	

BRASSICA NAPUS, *Linn.**English.*—Indian rape.*Vernacular.*—Tori, Lutni, Maghi.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Grain</i>											
Lutni, Hazaribach .	7.38	38.21	19.06	23.21	5.06	4.14	2.04	3.29	3.05	5.83	166.4
Do. Ranchi .	6.48	40.00	17.50	21.54	5.35	4.18	4.95	3.04	2.80	6.40	165.8
Do. Jahanabad .	6.21	40.18	18.32	24.80	5.30	4.56	0.63	3.18	2.93	6.40	171.1
<i>Cake</i>											
Tori cake, Punjab	6.81	10.28	27.19	37.08	9.85	7.10	1.69	4.66	4.35	2.23	130.8
Do. do. .	7.40	11.34	27.88	36.42	8.32	6.44	2.20	4.75	4.46	2.24	134.5
Rape cake, Nagpur	24.98	4.83	30.31*	24.16	7.60	6.53	1.59	4.85	..	1.46	112.0
Do. Cawnpore	20.26	8.79	27.37	27.63	6.35	8.01	1.59	4.78	4.38	1.75	108.0
Do. Nagpur .	8.24	8.91	38.37*	31.91	5.80	5.99	0.78	6.14	..	1.37	150.1
Do. Bengal .	10.55	12.35	30.25	32.07	7.35	6.14	1.29	5.16	4.84	2.00	139.6
Do. Ferozepore	8.28	5.89	34.31	37.03	6.15	5.23	2.21	6.02	5.49	1.60	138.4
Do. Agra .	8.28	12.09	29.09	37.43	4.86	6.32	1.93	1.16	1.03	2.24	140.4
Do. Dairy Farm, Ambala	8.65	12.31	25.83	39.34	5.69	6.65	1.53	4.79	4.13	2.62	134.5

CAJANUS INDICUS, *Spreng.**English.*—Pigeon pea.*Vernacular.*—Arhar, Rahar, Tur.

Inventory No.	Description of Samples	% Moisture	% Ether extract	% Aluminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
79 1899	L Red, Poona . . .	8.08	1.32	19.38	<i>Green</i>						
80 1899	L White, Poona . . .	7.92	1.23	18.69	61.39	5.94	3.80	0.09	3.35	3.10	3.12
271 1899	L Do. Poona . . .	8.64	1.91	19.19	60.58	5.24	3.86	0.58	3.41	3.07	3.33
203 1900	L Dark red, Kandulo, Madras.	14.33	1.31	17.25	56.95	6.55	3.50	0.05	3.25	2.78	3.45
418 1900	L White, Cawnpore . . .	10.80	1.46	14.25	63.68	6.22	3.45	0.05	2.74	2.28	4.50
419 1900	L Red, Cawnpore . . .	10.94	1.03	16.62	62.92	4.76	3.68	0.05	2.38	2.66	3.34
833 1902	Tur, split pulse, Poona	13.88	1.72	18.19	61.91	6.83	3.47	0.00	3.70	2.91	3.92
302 903	Arhar, Cawnpore . . .	14.29	1.08	15.82	57.20	5.82	4.40	0.49	3.13	2.53	3.30
831 1902	Tur husk, Poona . . .	13.98	0.73	18.31	<i>Husk</i>						
8 1911	Karai, Military Farm, Agra	8.27	2.07	5.92	47.16	28.93	2.80	0.09	1.02	1.01	7.74
45 1912	Ditto . . .	9.27	0.71	6.47	43.83	35.64	3.89	0.38	1.01	0.93	8.31
205 1894	L Cawnpore . . .	5.58	..	7.39	<i>Bhusa</i>						
54 1899	L White, Poona . . .	6.77	6.93	13.25	45.74	25.69	6.23	6.37	..	1.18	6.19
55 1899	L Red, Poona . . .	6.22	7.94	14.04	45.38	18.10	6.44	3.13	2.45	2.12	4.63
266 1899	L Poona . . .	8.89	2.97	7.38	46.51	14.35	6.12	3.92	2.60	2.39	4.33
204 1900	L Rajahmundry, Madras	11.97	1.30	9.19	49.94	21.74	6.46	2.62	1.42	1.18	7.69
446 190	L Cawnpore . . .	10.23	2.78	10.31	40.43	20.89	4.59	11.54	1.61	1.47	4.75
					41.08	21.06	6.92	7.90	1.85	1.65	4.46

CAJANUS INDICUS, *Spreng.*—concl.*English.*—Pigeon pea.*Vernacular.*—Arhar, Rahar, Tur.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Starch carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Arhar Dima	14.41	2.41	10.81	33.88	21.53	10.80	0.16	2.07	1.73	3.65	66.9
Do.	9.69	3.51	9.94	41.81	21.19	6.59	7.27	1.74	1.59	5.02	75.4
Do. Cawnpore	8.28	4.58	9.69	40.87	19.40	6.81	10.31	1.61	1.55	5.30	76.6
Do. Bangalore	7.74	0.32	3.97	45.12	39.16	3.34	0.35	0.65	0.43	11.55	55.8
Do. Jubbalpur	9.03	0.29	4.30	43.10	39.30	3.68	0.23	0.74	0.69	10.18	54.6
Do. Lucknow	6.53	1.03	9.51	46.49	30.68	4.53	1.23	1.84	1.52	5.14	72.9
Do. Allahabad	7.74	1.10	7.95	45.53	30.04	4.85	1.89	1.43	1.27	6.05	68.1
<i>Chuni</i>											
(Outer integument of the seed with part of the adhering kernel)											
Do.	14.99	2.06	22.25	49.30	7.15	3.98	0.29	3.72	3.96	2.43	110.0
Military Farm, Agra	8.67	2.33	15.93	49.63	17.41	4.24	1.79	2.68	2.55	3.45	85.3
Do. Muttra	8.44	1.35	15.67	48.19	16.93	4.67	4.75	2.82	2.51	3.27	90.7
Do. Bareilly	9.77	0.96	16.25	50.17	3.95	6.21	2.69	3.26	2.92	3.36	107.2

CAMELLIA THEA.

English.—Tea seed.*Vernacular.*—Chah.

Tea seed	Cake										
Kangra	6.12	15.64	10.56	54.46	7.03	3.81	0.35	1.92	1.69	8.56	120.0

CARTHAMUS TINCTORIUS, *Linn.**English.*—Safflower.*Vernacular.*—Kasumba, Kusum, Kardi, Kar.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain</i>												
95 1895	L Safflower, Poona	7.49	31.84	13.31*	18.66	26.31	2.39			2.13		6.39
92 1899	L Do. Do.	6.04	18.28	20.44	27.51	23.60	3.78	0.35		3.77	3.27	3.45
437 1900	L Do. Cawnpore	6.23	20.33	11.37	22.97	28.08	0.68	1.34		1.87	1.82	7.65
<i>Cake</i>												
16 1898	L Safflower Poona cake,	12.00	3.78	16.91	41.48	19.40	4.36	2.07		4.92	2.70	2.97
16 1902	Safflower Poona cake,	7.55	7.54	42.63	26.19	9.03	5.28	1.78		7.44	6.82	1.42
19 1902	Safflower Satara cake,	9.23	10.30	43.19	22.81	8.08	4.50	0.90		7.40	6.91	1.65
60 1902	Safflower Chalisgaon cake,	18.53	6.72	36.44	18.06	11.56	5.59	3.10		5.94	5.83	6.92
188 1902	Safflower Baroda cake,	7.68	6.98	40.00	26.76	10.90	6.53	1.15		6.80	6.40	1.65
189 1902	Safflower Baroda cake, (decorticated)	6.83	6.72	42.13	34.51	3.53	5.43	0.85		7.68	6.74	1.19
303 1902	Safflower Dharwar cake,	10.87	6.92	22.25	30.40	25.07	2.06	1.53		3.61	3.58	2.05
304 1902	Safflower Hubli cake,	11.10	6.06	27.43	26.97	24.76	2.99	0.69		4.43	4.39	1.56
685 1906	Safflower Poona cake,	14.22	7.04	47.77	20.19	5.27	4.89	0.62		8.08	7.64	0.76
686 1906	Safflower Poona cake,	10.15	8.53	30.06	24.54	20.29	4.12	2.31		5.22	4.81	1.17
278 1914	Safflower Kirkee cake,	6.92	13.45	34.73	28.26	11.39	4.39	0.86		5.91	5.56	1.11

COMPOSITION OF SOME INDIAN FEEDING STUFFS

17

CICER ARIETINUM, Linn.

English.—Common or Bengal gram, Chick-pea.

Vernacular.—Chana, Chhola, Bât.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Grain</i>											
Calcutta	11.35	4.83	18.57*	56.33	6.17	2.75	0.00	2.06	..	3.63	111.8
Red variety, Poona	8.60	5.31	15.50	60.13	7.21	3.06	0.10	2.71	2.40	4.67	112.2
White variety, large Kabuli, Calcutta	10.36	4.22	22.81	57.48	1.93	3.15	0.05	4.05	3.65	2.95	125.1
White variety, small, Jabalpur	10.80	5.01	15.19	60.33	4.41	3.12	0.54	2.63	2.43	4.77	111.1
Poona	17.21	5.04	18.12*	55.36	0.73	} 2.64		2.90	..	3.81	115.5
Calcutta	13.43	4.41	18.38	54.65	5.85	3.28	0.00	3.05	2.04	3.52	111.6
Military Farm, Agra	8.82	4.09	18.81	57.88	7.56	2.69	0.15	3.27	3.01	3.58	115.1
Do.	8.63	4.79	17.63	57.90	7.62	2.73	0.44	2.97	2.62	3.91	114.0
Supply Reserve Depot, Peshawar	12.92	4.61	16.36	55.81	7.52	2.75	0.03	2.69	2.62	4.06	108.2
Supply Reserve Depot, Peshawar	11.56	4.12	18.07	55.90	7.35	2.07	0.03	3.15	2.83	3.61	111.4
Kirkee	9.47	4.05	20.56	57.18	5.71	2.00	0.13	3.55	3.29	3.23	118.7
Ruk	9.14	4.28	19.36	56.27	7.27	3.43	0.25	3.30	3.10	3.41	115.4
Quetta	9.65	4.16	18.57	55.05	8.72	3.25	0.50	3.18	2.99	3.46	112.0
Mhow	9.72	5.10	16.90	58.41	6.70	2.03	0.24	2.87	2.70	4.15	113.3
Jabalpur	10.50	5.73	14.64	56.75	7.71	3.70	0.37	2.42	2.34	4.77	107.6
Military Kasauli Farm,	9.09	4.03	18.58	48.49	12.20	4.13	3.58	3.35	2.97	3.10	107.5
<i>Flour</i>											
Flour with husk purchased	13.23	2.14	19.12*	55.30	7.05	} 3.14		3.06	..	3.15	108.5
Flour prepared at home	13.98	2.64	21.43*	57.15	2.24	2.66		3.43	..	2.94	117.1

CICER ARIETINUM, *Linn.*—concd.*English.*—Common or Bengal gram, Chick-pea.*Vernacular.*—Chana, Chhola, But.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
619 1902	Gram husks . . .	13.42	0.40	3.75*	35.07	42.24	4.22		0.00	..	981
6 1915	Gram Thoath (husk), Ambala Dalry	4.80	4.34	0.45	08.11	11.31	4.42	0.48	1.16	1.03	12.11
7 1915	Gram husk, Ambala	11.16	0.04	5.01	40.33	37.23	3.98	0.25	1.10	0.95	7.02
<i>Bhusa</i>											
204 1894	L Cawnpore . . .	10.11	..	4.46	38.84	27.63	0.66	0.30	..	0.71	8.71
57 1890	L Poona	6.56	2.69	3.06	44.55	28.03	0.28	4.02	0.68	0.49	13.50
204 1899	L Do.	8.21	2.64	2.94	49.70	21.87	11.81	2.83	0.67	0.47	18.97
366 1902	Gram Bhusa . . .	8.63	1.70	3.25	51.37	26.02	7.82	0.51	0.58	0.52	15.30
370 1902	Do.	9.88	3.08	4.25	46.10	19.03	8.18	8.58	0.83	0.68	12.51
299 1903	Cawnpore . . .	11.43	1.26	2.87	42.81	28.52	8.18	4.93	0.58	0.46	15.92
300 1914	Bhusa, Bangalore .	9.36	0.89	1.44	40.36	40.40	4.24	0.31	0.75	0.71	9.55

COCOS NUCCIFERA, *Linn.**English.*—Coconut.*Vernacular.*—Nariyal, Narikel, Kalapa.

<i>Caks</i>											
Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
23 1898	L Poona	7.72	16.53	113.62	44.57	12.45	14.05	0.48	3.31	2.17	6.66
302 1914	Bangalore . . .	11.47	12.35	20.07	42.99	7.02	5.10	1.00	3.32	3.21	3.16

CURCUMA ZEDOARIA, *Rosc.**English.*—Long and round Zedoary.*Vernacular.*—Sati.

Laboratory No.	Description of Sample	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
232 1908	Flour, Cawnpore	19.30	0.57	0.51	73.09	0.00	0.38	0.15	0.08	..	157.41
237 1908	Starch, Curcuma Zedoaria	18.97	0.68	0.49	79.30	0.00	0.35	0.21	0.07	..	165.00

CYAMOPSIS PSORALOIDES, *DC.**English.*—Cluster-bean.*Vernacular.*—Guar, Khurti.

					<i>Grain</i>						
108 1899	L Poona	8.99	2.09	28.31	48.42	7.68	3.32	0.20	4.93	4.53	195
442 1900	L Cawnpore	10.67	2.63	26.18	47.04	8.40	3.82	0.27	4.40	4.19	206
59 1911	Military Farm, Muttra	9.04	3.36	25.09	56.10	3.13	3.04	0.24	4.29	4.01	204

DIOSCOREA FASCICULATA, *Rozb.**English.*—Kidney-shaped yam, Karen potato.*Vernacular.*—Suthni.

					<i>Tubers</i>						
245 1916	Suthni, Pusa village	7.33	0.64	2.75	84.24	1.28	3.61	0.10	0.56	0.44	1117

*DOLICHOS BIFLORUS, Linn.**English.—Horse-gram.**Vernacular.—Kulthi.*

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woolly fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Kulthi, Poona	7.45	0.89	20.06	60.62	4.57	4.34	2.07	3.74	3.21	3.12	113.0
Do., Berhampore, Madras	10.20	0.72	16.31	63.96	3.69	3.51	1.61	3.40	2.61	1.03	106.3
Kulthi, Matigiri (Salem)	9.08	0.93	21.94*	50.33	4.76	3.06	0.00	3.51	..	2.80	116.5
Kulthi, Belgaum	10.36	0.92	20.12	60.31	4.42	3.37	0.50	3.68	3.22	3.10	112.9
					<i>Bhusa</i>						
Kulthi, Berhampore Madras	5.60	2.63	5.25	49.06	28.01	6.54	2.31	1.00	0.31	10.70	69.4
Kulthi Bhusa	11.94	2.63	7.75	42.53	16.81	8.25	10.00	1.50	1.24	0.27	68.5

*DOLICHOS LABLAB, Linn.**Vernacular.—Val, Popat.*

	<i>Grain</i>										
	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woolly fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
White variety, Poona	7.11	0.93	23.31	56.98	6.94	3.99	0.71	1.06	3.73	2.54	117.6
White variety, Poona	9.55	2.03	23.44	53.26	7.42	4.20	0.10	1.07	3.75	2.47	116.9
White "Kadawa," Poona	9.08	1.11	20.75	58.38	6.78	3.85	0.05	3.46	3.32	2.91	113.0
Large white variety, "Damaia," Poona	9.70	1.14	19.56	61.94	4.69	2.92	0.05	3.24	3.13	3.50	113.7
"Walanja," Poona	9.19	1.17	23.31	55.35	6.12	3.60	1.17	3.98	3.73	2.49	116.6
Red variety Rajahmundry	12.90	1.12	17.75	57.46	7.48	3.24	0.95	3.31	2.84	3.38	104.6
Val, Kirkee Farm	9.28	1.16	14.44	67.06	4.91	2.75	0.00	3.26	2.31	4.85	106.4
Lobia, Cawnpore	12.99	1.72	22.81	54.40	4.34	3.55	0.19	3.98	3.65	2.56	115.17
					<i>Bhusa</i>						
Val Bhusa, Poona	9.93	3.72	13.37	43.03	16.17	11.27	2.51	2.56	2.14	3.86	85.8
					<i>Straw</i>						
Lobia straw, Cawnpore	13.54	0.92	4.57	40.80	32.90	5.18	2.09	0.87	0.73	9.39	54.5

COMPOSITION OF SOME INDIAN FEEDING STUFFS

ELEUSINE CORACANA, Gaertn.

Vernacular.—Nagli, Ragi, Bavto, Marua.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
87 1889	L Nagli, Poona .	9.38	1.38	5.37	78.40	2.47	2.47	0.47	0.95	0.86	15.20
47 1900	L Do Punjab .	12.33	1.00	6.13	73.11	3.45	3.46	0.41	1.23	0.98	12.36
195 1900	L "Bhuddai" or "Bhuda Munda," Ganjam, Madras	11.12	1.26	7.69	66.95	3.26	2.69	4.03	1.41	1.23	9.68
196 1900	L "Bhuda Munda," Ganjam, Madras	13.06	1.30	6.31	66.91	2.55	2.82	7.16	1.09	1.01	11.16
197 1900	L "Rinjya" or "Rinja Munda," Ganjam, Madras	13.27	1.15	6.94	66.72	3.67	3.28	4.97	1.12	1.11	10.91
475 1900	L "U Raitrub," Hill District, Assam	14.03	1.03	6.00	74.91	2.33	2.25	0.05	1.01	0.96	12.78
589 1902	Bavto, Nadial .	15.29	1.40	5.25*	66.54	2.66	4.20		1.48	..	7.54
590 1902	Do. do. (cleaned grain)	14.48	1.40	8.00*	71.67	2.30	2.15		1.28	..	9.08
603 1902	Nagli (cleaned) .	15.96	1.33	5.25	73.92	1.73	2.41		0.86	0.84	11.66
604 1902	Do. (uncleaned) .	15.14	1.26	5.31	73.19	2.20	2.00		0.89	0.85	11.49
604A 1902	Bavto, Nadial .	13.47	1.05	5.94*	74.21	2.99	2.34		0.94	..	12.93
605A 1902	Do. .	13.52	1.24	5.62*	75.38	1.90	2.19		0.90	..	13.93
611 1902	Nagli, Poona .	14.36	1.34	6.44*	73.34	1.83	2.69		1.03	..	11.57
840 1902	Do. Mysore .	13.22	1.20	5.33*	75.13	2.10	2.98		0.86	..	11.50
644 1902	Nagli flour, Poona .	14.77	1.19	6.87*	72.50	1.73	2.91		1.10	..	10.96

ELEUSINE CORACANA, *Gaertn.*—concl'd.*Vernacular.*—Nagli, Ragi, Bavto, Marua.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Nagli husk . . .	17.36	2.03	6.25	43.05	0.75	13.52	11.04	1.21	1.02	7.6	63.8
Do. Nadiad . . .	12.94	2.05	7.50*	46.82	2.72	21.97		1.24	..	6.87	70.7
Nagli Husk . . .	17.13	1.40	6.88	54.55	0.25	9.01	1.78	1.16	1.10	8.40	75.3
Do. Nadiad . . .	16.80	1.90	7.68*	54.08	0.34	10.20		1.22	..	7.61	73.0
Do. Poonna . . .	13.62	1.35	5.50*	36.58	4.55	38.10		0.88	..	7.22	53.7
Do. Mysore . . .	13.50	1.50	3.75*	66.61	3.77	6.87		0.60	..	18.88	79.3
<i>Green fodder</i>											
"Madal," Punjab . . .	80.83	0.48	1.94	7.85	5.38	2.28	1.24	0.48	0.31	4.61	13.9
Do. (dry state)	10.00	2.25	0.11	36.86	25.26	10.70	5.82	2.25	1.46	4.61	65.3

ERUCA SATIVA, *Lam.**English.*—The Rocket.*Vernacular.*—Tara-mira, Tara-moni, Usan, Sihuan.

Sihuan, Cawnpore . . .	6.50	33.45	24.88	24.21	4.29	4.02	2.65	4.23	5.98	4.07	170.0
<i>Grain</i>											
Rocket, Punjab . . .	5.94	6.35	31.25	41.45	7.84	6.03	1.14	5.37	5.00	1.79	135.5
<i>Cake</i>											
Tara-mira, Punjab . . .	9.44	8.88	36.00*	28.46	6.80	5.52	4.87	5.76	..	1.36	140.6

COMPOSITION OF SOME INDIAN FEEDING STUFFS

FAGOPYRUM ESCULENTUM, *Moench.**English.*—Buck wheat.*Vernacular.*—Phaphra, Trumba, Kootroo.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
12 1916	Phaphra, Mahanada (near Pusa)	13.04	2.36	8.75	73.32	0.56	1.72	0.25	1.48	1.40	9.09
69 1911	Kootroo (husked) Bhojra Benares	10.94	2.73	11.52	72.53	0.36	1.81	0.11	1.90	1.84	6.24
70 1911	Kootroo (unhusked)	10.86	2.63	11.59	66.98	5.50	2.09	0.35	2.10	1.85	6.29

GLYCINE SOJA, *Benth.**English.*—The Soybean.*Vernacular.*—Bhat, Gari-kulay.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	<i>Soybean</i>		% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
					% Soluble carbohydrates	% Woody fibre					
459 1902	Soybean, Japan	6.70	10.88	38.75*	29.75	8.69	5.23	6.20	..	1.41	
490 1902	Do. do.	6.72	11.17	43.25*	26.39	6.35	6.13	0.92	..	1.20	
1013 1902	Do. Dumraon	7.57	15.55	30.12	34.87	5.21	6.18	0.20	5.72	4.82	2.50
1017 1902	Do. do.	7.66	19.72	30.75	30.41	4.50	6.66	0.30	5.16	4.92	2.16
1019 1902	Do. do.	7.87	17.55	32.14	31.48	4.09	6.37	0.20	5.49	5.19	2.21
1023 1902	Do. Cawnpore	7.57	22.01	31.25	29.80	3.56	5.78	nil	5.44	5.00	2.58
1025 1902	Do. do.	8.97	21.30	26.12	34.36	2.67	5.58	nil	5.40	4.18	3.19
1029 1902	Do. do.	8.95	17.93	31.12	32.23	4.40	5.27	0.10	5.79	4.98	2.96
176 1903	Do. Farm Siripur	6.48	18.61	34.81	28.32	5.21	6.29	0.28	6.11	5.57	2.04
177 1903	Soybean, Farm Siripur	5.82	21.34	33.44	29.21	3.79	6.40	nil	5.95	6.55	2.94
28 1904	Soybean, Farm Manjri	8.21	17.47	36.62	30.17	2.26	5.27	6.80	5.86	1.92	
30 1904	Soybean, Farm Manjri	6.60	29.74	29.44	33.25	3.77	6.20	5.49	4.71	2.71	
38 1904	Soybean, Farm Manjri	7.36	19.02	25.19	38.65	3.55	6.23	4.89	4.03	3.27	

GLYCINE SOJA, *Benth.*—concl'd.*English.*—The Soybean.*Vernacular.*—Bhat, Gari-kulay.

Description of Samples		% Moisture	% Ether extract.	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Soybean straw</i>												
Soybean	Bhusa, Dumraon	9.68	1.33	4.31	43.69	27.91	10.38	0.70	0.70	0.69	11.31	59.8
Soybean	Bhusa, Dumraon	9.21	0.87	2.38	47.93	28.45	10.15	0.93	0.54	0.58	20.98	56.1
Soybean	Bhusa, Jawnpore	9.62	3.13	5.10	46.78	21.29	10.32	5.67	0.95	0.83	10.40	67.6
Soybean	Bhusa, Jawnpore	8.79	2.42	6.44	44.73	16.85	10.38	0.79	1.12	1.03	7.81	66.9
Soybean	straw, Siripur Farm	5.95	1.26	2.75	38.10	46.09	5.66	0.19	0.46	0.44	14.91	48.1
Soybean	straw, Siripur Farm	5.77	1.36	3.62	41.80	30.22	7.77	0.37	0.76	0.58	12.44	54.3
Soybean,	Mandri	9.84	3.29	8.12	43.20	22.20	7.00	0.36	1.93	1.29	6.99	77.7
Do.	do.	10.64	0.83	1.08	49.67	29.35	7.70	0.19	0.39	0.27	30.70	56.0

GOSYPIUM.

English.—Cotton seed.*Vernacular.*—Sarki, Kapasia, Rui, Tula.

<i>Cotton seed</i>													
L.	Cotton seed,	Poon	8.48	18.33	11.74	38.78	17.53	3.92	1.22	2.57	1.87	6.90	114.9
L.	Do.	Do.	6.93	14.57	11.34	35.96	25.05	4.47	1.68	2.49	1.81	6.13	109.7
L.	Do.	Surat	6.83	16.51	12.54	32.54	27.11	4.23	0.24	2.86	2.00	5.62	105.2
L.	Egyptian seed		6.75	20.40	22.63	21.06	16.71	4.19	0.26	3.78	3.63	3.82	148.6

GOSSYPIUM—*contd.**English.*—Cotton seed.*Vernacular.*—Sarki, Kapasia, Rui, Tula.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
					<i>Cotton seed—concl.</i>						
439 1900	L "Hybrid," Cawnpore	9.04	17.78	15.06	31.05	22.30	3.37	0.50	2.52	2.41	4.5
440 1900	L "Cook's Staple," Cawnpore	10.26	19.49	20.75	27.03	18.10	3.07	0.40	3.37	3.32	3.46
441 1900	L "Cawnpore var." Cawnpore	9.26	18.68	16.13	35.33	16.62	3.55	0.33	2.01	2.50	4.56
579 1904	Cotton seed	6.41	13.65	13.12	38.34	24.59	3.79	0.07	2.44	2.19	5.32
77 1908	Cotton seed, Lucknow	6.88	23.11	16.69	32.61	15.71	4.26	0.74	2.72	2.67	5.14
78 1908	Do. Do.	6.54	14.55	15.19	39.81	19.33	3.78	0.20	2.65	2.43	4.82
43 1912	Cotton seed, Military Dairy Farm, Agra	10.86	11.57	14.07	30.70	19.67	3.81	0.23	2.65	2.25	4.72
279 1914	Cotton seed, Kirkee	7.21	19.50	17.06	33.48	16.67	4.05	1.04	2.90	2.13	4.60
308 1914	Cotton seed, crushed, Mhow	7.47	17.99	15.65	33.88	15.79	5.27	1.95	2.62	2.50	4.94
314 1914	Cotton seed, Belgium	8.44	18.37	15.04	36.12	17.61	3.06	0.16	2.65	2.40	5.23
339 1914	Cotton seed, Jubulpore	8.84	18.54	15.50	33.54	18.32	3.03	0.33	2.53	2.48	4.92
16 1916	Cotton seed, Varhadi, Kirkee	6.60	10.90	17.86	35.87	15.60	4.09	0.08	2.88	2.86	4.57
41 1916	Cotton seed, Varhadi, Kirkee	6.24	14.58	15.17	40.03	19.77	4.15	0.06	2.76	2.43	4.65
42 1916	Cotton seed, Varhadi, Kirkee	7.47	12.33	15.76	39.73	20.49	4.12	0.70	2.73	2.52	4.32
47 1916	Cotton seed, Varhadi, Kirkee	5.55	19.32	17.59	35.35	18.00	4.11	0.08	2.96	2.82	4.54
50 1916	Cotton seed, Varhadi, Kirkee	5.24	16.34	15.65	39.80	18.73	4.10	0.09	2.73	2.50	4.94
57 1916	Cotton seed, Varhadi, Kirkee	5.14	10.24	18.27	34.19	19.02	4.03	0.11	3.18	2.92	4.29

GOSSYPIMUM—contd.

English.—Cotton seed.*Vernacular.*—Sarki, Kapasia, Rui, Tula.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
<i>Cotton seed meal</i>											
Cotton seed meal (Bore streamin?)	4.00	33.53	33.81	20.48	1.45	5.94	0.10	5.38	5.41	2.80	188.8
Cotton seed meal, Caneput	6.59	10.13	14.62	49.74	9.44	10.52	7.96	2.71	2.31	4.38	102.6
Cotton seed meal, Kharkee	7.28	8.86	23.33	35.60	9.95	6.17	0.78	4.69	4.33	2.08	131.6
Cotton seed meal, Aden	7.38	9.97	31.15	36.06	7.37	6.38	1.69	5.26	5.00	1.88	139.6
Cotton seed meal, Rak	7.44	9.29	30.80	36.33	8.44	6.45	1.19	6.13	4.91	1.87	136.7
Cotton seed meal, Quetta	8.48	8.68	31.06	35.30	8.08	6.30	1.20	5.21	5.11	1.70	136.9
Cotton seed meal, Quetta	7.45	10.17	31.11	37.07	7.44	5.98	0.75	5.20	4.98	1.94	140.4
Cotton seed meal, Belgaum	8.60	8.06	30.68	36.42	8.40	6.26	1.40	5.06	4.91	1.79	133.3
Cotton seed meal, Jabulpore	8.00	8.87	30.90	36.64	8.01	6.27	1.22	5.19	4.94	1.84	136.1
<i>Cotton seed hull</i>											
Cotton seed hull, Kharkee	8.32	5.20	6.52	49.58	26.05	3.29	0.14	1.09	1.04	0.44	78.9
Cotton seed hull, Aden	7.98	3.57	5.07	50.87	29.32	3.04	0.15	0.87	0.81	11.65	72.4
Cotton seed hull, Bangalore	8.68	5.05	5.93	50.06	27.44	2.75	0.09	1.11	0.95	10.40	77.5
<i>Cotton seed cake</i>											
Cotton seed cake, Quetta	6.05	12.05	36.00*	27.84	6.96	11.10		5.76	..	1.54	148.9
Cotton seed cake, Quetta	14.31	1.86	20.94	40.17	17.87	4.38	0.79	3.55	3.35	8.07	95.9
Cotton seed cake, (whole seed), Lahore	9.67	7.25	18.37	39.97	17.36	5.34	2.04	3.20	2.94	3.68	104.0

GOSSYPIMUM—concl'd.

English.—Cotton seed.

Vernacular.—Sarki, Kapasia, Rui, Tula.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Cotton seed cake—concl'd.</i>											
786 1902	Cotton seed cake, (10 per cent. husk removed), Lahore	9.65	6.57	18.81	41.60	15.81	5.32	2.24	3.37	3.00	3.00
787 1902	Cotton seed cake, (dehulled and decorticated), Lahore	11.33	11.23	24.44	35.37	10.38	5.91	1.34	4.38	3.01	2.56
882 1902	Cotton seed cake, Hissar, Punjab	9.82	8.51	17.00	40.33	18.50	4.71	1.04	2.90	2.72	3.32
5 1903	Cotton seed cake, Hull, England	10.41	4.77	17.87	29.41	20.55	5.01	1.98	3.07	2.86	3.32
40 1903	Cotton seed cake, England	10.90	4.76	17.50	43.35	17.27	4.93	1.29	..	2.80	3.10
47 1903	Cotton seed cake, England	10.73	4.94	17.44	42.60	18.75	4.59	0.95	..	2.79	3.06
594 1903	Cotton seed cake	13.30	0.99	34.97	29.55	6.21	5.92	0.66	5.82	5.50	1.52
570 1904	Cotton seed cake, Kirkee (crushed in country ghaut)	36.55	5.83	11.45	29.26	13.77	3.05	0.09	2.68	1.83	3.52
3 1911	Cotton seed cake, Military Farm, Agra	8.61	5.26	16.27	42.89	22.30	4.51	0.16	3.02	2.60	3.38
58 1911	Cotton seed cake, Military Farm, Muttra	8.32	3.92	16.02	48.18	19.28	3.90	0.20	2.91	2.56	3.57
33 1914	Cotton seed cake, Military Farm, Lahore	9.88	5.61	18.18	42.32	19.28	4.34	0.39	3.01	2.91	2.68
35 1914	Cotton seed cake, Military Farm, Ambala	7.55	7.62	19.49	42.47	14.48	5.58	2.81	3.14	3.56	3.08
225 1914	Cotton seed cake, Military Farm, Ruk	8.56	9.88	24.30	30.26	8.10	17.89	1.01	4.28	3.89	2.18
313 1914	Cotton seed cake, Military Farm, Mhow	8.48	5.13	19.88	40.29	18.72	5.50	1.91	3.26	3.18	2.62
1 1915	Cotton seed cake (undecorticated), Cawnpore	8.65	4.12	20.41	41.11	20.93	4.49	0.29	3.43	3.37	2.47

*English.—Grass and Hay.**Vernacular.—Ghas, Gawat.*

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Grass seed</i>							
Grass seed, Bikaner State	11.23	7.72	27.12*	50.79	0.50	2.41	0.25	4.84	..	2.58	138.0
				<i>Grass</i>							
Grass (green) . . .	11.07	0.00	2.69	45.40	32.07	2.05	6.72	..	0.47	16.88	52.1
Do. Aligarh	4.76	0.00	3.05	50.87	32.04	2.39	6.89	..	0.49	16.62	58.5
Grass (green), Saharawpore	47.43	0.00	2.66	22.00	22.23	2.08	3.32	..	0.42	8.27	28.7
Grass (green), Aligarh	13.83	0.00	3.56	48.16	25.42	3.64	5.30	..	0.57	13.53	57.1
Plumed grass, Juhl, Cawnpore	10.07	0.00	4.45	50.80	29.76	2.37	2.55	0.36	0.71	11.42	61.9
Grass (cut dry), Nagpur	9.81	0.00	1.54	39.38	34.58	2.67	12.01	0.26	0.25	25.58	43.2
Grass (cut green), Nagpur	9.23	0.00	2.46	44.16	31.75	1.74	10.86	0.41	0.39	17.95	50.3
Grass, Kaira, Gujarat	8.72	0.00	2.45	45.67	34.48	1.10	7.38	0.45	0.38	18.72	52.0
Grass, Aligarh . . .	6.87	0.00	5.80	48.98	30.08	3.15	5.31	1.05	0.89	8.75	63.0
Grass, Navapur, Bombay	12.40	0.00	2.12	51.21	27.16	2.88	4.28	0.37	0.34	24.18	56.5
Grass, Thana, Bombay	12.21	0.00	1.50	39.13	35.54	4.30	7.32	0.25	0.24	26.09	42.9
Grass, Saugor, Central Provinces	10.59	0.00	2.07	49.89	28.11	2.55	6.70	0.53	0.38	24.10	53.1
Grass, Jabulpore, Central Provinces	11.73	0.00	2.31	43.51	33.66	2.36	6.33	0.37	0.37	18.84	49.3
Grass, Budai, Central Provinces	11.36	0.00	1.81	44.42	35.24	1.99	5.68	0.21	0.21	33.91	47.7
Grass, Kulphar . . .	11.89	0.00	1.37	49.94	26.88	2.09	7.85	0.22	0.22	36.45	53.4
Grass, Bhopal . . .	10.73	0.00	0.94	43.92	34.98	1.14	8.24	0.15	0.15	46.72	16.3

English.—Grass and Hay.—contd.

Vernacular.—Ghas, Gawat.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grass—contd.</i>											
378 1900	L Grass, Hiranin . . .	11.58	0.00	1.31	46.33	31.80	2.14	6.84	0.22	0.21	35.3
379 1900	L Grass, Solhazpore . . .	10.91	0.00	1.37	48.21	33.08	1.34	4.96	0.29	0.22	35.21
283 1901	L Grass (yellowish), Cawnpore . . .	9.03	0.93	4.88	41.05	33.57	4.05	6.40	0.93	0.78	8.5
284 1901	L Grass (greenish), Cawnpore . . .	9.06	1.83	4.19	39.39	31.09	3.48	7.46	0.67	0.51	16.1
828 1906	Grass, Ambala . . .	7.45	0.99	7.62	32.12	35.65	8.10	7.08	1.30	1.22	4.6
26 1908	Grass (forest), Sandhaur . . .	12.15	1.62	1.73	45.84	33.54	2.28	2.84	0.28	0.27	28.6
27 1908	Grass (forest), Kans	10.98	1.72	2.84	46.02	32.59	2.12	2.83	0.47	0.45	17.9
28 1908	Do. Kus . . .	10.51	1.06	2.72	44.99	34.87	1.99	3.83	0.46	0.44	17.41
29 1908	Do. Gaurar . . .	12.31	1.19	1.91	44.85	33.48	2.77	3.40	0.40	0.31	24.9
30 1908	Grass (general ad- mixture)	9.87	2.75	2.50	44.26	34.19	2.48	3.95	0.41	0.40	20.21
38 1905	Grass (forest), Bundelkhand . . .	8.82	1.07	2.38	48.22	31.59	2.46	5.16	0.49	0.38	21.2
39 1908	Grass (forest), Bundelkhand . . .	7.58	1.14	1.39	49.21	31.42	1.97	7.29	0.28	0.22	37.29
251 1908	Grass, Barrackpore	7.39	1.63	2.63	43.25	38.00	2.41	4.06	..	0.40	17.8
252 1908	Do. Do. . . .	7.00	1.18	5.94	44.17	18.55	8.95	13.41	..	0.95	7.89
7 1909	Grass (kessari), Lucknow . . .	7.06	1.90	3.19	48.00	32.15	3.01	4.09	..	0.51	16.61
203 1909	Grass (todder), Muttra . . .	8.16	0.55	2.50	47.10	30.82	4.12	0.75	0.61	0.40	19.35
16 1910	Grass, Muttra . . .	6.25	1.82	4.69	51.56	30.57	1.75	3.36	0.81	0.75	11.89
13 1910	Do. Do. . . .	7.36	1.33	2.06	48.83	32.81	2.61	5.00	0.38	0.33	25.14
22 1910	Do. Barrackpore	8.08	1.16	3.95	49.17	30.15	2.38	5.10	0.67	0.63	13.42

*English.—Grass and Hay.—contd.**Vernacular.—Ghas, Gawat.*

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Foot units
<i>Grass—contd.</i>											
Grass, Bareilly . . .	11.47	1.72	2.46	48.72	29.30	2.54	3.75	0.42	0.39	21.41	59.2
Do. Agra . . .	9.95	1.43	0.63	49.32	30.67	1.66	6.94	0.29	0.10	83.51	54.5
Do. Do. . .	10.17	1.62	5.98	50.57	23.46	4.53	3.68	1.14	0.96	9.08	63.6
Do. Meerut . . .	13.83	1.53	5.66	47.39	24.06	3.38	4.15	1.16	0.91	8.00	65.4
Do. Do. . .	11.85	1.42	2.68	50.21	24.40	1.95	7.49	0.47	0.43	19.96	60.5
Do. Bankhet . . .	9.64	1.92	3.38*	49.80	23.04	2.63	3.90	0.55	..	16.04	63.1
Do. Do. . .	10.53	2.91	2.80*	51.50	27.24	1.99	3.13	0.43	..	20.75	65.7
Do. Nowshera . . .	7.72	0.83	4.23	49.42	21.68	5.69	10.43	0.75	0.68	12.13	62.1
Do. Do. . .	7.82	1.97	2.28	49.89	29.87	2.10	6.07	0.58	0.37	23.87	60.5
Do. Lucknow . . .	7.44	1.92	1.18	49.66	31.83	1.58	6.09	0.30	0.21	36.54	58.2
Do. Do. . .	7.41	1.44	1.75	49.03	29.95	3.15	3.27	0.59	0.28	29.91	57.0
Do. Xainital . . .	36.81	1.00	2.41*	30.80	23.88	3.12	1.98	0.59	..	13.73	39.3
Do. Do. . .	24.28	1.14	3.56*	37.59	28.91	3.58	2.14	0.57	..	11.24	49.1
Do. Do. . .	19.80	0.83	2.25*	40.18	32.15	1.73	3.62	0.36	..	18.70	47.9
Do. Do. . .	21.57	1.14	2.69*	39.34	31.45	1.90	1.91	0.43	..	15.60	48.9
Grass, Marvale, Hyderabad	7.90	1.64	2.68	47.10	31.21	1.91	7.29	0.50	0.58	17.07	58.7
Grass, Pownia, Hyderabad	7.54	1.28	1.84	46.04	28.37	2.79	1.14	0.45	0.30	26.62	53.3
Grass, Rowsa, Hyderabad	8.05	2.05	1.71	48.46	33.40	2.60	4.33	0.29	0.27	31.11	57.9

English.— Grass and Hay.—contd.

Vernacular.—Ghas, Gawat.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibres	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grass—concl.</i>											
63 1913	Grass, Gundall, Hyderabad	7.97	1.35	2.23	49.47	29.75	3.04	6.19	0.42	0.36	23.58
94 1913	Grass, Barrackpore	11.67	1.47	5.12	55.08	19.34	1.83	2.09	0.95	0.82	11.42
127 1915	Grass, Meerut (cut from shady plot)	8.24	1.31	2.56	50.16	29.40	1.66	6.07	0.46	0.41	20.51
129 1915	Grass, Meerut (cut from open and dry plot)	5.43	1.22	3.71	46.43	34.05	2.36	6.80	0.77	0.59	12.47
180 1915	Grass, Sirwala (cut from open and dry plot), Meerut	4.51	0.93	1.82	48.48	37.15	1.70	5.41	0.36	0.29	27.81
138 1915	Grass, Sirwala (cut from shady plot), Meerut	5.14	1.01	2.65	46.75	35.91	2.00	6.54	0.45	0.42	18.62
142 1915	Grass, Sirwala (cut from open and dry plot)	4.45	1.06	2.24	47.92	33.68	1.94	6.71	0.45	0.36	22.48
7 1916	Grass (Nevla), Kirkee	7.38	1.78	1.90	53.41	26.81	4.00	4.72	0.35	0.30	30.20
8 1916	Grass (Arsenal), Kirkee	6.31	1.95	2.68	45.93	32.62	2.80	8.21	0.47	0.43	18.81
9 1916	Grass (Arsenal), Kirkee	7.13	1.54	3.40	43.03	30.34	2.03	12.53	0.50	0.54	13.70
104 1916	Grass (Rhodes), Jubbulpore	1.59	1.48	4.47	45.09	34.66	9.73	2.98	1.99	0.72	19.65
<i>Hay</i>											
4 1904	Hay, Cawnpore	9.78	1.14	3.50	55.71	20.39	4.74	4.74	0.63	0.56	16.67
1089 1904	Hay, Agra, United Provinces	8.04	0.00	2.94	54.63	23.57	4.39	6.83	0.57	0.47	18.60
630 1907	Hay, Gonda, United Provinces	9.69	1.36	2.25	46.72	33.08	2.45	4.46	0.40	0.36	22.15
637 1907	Hay, Bundelkhand	7.95	1.28	1.71	51.25	31.24	2.63	3.94	0.55	0.27	31.69
639 1907	Do. Do.	9.64	1.23	1.32	46.10	32.00	2.34	5.37	0.27	0.21	36.88
643 1907	Do. Do.	8.63	1.28	2.26	45.57	31.66	2.30	8.40	0.44	0.36	21.46

English.—Grass and Hay.—concd.*Vernacular.*—Ghas, Gawat.

Description of Samples	Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and silica ^a	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				Hay - concd.								
Hay, Bahraich, United Provinces	9.48	1.50	1.63	48.52	31.81	2.61	4.45	0.28	0.26	31.88	56.4	
Hay, Gorakhpur	9.27	1.70	2.09	48.21	30.50	2.43	5.50	0.36	0.53	24.94	57.7	
Do. Ambala	10.25	1.60	3.05	42.38	30.58	3.23	9.10	0.50	0.44	15.05	54.0	
Do. Do.	10.06	2.46	11.16	38.12	36.32	9.81	2.07	2.03	1.70	3.02	72.2	
Do. Do.	10.34	1.51	3.12	43.08	32.83	3.56	4.66	0.64	0.50	15.21	55.6	
Do. Meerut	7.01	1.46	2.45	46.18	30.22	1.78	10.90	..	0.39	20.22	56.0	
Do. Do.	6.62	1.32	1.67	47.60	27.82	2.27	12.61	..	0.27	30.38	55.2	
Do. Do.	6.35	1.97	1.97	48.35	30.12	1.90	9.34	..	0.32	26.84	58.2	
Do. Do.	9.27	1.29	2.77	50.53	29.69	2.19	4.26	0.46	0.44	19.31	69.7	
Hay (<i>Cynodon dactylon</i>), Jabalpur	3.04	1.45	7.22	55.18	24.74	5.37	3.00	1.51	1.16	8.10	75.9	

GUIZOTIA ABYSSINICA, *Cass.**English.*—Niger seed.*Vernacular.*—Kala til, Ram til, Surguja.

Description of Samples	Moisture	% Ether extract	% Albuminoids	Grain		% Soluble mineral matter	% Sand and silica ^a	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				Grain							
Niger seed, Poona	6.16	41.14	20.07*	15.08	12.10	4.37	1.09	3.24	..	5.47	168.1
Do. Lucknow	8.43	38.20	19.25*	11.49	15.19	4.36	3.08	3.08	..	5.16	155.1
Do. Poona	4.88	38.03	10.31	17.47	9.20	6.69	4.42	3.19	3.09	5.43	160.8
Do. Surguja	7.70	9.32	29.44	28.65	14.70	7.04	2.35	4.97	4.78	1.68	127
Niger seed cake, Poona	7.42	9.30	39.56*	25.48	10.03	6.25	2.96	6.17	..	1.22	145.1

COMPOSITION OF SOME INDIAN FEEDING STUFFS

*HELIANTHUS ANNUUS, Linn.**English.*—Sunflower.*Vernacular.*—Surajmukhi.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	Woody fibre	Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
312 1914	Belgaum	8.38	7.35	18.02	57.87	Oil cake 1.96	4.28	2.19	3.05	2.88	4.13

*HORDEUM VULGARE, Linn.**English.*—Barley.*Vernacular.*—Jav.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	Grain		% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
					% Soluble carbohydrates	Woody fibre					
164 1893	Local Cawnpore white,	13.74	1.80	8.20*	70.32	3.49	1.76	0.60	1.33	..	2.68
165 1893	Local Cawnpore black,	12.55	1.93	7.73*	69.71	5.63	0.85	1.80	1.24	..	3.39
166 1893	Chocolate, Cawnpore	12.79	1.97	8.23*	73.23	1.73	1.89	0.15	1.32	..	3.44
168 1893	White huskless, Cawnpore	13.18	1.83	7.92*	74.12	2.10	1.00	0.85	1.26	..	3.19
4 1893	Local Cawnpore black,	11.85	1.84	8.04*	72.65	3.24	1.99	0.30	2.20	..	3.36
423 1900	Local Cawnpore white,	11.40	1.83	6.62	73.52	4.29	1.72	0.62	1.17	1.09	10.33
421 900	White huskless, Cawnpore	11.44	1.63	12.50	70.44	1.86	1.05	0.18	2.13	2.00	5.94
7 1911	Military Farm, Agra	9.32	2.46	8.38	71.44	5.67	1.61	1.22	1.39	1.34	9.20
192 1913	Crushed barley, Peshawar	8.74	1.80	9.23	73.16	4.13	1.50	1.05	1.55	1.48	8.49
280 1914	Kirkee	10.32	2.26	7.73	73.02	4.49	1.71	0.47	1.31	1.24	10.12
291 1914	Rok	9.38	2.19	8.81	69.72	5.37	2.39	2.14	1.46	1.41	3.49
299 1914	Quetta	10.48	2.12	8.51	70.43	5.27	2.00	1.19	1.38	1.36	8.83

HORDEUM VULGARE, *Linn.*—contd.*English.*—Barley.*Vernacular.*—Jav.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
				%	%						
				<i>Meal</i>							
Calcutta	10.64	2.42	18.48	70.27	1.07	1.87	0.25	2.30	2.16	5.63	119.0
				<i>Dhusa</i>							
Calcutta	7.93	..	4.00	41.45	34.82	5.53	6.25	..	0.64	10.36	51.5
Do.	12.07	1.38	7.81	39.99	24.56	0.19	5.00	1.28	1.25	3.52	63.0
				<i>Green fodder</i>							
Green Punjab	79.66	0.45	2.46	8.20	6.54	2.14	0.55	0.46	0.40	3.76	15.5
Green barley, dry state	10.31	1.98	10.85	36.16	28.84	0.11	2.42	2.03	1.76	3.75	68.2
Green barley (dried)	3.62	1.54	5.81	43.26	31.25	8.47	3.05	1.46	0.93	8.05	61.6

IPOMEA BATATAS, *Lank.**English.*—Sweet Potato.*Vernacular.*—Alua, Sakarkand, Ranga-alu, Ratalu.

Ilhalla, red	9.50	1.64	1.57	82.26	1.84	3.35	0.01	0.31	0.25	54.79	90.3
Moula, white	8.30	0.82	1.66	83.54	1.95	3.56	0.08	0.33	0.28	51.46	89.7
Highland, flesh-coloured	7.67	0.75	1.55	85.01	1.46	2.62	0.04	0.29	0.25	58.54	91.7
Gajira, red	7.59	0.92	2.29	83.60	1.46	4.01	0.04	0.44	0.37	57.47	91.7
Panna, white, very big	6.50	1.03	5.40	80.54	1.52	4.92	0.09	1.17	0.95	15.64	96.6
Panna, white, very big	6.16	1.23	1.87	85.40	2.05	3.19	0.10	0.39	0.30	47.18	93.2
Panna, white, very big	5.05	1.23	2.77	86.00	1.76	3.06	0.13	0.49	0.44	32.97	96.0
Panna, white, very big	7.26	1.27	2.59	84.03	1.78	2.91	0.16	0.52	0.41	33.57	93.7
Panna, white, very big	4.86	1.36	2.48	86.35	1.76	3.09	0.10	0.57	0.40	36.00	86.6
Panna, white, very big	5.22	1.42	3.41	84.47	2.06	3.32	0.10	0.70	0.55	26.30	96.8

*LATHYRUS SATIVUS, Linn.**English.*—Chickling-Vetch.*Vernacular.*—Khesari, Lakh, Lang, Teora.

Laboratory No.	Description of Samples	% Moisture		% Ether extract	% Albuminoids	% Soluble carbohydrates	Grain		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Protein value
107 1899	Poona	7.80	0.70	24.60	57.98	4.28	3.18	1.19	4.21	3.95	2.42	11			
56 1899	Poona	6.10	5.00	9.75	45.39	19.36	9.49	4.91	1.96	1.56	5.81	11			
265 1899	Do.	11.08	2.93	9.25	43.03	20.57	10.46	2.68	1.66	1.32	5.90	11			

*LENS ESCULENTA, Moench.**English.*—Lentil.*Vernacular.*—Masur.

Laboratory No.	Description of Samples	% Moisture		% Ether extract	% Albuminoids	Grain		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Protein value
103 1899	Poona	8.03	1.06	23.00	61.14	2.42	3.54	0.81	3.94	3.68	2.76	12		
273 1902	Masur bhua	10.23	1.80	4.37	50.03	21.36	10.82	1.39	0.66	0.70	12.39	9		

*LINUM USITATISSIMUM, Linn.**English.*—Linseed.*Vernacular.*—Alsi, Masina, Tisi.

Laboratory No.	Description of Samples	% Moisture		% Ether extract	% Albuminoids	Seed		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Protein value
94 1899	Brown variety, Poona	4.97	37.47	20.92	26.24	5.60	3.06	0.84	3.71	3.35	6.37	12		
426 1900	Brown variety, Cawnpore	6.62	43.16	15.00	26.01	4.94	3.67	0.80	2.67	2.40	8.65	12		
307 1914	Mhow	3.56	41.34	17.45	26.43	5.71	3.82	1.69	2.99	2.79	6.99	12		

LINUM USITATISSIMUM, *Linn.*—conold.*English.*—Linseed.*Vernacular.*—Alsi, Masina, Tisi.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and Silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Linseed cake . . .	21.71	2.46	27.19	32.46	6.42	6.67	3.09	4.50	4.35	1.40	106.6
Do.	10.45	9.42	26.69	40.28	6.32	5.47	1.39	4.35	4.27	2.32	130.5
Do.	16.24	8.99	30.44	32.39	4.90	5.85	1.48	5.05	4.87	1.74	130.7
Do.	8.63	11.72	26.75	33.68	6.06	5.79	1.37	4.28	4.11	2.49	136.9
Do. Aden	7.77	11.59	27.22	26.04	2.85	10.00	4.44	6.41	5.96	1.42	148.1
Do. Mhow	8.58	10.57	30.72	36.73	6.72	5.33	1.35	5.25	4.92	1.99	140.0
Linseed cake, Jubbulpore	8.70	13.19	27.02	37.59	6.59	5.32	1.59	4.80	4.32	2.51	138.1

MEDICAGO SATIVA, *Linn.**English.*—Lucerne, Alfalfa.*Vernacular.*—Vilayti-gawuth.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and Silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				Green fodder	Dried							
Poona	77.75	0.76	3.00	11.89	3.74	2.75	0.11	0.71	0.48	4.55	21.29	
Do.	78.32	0.75	3.61	11.21	3.35	2.44	0.12	0.61	0.61	3.40	22.61	
Baled, Quetta	3.14	3.32	15.48	46.30	11.70	11.83	2.23	2.98	2.48	3.49	99.3	
Dried in country fashion, Quetta	5.00	2.80	11.71	43.87	27.95	8.10	0.47	2.19	1.87	4.40	80.4	

MELILOTUS PARVIFLORA, *Desf.**Syn.*—TRIFOLIUM INDICUM.*English.*—Senji.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and Silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				Green fodder	Dried							
Punjab	84.40	0.36	2.69	6.16	4.13	1.87	0.39	5.15	0.43	2.60	13.8	
Dry state	10.00	2.08	15.52	35.54	23.83	10.79	2.25	2.97	2.47	2.60	79.5	

COMPOSITION OF SOME INDIAN FEEDING STUFFS

MISCELLANEOUS.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food value
<i>Mixed rape and cotton cake</i>												
784 1902	Lahore	9.70	8.21	26.50	19.07	10.86	3.23	1.34	4.27	4.24	2.32	53
237 1907	Do.	9.10	7.40	22.06*	40.54	13.97	5.50	1.43	3.53	..	2.61	51
<i>Mixed groundnut and niger seed cake</i>												
17 1902	Poona	7.32	9.12	42.06	25.42	8.19	6.45	1.44	6.97	6.73	1.61	55
61 1902	Nasik	9.44	8.14	29.01	28.52	14.17	6.89	2.90	4.98	4.79	1.33	51
<i>Mixed oil cake</i>												
840 1904	Hyderabad, Sind	5.87	11.42	31.01	35.08	8.16	6.07	1.49	5.60	5.10	1.42	51
212 1906	Anbala	9.47	9.86	28.81	34.79	9.99	5.87	1.23	5.25	4.61	1.99	52
213 1906	Do.	8.78	10.24	28.35	35.83	9.04	5.93	1.83	5.02	4.54	2.09	52
<i>Priehly pear</i>												
575 1902	Poona	16.06	..	2.94*	21.81	0.50	0.47
<i>Molasses.</i>												
72 1908	Lucknow	13.48	..	1.30	79.74	7.96	5.98	0.56	..	0.21	54.42	5
<i>Mixed gram and barley</i>												
69 1911	Muttra	9.49	2.74	12.71	67.03	5.40	1.92	0.71	2.28	2.63	5.77	56
<i>Mixed Bhusa</i>												
376 1909	Dargal Altabahad Bhusi.	10.38	3.73	4.84	61.32	14.93	3.03	1.77	1.72	0.77	14.44	5
100 1912	Nowshera	6.01	1.42	3.08	44.40	23.89	4.28	10.92	0.57	0.50	15.48	5
102 1912	Do.	4.58	1.86	3.34	45.79	31.77	4.18	8.98	0.50	0.53	14.65	5
159 1916	Sialkot	1.28	1.16	2.68	48.12	34.80	2.05	9.91	..	0.48	18.91	5

ORYZA SATIVA, *Linn.*—contd.*English.*—Paddy, Rice.*Vernacular.*—Dhan, Dangar, Bhatta, Chaval, Nellu.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter		% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain decorticated—concd.</i>												
458 1900	L Panlkeoa, Assam .	13.75	0.91	7.25	76.77	0.18	1.05	0.09		1.25	1.16	10.88
460 1900	L Ranga Abu, Assam	13.78	1.23	0.32	73.35	0.62	1.54	0.16		1.54	1.49	8.17
611 1902	Rice, cleaned .	12.66	1.17	6.43*	78.63	0.25	0.86			1.03	..	12.68
612 1902	Do. Kankl .	13.21	1.29	7.62*	76.55	0.40	0.85			1.22	..	10.41
	Hemcha, Sabour .	12.45	2.44	8.64	74.44	0.57	1.40			1.38	1.38	9.27
	C. P. Aus, Bankipore	12.28	2.19	7.56	75.28	0.95	1.74			1.21	1.20	10.82
	Kalamdan, Dumraon	11.14	2.40	6.06	78.56	0.50	1.54			0.97	0.97	13.84
	Badshahhog Do.	11.44	2.59	8.63	74.60	0.90	1.84			1.33	1.37	9.33
<i>Rice, polished</i>												
	Hemcha, Sabour .	10.76	0.60	8.25	80.28	0.13	0.60			1.32	1.31	9.90
	C. P. Aus, Bankipore	11.60	1.14	7.39	78.91	0.95	0.91			1.18	1.15	10.99
	Kalamdan, Dumraon	11.83	0.85	5.60	80.42	0.35	0.86			0.91	0.90	14.48
	Badshahhog, Do.	12.08	0.99	8.63	77.37	0.10	0.83			1.28	1.33	9.23
<i>Rice dust</i>												
274 1914	Rice sweepings, Kirkee	9.64	2.59	9.26	74.17	1.51	1.74	1.09		1.59	1.48	8.65
319 1915	White rice dust, Kassul	11.07	3.05	11.90	60.42	1.94	5.83	5.79		2.22	1.90	5.66
<i>Rice bran</i>												
566 1900	L Bran mixed with husks, Madras	7.98	7.06	5.50	32.98	27.44	3.40	15.64		1.01	0.88	8.95
567 1900	L Bran mixed with husks, Madras	8.44	9.56	5.94	35.53	22.91	3.71	13.91		1.06	0.95	9.46
<i>Rice husk</i>												
36A 1900	L Fine winter, Bengal	9.33	5.43	4.81	40.15	22.14	2.73	15.41		1.06	0.77	16.94
35A 1900	L Coarse winter, Burdwan	6.7	3.04	4.12	34.32	25.31	2.57	23.91		0.74	0.66	16.02

COMPOSITION OF SOME INDIAN FEEDING STUFFS

*Panicum maximum, Jacq.**Syn.* PANICUM JUMENTORUM, *Pers.**English.*—Guinea grass.*Vernacular.*—Gini gawat.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
50 1899	L Poona	63.38	0.84	1.88	Green fodder		2.60	3.15	0.41	0.30	11.02
52 1899	L Do.	71.55	1.05	2.62	19.36	8.79	1.87	3.46	0.53	0.42	6.16

PANICUM MILIACEUM, *Linn.**English.*—Common millet.*Vernacular.*—Varagu, China, Vari.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Grain		% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
88 1899	L Poona	7.95	4.11	6.81	67.26	7.63	2.16	4.08	1.18	1.09	11.26
97 1899	L Do.	8.57	5.09	9.38	64.21	6.30	2.50	3.95	1.52	1.50	8.96
45 1900	L Punjab	9.99	4.52	7.94	64.13	8.24	1.83	3.35	1.39	1.27	9.29
633 1902	Vari	12.62	4.40	7.31*	64.19	8.99	2.49		1.17	..	10.17
636 1902	Vari cleaned grain .	12.47	1.44	7.93*	76.66	0.39	1.20	..	1.27	..	10.08
634 1902	Chaff before grinding	12.54	3.94	10.12*	55.80	8.72	8.88	..	1.62	..	6.41
635 1902	Do. after do. . . .	12.10	6.54	7.18*	45.76	21.65	0.77	..	1.15	..	8.47

PANICUM MILIARE, Lamk.

English.—Little millet.*Vernacular.*—Shamai, Sava, Kutki, Gondula, Kungu.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				%	%							
Sava	12.98	5.33	9.06*	60.93	7.57	4.13		1.45	..	8.12	95.9	
Sava cleaned grain	12.92	1.79	9.50*	74.65	0.35	0.79		1.52	..	8.29	102.9	
Sava chaff before grinding	12.25	3.94	9.06*	53.60	13.76	7.39		1.45	..	9.61	86.1	
Sava chaff after grinding	11.11	9.76	7.15*	39.13	21.41	11.41		1.15	..	8.57	81.5	

PAPAVER SOMNIFERUM, Linn.

English.—Poppy.*Vernacular.*—Kashkash, Postadana.

Sample	% Seed								Total nitrogen	Albuminoid ratio	Food units
	%	%	%	%	%	%	%	%			
Sample	1.07	48.95	17.75	16.99	5.09	6.85	0.30	2.97	2.84	7.30	183.7

PASPALUM SCROBICULATUM, Linn.

English.—Kodo millet.*Vernacular.*—Kodon, Kodra, Harik.

Sample	% Grain								Total nitrogen	Albuminoid ratio	Food units
	%	%	%	%	%	%	%	%			
Ponca	8.01	3.36	5.81	70.06	8.47	1.34	2.95	1.60	0.93	13.32	93.0
Kodra cleaned	12.84	1.20	8.06*	75.28	0.55	1.98		1.29	..	9.71	98.7
Kodra	11.71	2.85	8.75*	64.72	9.14	5.83		0.92	..	8.15	99.7
Kodra No. 1	10.21	3.29	6.54	68.00	3.20	1.98	1.93	1.09	1.01	11.62	92.1

PASPALUM SCROBICULATUM, *Linn.*—conold.*English.*—Kodo millet.*Vernacular.*—Kodon, Kodra, Harik.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter.	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
66 1903	Kolaba No. 2	8.46	3.41	6.36	66.41	10.95	2.05	2.36	1.07	1.02	11.67
68 1903	Ratnagiri	9.07	3.94	5.40	70.77	9.37	0.80	1.09	0.99	0.87	14.59
70 1903	Do.	8.71	2.90	6.31	71.02	8.92	1.24	0.90	1.04	1.01	12.31
71 1903	Do.	8.83	3.17	6.19	69.75	9.32	1.15	1.59	1.14	0.99	12.45
73 1903	Do.	8.04	3.13	5.81	68.69	11.65	1.39	1.29	1.00	0.93	12.04
75 1903	Do.	7.43	2.46	5.31	69.47	9.98	2.48	2.67	0.88	0.85	14.04
814 1902	Kodra husk after grinding	10.56	3.28	4.87*	71.10	2.19	8.90		0.78	..	16.15

PENNISETUM TYPHOIDEUM, *Rich.**English.*—Bulrush millet, Spiked millet.*Vernacular.*—Bajra, Kambu.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter.	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
81 1899	L "Mahidhri," Poona	8.05	5.36	9.89	74.26	0.60	1.00	0.25	1.72	1.58	8.78
84 1899	L "Bhownuggri," Poona	8.80	5.37	9.37	73.94	0.86	1.68	0.18	1.58	1.41	9.21
91 1899	L "Awmed," Poona	8.09	5.50	10.00	72.99	0.62	2.12	0.68	1.70	1.60	8.96
95 1899	L Nadiad, Poona	8.87	5.08	8.62	74.75	0.60	1.59	0.19	1.47	1.38	10.00
98 1899	L Local variety, Poona	8.86	5.75	8.12	74.11	0.93	1.74	0.39	1.34	1.30	10.78
43 1900	L Punjab	10.08	4.93	11.12	71.07	0.76	1.64	0.40	1.86	1.78	7.71
826 1902	L Bajra	14.30	5.16	8.75*	67.87	1.34	2.58		1.40	..	9.11
827 1902	Purchased	12.84	3.89	8.43*	70.72	1.39	2.74		1.35	..	9.45
828 1902	Home made	13.54	3.74	8.75*	71.19	1.39	1.39		1.40	..	9.11

PHASEOLUS ACONITIFOLIUS, Jacq.

English.—Aconite-leaved kidney bean.*Vernacular*.—Moth, Matti-kalai, Bhringga.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
<i>Grain</i>											
1. Poona	8.59	1.07	22.50	58.85	4.24	3.99	0.76	4.01	3.60	2.73	117.8
1. Punjab	7.46	0.83	20.50	63.55	3.83	3.58	0.25	3.75	3.28	3.19	116.9
1. Rimeh-je, Assam .	13.78	0.67	17.00	50.34	5.73	3.43	0.05	2.97	2.72	3.52	103.5
<i>Dhusa</i>											
1. Lahore	8.78	2.80	12.13	47.12	14.20	10.48	4.40	3.21	1.94	4.42	84.5
<i>Green fodder</i>											
1. Punjab	74.70	0.89	3.20	12.00	4.99	2.95	1.27	0.68	0.51	4.39	22.2
Dry state	10.00	3.16	11.36	42.60	17.71	10.47	4.70	2.43	1.82	4.39	78.9

PHASEOLUS LUNATUS, Linn.

English.—Lima bean, Duffin bean, Burma bean.*Vernacular*.—Pegyi, Banbarbati.

From Tempesby & Co.	9.13	1.15	15.50	65.82	4.71	3.69	0.00	2.83	2.48	4.42	107.5
Burma	10.00	1.15	12.63	67.94	4.17	3.80	0.19	2.80	2.03	5.56	102.5
Do.	9.53	0.89	14.56	66.80	4.15	3.78	0.29	3.12	2.33	4.73	105.4
Burma (Sogaing District).	10.29	1.28	14.06	66.37	3.83	3.98	0.19	3.08	2.55	4.93	104.7
Burma (Pakoku District)	10.03	1.22	12.69	67.89	3.76	4.23	0.18	3.00	2.03	5.57	102.7
From Morrison and Dewna.	13.60	1.32	11.35	65.11	4.86	3.66	0.10	2.85	1.82	6.00	96.8
Gillespi & Co. . .	14.44	1.25	12.60	63.59	4.45	3.48	0.10	2.82	2.03	5.24	98.4

PHASEOLUS LUNATUS, *Linn.*—concl'd.*English.*—Lima bean, Duffin bean, Burma bean.*Vernacular.*—Peyi, Banbarbati.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Point source
281 1903	Rangoon market	14.53	0.92	13.69	62.66	4.42	3.78	0.00	2.92	2.19	4.75	6
282 1903	Morrison and Downes	10.79	1.41	13.35	66.29	4.27	3.89	0.00	3.21	2.14	5.21	11
283 1903	Giltspl & Co.	16.92	0.92	11.87	63.09	3.65	3.55	0.00	3.06	1.89	3.49	6
284 1903	Rangoon market	16.97	0.95	12.19	62.56	3.70	3.63	0.00	3.06	1.95	3.82	11

PHASEOLUS MUNGO, *Linn.**Vernacular.*—Urid, Mash-kalai.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates			% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Point source
					<i>Craus</i>									
100 1890	L Poona	8.14	0.99	18.50	59.11	4.33	4.51	4.42	3.21	2.96	3.49	11		
50 1900	L Green Punjab variety,	11.05	0.96	20.13	60.82	3.48	3.17	0.39	3.51	3.22	3.13	11		
51 1900	L Black Punjab variety,	9.69	1.13	22.81	50.36	3.27	3.54	0.20	3.75	3.65	2.72	11		
183 1900	L "Black Madras grain,"	9.97	0.82	21.81	50.64	3.77	3.24	0.75	3.77	3.49	2.82	11		
479 1900	"Mation b," Assam	10.49	0.83	20.50	59.03	4.79	3.58	0.30	3.64	3.28	2.97	11		
223 1903	Cawnpore	11.67	1.02	22.32	57.52	3.88	3.50	0.59	3.74	3.57	2.68	11		
					<i>Dusa</i>									
186 1900	L Black grain bhusa, Madras	15.96	1.70	11.15	39.14	17.08	9.97	4.96	2.03	7.9	3.55	7		
375 1902	Urid bhusa	9.89	1.13	6.13	41.86	32.58	7.03	1.38	1.80	0.68	7.23	6		
41 1903	Lahore	8.97	2.56	14.50	44.11	10.62	8.87	10.37	2.48	2.32	3.45	6		
333 1903	Cawnpore	10.92	1.91	8.94	35.82	11.47	9.57	21.27	1.54	1.43	4.50	6		

COMPOSITION OF SOME INDIAN FEEDING STUFFS

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PHASEOLUS RADIATUS, *Linn.*

English.—Green gram.

Vernacular.—Mug, Mung.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Grain</i>							
1. Poona	9.48	1.83	23.36	56.29	4.42	4.02	0.30	4.03	3.77	2.57	119.9
1. Mut, Punjab	10.02	0.93	22.91	58.94	3.38	3.71	0.05	3.76	3.67	2.66	118.6
1. Dussara, Godavari	11.04	0.79	20.82	58.72	4.04	3.99	0.90	4.17	3.33	2.91	112.7
1. Musso, Ganjam, Madras	9.79	0.86	20.12	61.67	3.71	3.32	0.33	3.75	3.33	3.16	111.1
1. Cawnpore	11.00	0.66	18.69	62.19	3.43	3.32	0.51	3.41	2.99	3.45	111.3
				<i>Bhusa</i>							
1. Rajahmundry, Madras	13.30	2.52	10.88	49.35	18.60	10.33	3.91	1.85	1.71	4.21	73.9
1. Mung bhusa	9.27	2.03	8.56	39.45	18.76	8.77	13.16	1.43	1.37	5.15	65.9
1. Lahore	9.50	2.43	11.81	45.93	14.81	10.60	4.99	2.10	1.89	4.36	85.5

PISUM ARVENSE, *Linn.*

English.—Grey or Field Pea.

Vernacular.—Karain, Mattar rewari.

1. Cawnpore	10.56	0.93	20.12	<i>Grain</i>		2.54	0.05	3.45	3.22	3.16	114.6
				61.34	4.46						
1. Field Pea (Fodder)	4.56	2.42	9.93	<i>Green fodder</i>		0.11	0.06	3.35	1.59	5.43	75.7
				44.84	23.48						

PISUM SATIVUM, *Linn.**English.*—Garden Pea.*Vernacular.*—Bara-mattar, Bahtahna.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
					<i>Grain</i>						
1180 1893 L	White, Cawnpore . . .	12.05	1.27	24.12*	54.44	5.47	2.65	0.00	3.84	..	2.38 H
181 1893 L	Black, Do.	11.27	1.47	24.67*	52.47	6.07	3.30	0.15	3.95	..	2.22 H
90 1899 L	Vatanc, Poona	7.80	1.40	20.06	62.12	5.69	2.79	0.05	3.38	3.21	3.26 H
420 1900 L	Do. Cawnpore	11.42	1.17	21.00	57.84	5.43	3.05	0.09	3.87	3.36	2.68 H
637 1900 L	Do. Jubbulpore . . .	11.05	1.06	19.00	61.86	3.20	2.99	0.78	3.31	3.04	3.38 H
					<i>Bhusa</i>						
58 1899 L	Poona	7.27	3.02	11.75	42.43	19.36	9.65	6.52	2.49	1.89	1.20

RICINUS COMMUNIS, *Linn.***English.*—Castor.*Vernacular.*—Arand, Bherenda.

				<i>Seed</i>							
430 1900 L	Large variety, Cawnpore.	7.43	45.28	14.00	10.59	19.58	2.04	0.18	2.36	2.24	8.20
					<i>Cake</i>						
63 1902	Surat	11.83	7.18	30.06	25.02	19.60	5.57	0.65	5.05	4.81	1.58
294 1902	Bronch	7.55	7.07	29.31	29.63	19.73	5.57	1.14	4.82	4.69	1.57
326 1902	Surat	12.37	4.50	27.56	18.08	29.71	6.84	0.94	5.05	4.41	1.03

* Although not used for feeding purposes, this is included here for the sake of comparison with edible oil-cakes.

SACCHARUM OFFICINARUM, *Linn.**English.*—Sugarcane.*Vernacular.*—Ukh, Ak, Ganna, Oos.

Description of samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Sugarcane (fodder), Lucknow	31.85	1.03	1.01	37.76	<i>Cane</i> 21.56	2.23	4.56	0.19	0.16	39.73	42.0
Molasses, Lucknow	11.20	0.00	1.52	65.84	<i>Molasses</i> 14.78	4.07	1.60	..	0.24	4.33	69.6
Sugarcane leaf, Bangalore	7.27	1.47	3.12	47.38	<i>Leaf</i> 34.40	4.27	2.09	0.55	0.50	16.27	58.1

SESAMUM INDICUM, *DC.**English.*—Gingelly, Sesame.*Vernacular.*—Til.

				<i>Seed</i>							
L. White var., Ahmednagar.	4.48	48.13	22.50*	14.05	4.49	5.59	0.37	3.60	..	6.54	190.6
L. Black var., Nadiad.	5.43	46.50	25.81*	9.06	6.51	6.03	0.65	4.13	..	4.50	189.8
L. Red var., Ahmednagar.	5.37	46.20	21.03*	15.87	4.18	0.00	1.35	3.37	..	5.81	184.0
L. Red var., Poona	4.18	49.12	20.37	14.16	2.93	6.65	2.50	3.34	3.26	6.24	187.9
L. Black var., Do.	4.14	47.60	18.12	18.56	4.14	6.85	0.59	3.11	2.90	7.07	182.9
L. White var., Do.	4.21	51.96	18.06	14.62	4.49	6.28	0.38	2.99	2.89	7.43	189.7
L. Black var., Punjab	5.57	52.27	17.94	18.26	3.67	6.58	0.51	3.06	2.87	7.44	188.8
L. White var., Do.	5.53	48.53	21.37	13.96	3.56	6.56	0.49	3.68	3.42	5.88	188.7
L. Black var., Cawnpore	4.82	47.11	20.00	15.86	5.20	6.34	0.67	3.39	3.20	6.21	188.6

SESAMUM INDICUM, DC.—conold.

English.—Gingelly, Sesame.

Vernacular.—Til.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woolly fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food value
432 1900	L White var., Cawnpore	4.01	48.00	10.60	15.60	5-15	6.82	0.33	3.36	3.15	6.49	150
433 1900	L Do. Do.	4.51	48.45	10.00	16.22	4.33	6.60	0.89	3.23	3.04	6.72	161
822 1902	Til seed	5.07	44.56	10.00*	13.51	4.74	12.52	0.00	3.04	..	6.11	154
169 1898	L Red var., Poona	10.39	14.12	29.46	29.91	3.88	8.52	3.72	5.81	4.71	2.12	139
170 1898	L Black var., Do.	10.07	19.90	31.66	29.59	10.30	5.77	1.71	6.15	5.06	1.73	137
15 1902	Oil cake, Do.	9.05	15.14	36.31	25.00	3.08	8.95	1.59	6.03	5.81	1.65	132
62 1902	Do. Surat	11.20	10.90	32.63	26.00	7.83	8.66	1.69	5.69	5.38	1.52	124
66 1902	Do. Khandesh	7.36	11.87	29.88	31.21	8.63	9.50	1.49	5.41	4.78	1.96	135
90 1902	Do. Tanjab	6.95	8.08	37.31	29.89	3.67	11.50	2.60	6.29	5.97	1.30	134
203 1902	Til oil cake, Sauger	6.50	7.22	32.56	36.80	4.18	10.09	2.65	5.49	5.21	1.64	137
203 1902	Do. Broach	8.34	15.13	34.44	24.87	2.98	10.79	3.45	5.88	5.51	1.73	163
327 1902	Do. Surat	13.41	6.41	35.31	28.16	6.81	9.31	0.59	6.16	5.65	1.22	122
518 1902	A Do. Raipur	12.69	11.29	33.18	28.45	3.61	10.50	2.28	5.63	5.31	1.35	134
635 1902	Do. Rodputti	15.13	8.36	30.31	30.30	3.00	10.85	2.04	5.13	4.85	1.43	153
522 1902	Do. Sambalpur.	14.64	8.62	33.43	27.51	3.86	9.69	2.25	5.67	5.35	1.42	123
595 1902	Do. Chanda	16.23	3.60	35.37	27.50	4.40	11.46	1.44	6.07	5.06	1.61	133
844 1902	Do. Madras.	20.29	6.49	48.38	13.94	2.55	6.76	1.50	7.79	7.74	6.69	151
1 1911	Do. Agra	7.40	8.50	36.35	31.58	4.09	9.06	1.22	6.15	5.82	1.41	137
326 1914	Do. Jubbulpore.	7.74	17.12	33.16	24.07	2.25	6.65	4.99	5.55	5.31	1.91	143
4 1915	Do. Cawnpore.	10.07	16.32	41.66	22.35	2.34	6.77	0.52	7.19	6.66	1.44	162

COMPOSITION OF SOME INDIAN FEEDING STUFFS

51

SETARIA ITALICA, Beauv.

English.—Italian millet.

Vernacular.—Rala, Kangni.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
"Rala," Poona	7.75	4.54	10.37	69.19	5.22	1.44	1.40	1.68	1.68	7.68	105.5
"Kangni," Punjab	10.11	4.00	10.50	63.81	6.20	1.74	2.50	1.75	1.68	7.16	102.5
"Swaux," Punjab	10.25	4.33	10.62	65.37	6.18	2.25	1.00	2.07	1.70	7.09	102.8
W. " Rai-Soh," Hill district, Assam.	11.96	3.46	10.25	62.79	6.23	2.08	2.33	1.72	1.64	6.90	97.1
Rala grain (cleaned)	12.17	4.14	10.00*	63.48	8.64	1.57		1.60	..	7.50	98.8
Rala chaff (before grinding).	12.48	2.81	9.37*	54.40	10.06	4.85		1.50	..	6.50	84.9
Rala chaff (after grinding).	13.26	5.18	6.87*	40.52	22.92	11.18		1.10	..	7.64	70.7
					<i>Green fodder</i>						
L Kangni (fresh), Punjab.	76.70	0.54	2.08	10.08	6.37	1.82	2.32	4.81	3.32	5.44	16.6
"Kangni (dry), Punjab.	10.00	2.00	8.07	39.11	24.71	7.02	9.00	1.86	1.28	5.44	64.5

SILAGE.

L Air-dry silage, Nagpur	12.08	0.00	2.53	40.52	33.95	1.38	9.34	0.47	0.11	16.02	46.9
Maize silage (fresh state), Nagpur	81.87	0.21	0.77	9.14	5.50	1.10	1.11	0.17	0.12	12.88	11.9
Maize silage (air-dry)	7.66	1.07	3.08	48.02	28.06	5.80	5.66	0.90	0.63	12.84	60.5
L Sorghum silage (fresh)	60.52	0.65	1.89	21.37	11.29	1.59	2.69	0.33	0.40	12.10	37.7
Sorghum silage (air-dry)	5.72	1.55	4.53	51.10	26.87	3.80	6.43	0.79	0.72	12.07	66.3
Silage of Sunghia Juar	4.60	2.43	4.25	53.74	24.71	4.52	5.65	1.03	0.68	14.01	70.7
Silage (fresh)	51.69	1.96	2.87	21.65	15.52	2.93	3.38	0.81	0.46	8.91	33.1
Silage	6.10	1.48	5.31	42.31	32.22	6.04	6.54	0.90	0.85	8.61	59.2

COMPOSITION OF SOME INDIAN FEEDING STUFFS

SORGHUM VULGARE, *Pers.**English.*—The Indian or Great Millet, Guinea corn.*Vernacular.*—Juar, Cholam, Janera.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates		% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
					<i>Grain.</i>							
23 1896	L Juar grain, Nagpur	9.96	7.66	7.60	70.15	2.24	1.67	0.63	1.20	1.23	11.41	
63 1898	L Juar grain, (white fine), Surat	12.04	3.06	7.10	74.45	1.30	1.61	0.32	1.21	1.13	11.47	
64 1898	L Juar grain (white fine) (2nd class), Surat	11.55	3.50	6.00	76.70	0.96	1.24	0.05	1.05	0.96	11.12	
65 1898	L Juar grain (red cheap-grain), Surat	12.08	3.22	9.02	71.47	1.17	1.37	0.27	1.67	1.58	7.95	
273 1899	L Juar grain, "Khend," Poona	9.98	3.61	11.87	71.54	1.12	1.33	0.05	1.96	1.31	6.73	
278 1899	L Juar grain, "Nilwa," Poona	10.41	4.45	11.19	70.09	1.18	1.73	0.05	1.91	1.79	7.35	
279 1899	L Juar grain, "Dudh Mogra," Poona	10.21	4.13	10.19	71.90	1.22	2.11	0.24	1.74	1.63	7.99	
280 1899	L Juar grain, "Mal Dandi," Poona	8.76	3.47	9.57	74.20	1.75	1.92	0.33	1.65	1.53	8.39	
281 1899	L Juar grain, "Sundia," Poona	9.90	4.59	12.44	70.05	0.79	1.33	0.40	2.11	1.99	6.68	
42 1900	L Juar grain (brown), Punjab	11.33	3.16	8.94	71.88	2.09	1.90	0.70	1.49	1.43	8.55	
56 1900	L Juar grain (white), Punjab	12.04	3.13	8.19	73.44	1.37	1.61	0.19	1.34	1.31	8.33	
404 1900	L Juar grain (red), Gazipore	11.25	3.20	9.44	73.37	1.56	1.31	0.23	1.62	1.51	8.47	
405 1900	L Juar grain (white), Agra	11.71	3.64	7.99	72.99	1.36	1.32	0.29	1.34	1.27	10.34	
406 1900	L Juar grain (white), Cawnpore	11.37	3.58	8.19	73.46	1.66	1.64	0.10	1.39	1.31	8.67	
407 1900	L Juar grain (dwarf brown), Cawnpore	10.86	3.39	8.31	73.40	1.31	1.68	0.05	1.48	1.41	8.22	
623 1902	Do. do.	14.41	3.23	8.31*	70.64	1.59	1.32	0.00	1.33	..	8.33	
624 1902	Juar flour (Purchased)	14.20	2.53	8.25*	71.66	1.44	1.33	0.00	1.32	..	9.49	
625 1902	Juar flour (Home made)	14.68	2.43	9.31*	70.33	1.39	1.36	0.00	1.49	..	8.15	

SORGHUM VULGARE, *Pers.*—contd.*English.*—The Indian or Great Millet, Guinea corn.*Vernacular.*—Juar, Cholam, Janera.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Grain—concd.</i>							
Juar grain, Cawnpore	14.02	3.06	5.75	73.41	1.10	1.72	0.85	1.21	0.02	13.09	95.4
Do. do.	13.33	3.04	7.44	72.70	1.22	1.78	0.40	1.10	1.29	10.70	98.9
Do. do.	13.88	2.88	6.94	72.72	1.20	2.00	0.29	1.21	1.11	11.43	97.3
				<i>Green fodder</i>							
Juar (sun-dried sample), Aligarh	8.35	0.00	4.10	47.85	33.59	3.28	2.74	0.70	0.67	11.42	58.3
Juar (reaped green), Nagpur	69.76	0.00	0.55	14.74	11.90	1.17	1.88	0.11	0.09	26.80	16.1
Juar (reaped ripe), Nagpur	67.02	0.00	0.61	16.42	12.78	1.52	1.62	0.17	0.10	23.66	18.0
Juar (dead ripe), Nagpur	10.79	0.00	2.24	51.57	23.42	3.04	0.94	0.40	0.36	23.02	57.2
Juar (cut in October), Cawnpore	56.10	0.00	3.10	20.65	15.32	2.29	2.54	0.56	0.50	6.66	28.4
Juar (cut in March), Cawnpore	63.77	0.00	1.54	18.50	10.35	1.77	4.07	0.42	0.25	2.01	22.4
Do. do.	48.78	0.00	2.01	25.31	15.92	2.10	5.88	0.43	0.32	12.50	30.3
Juar (cut in March), Madras	80.24	0.46	1.21	9.71	0.15	1.00	1.14	0.23	0.19	8.90	13.9
Juar (cut in March), Punjab	80.27	0.51	1.24	8.87	6.18	1.51	1.42	0.24	0.20	9.10	13.3
Kerli (Juar) green, Ruk	3.75	1.42	4.28	32.61	30.50	5.11	2.33	1.04	0.68	13.66	66.9
Kerli (Juar), Nilwa, Ruk	3.78	1.83	1.44	40.60	35.73	5.91	1.05	0.43	0.23	37.37	57.6
				<i>Straw</i>							
Juar straw, Cawnpore.	10.63	1.43	2.38	42.80	20.60	4.27	17.59	0.33	0.33	10.37	52.3
Do. do.	13.00	2.43	2.56	46.58	23.75	4.06	7.93	0.51	0.41	10.99	58.4
Do. do.	12.20	1.94	2.19	45.91	23.58	4.36	9.02	0.42	0.35	22.89	56.0

COMPOSITION OF SOME INDIAN FEEDING STUFFS

SORGHUM VULGARE, *Pers.*—concd.*English.*—The Indian or Great Millet, Guinea corn.*Vernacular.*—Juar, Cholam, Janera.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre!	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Bhusa</i>											
9 1898	L Juar Bhusa, Nagpur	12.61	0.00	2.24	45.95	25.42	3.23	10.56	0.48	0.36	26.01
174 1898	L Juar Bhusa, "Sundhia" (not quite ripe), Poona	8.04	2.10	3.83	47.98	27.90	2.91	7.15	0.64	0.61	15.48
175 1898	L Juar Bhusa, "Kowbi" (not quite ripe), Poona	7.35	2.11	2.29	46.27	31.38	3.45	7.15	0.41	0.37	22.22
148 1900	L Juar Bhusa, Samalkota, Madras	7.63	3.09	4.50	44.67	21.64	3.42	15.05	0.81	0.72	11.50

SORGHUM VULGARE *var.* SACCHARATUS, *Pers.**English.*—Sugar Sorghum, Amber Cane.*Vernacular.*—Deo-dhan.

<i>Green fodder</i>											
18 1896	L Deo-dhan (reaped green), Nagpur	70.96	0.00	0.81	12.14	12.57	1.23	2.29	0.18	0.13	14.83
20 1896	L Deo-dhan (reaped ripe), Nagpur	57.15	0.00	1.22	19.17	18.13	1.29	3.04	0.26	0.19	15.71
20 1915	L Deo-dhan, Karnal	7.36	1.90	3.70	59.15	21.32	3.88	2.89	0.68	0.59	15.47

TRIFOLIUM ALEXANDRINUM, *Linn.**English.* Egyptian clover.*Vernacular.*—Berseem.

12 1916	Green fodder	6.48	2.77	22.04	34.44	15.52	16.32	2.43	4.80	3.53	188
103 1916	Do	2.60	1.85	10.94	41.46	30.60	11.73	0.62	2.70	1.75	437

TRIFOLIUM RESUPINATUM, *Linn.**English.*—Persian clover.*Vernacular.*—Shaftal.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and Silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
Shaftal hay, Quetta.	15.86	2.19	14.10	39.98	13.80	12.88	1.19	2.48	2.26	3.19	80.7
Shaftal (from Usar spot), Quetta.	21.91	2.44	14.27	39.41	10.80	10.18	0.99	2.70	2.28	3.15	81.2
Shaftal (from normal area), Quetta.	22.15	2.43	13.56	38.80	10.58	11.70	0.76	2.63	2.17	3.27	78.8

TRITICUM VULGARE, *Vill.**English.*—Wheat.*Vernacular.*—Gehum.

<i>Grain</i>											
Country, bearded, Cawnpore	13.35	1.73	8.47*	73.08	1.57	1.75	0.05	1.80	..	9.10	98.6
Country, beardless, Cawnpore	13.19	1.60	9.75*	72.03	1.23	1.40	0.10	1.50	..	7.76	100.4
Sindh, Cawnpore	12.21	1.60	9.92*	72.68	1.75	1.80	0.00	1.50	..	7.71	101.6
Chandiali, Bengal, red hard	13.78	1.89	9.57	70.25	2.39	1.84	0.51	1.77	1.50	7.80	98.9
Budha, Banka, local white, soft	16.11	1.75	9.44	68.55	2.35	1.02	0.18	1.02	1.53	7.69	95.5
Boskha, Palanau, white, soft	14.26	1.91	10.19	65.54	2.61	2.25	2.04	1.76	1.63	6.65	95.8
"Muzaffarnagar" Cawnpore white, soft	11.58	1.70	8.13	75.22	1.23	2.04	0.10	1.38	1.30	9.73	99.8
Katwa, Cawnpore, white, soft	11.00	1.53	9.25	73.65	1.33	2.00	0.25	1.66	1.48	8.94	100.6
"Best proof," Cawnpore, white, hard	9.94	1.50	9.25	75.56	1.50	1.80	0.05	1.57	1.43	8.59	102.8
Kharf, Malda, red, hard	13.62	2.20	10.06	68.76	2.43	2.26	0.27	1.73	1.61	7.34	99.4
Ganjanji, Malda, red, hard	13.61	1.60	11.88	69.55	2.33	1.90	0.23	2.01	1.90	6.08	102.3

TRITICUM VULGARE, *Vill.*—contd.*English.*—Wheat.*Vernacular.*—Gehum.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio
<i>Grain</i> —contd.											
489 1900	L "Jamali," Barb. Bengal, red, soft	14.26	1.82	10.69	68.25	2.80	2.15	0.47	1.82	1.71	0.70
491 1900	L "Champapuri," Darbhanga, red, soft	13.27	2.11	12.69	66.75	2.93	2.06	0.19	2.14	2.03	1.04
497 1900	L "Dudhia," Patna, white, soft	13.86	1.82	10.00	69.44	2.71	2.03	0.14	1.73	1.80	1.05
505 1900	L "Dudhia," Gaya, white, soft	13.73	1.74	10.63	68.53	2.07	2.22	1.08	1.85	1.70	0.92
507 1900	L Jamali, Gaya, red, soft	13.40	1.71	8.87	71.69	2.39	1.80	0.14	1.55	1.42	0.91
513 1900	L "Champapuri," Gaya, red, soft	12.77	1.98	11.00	69.27	2.15	2.36	0.47	1.89	1.76	0.91
516 1900	L "Naubia," Arariah, red, hard	12.64	1.21	10.50	70.58	2.67	2.19	0.21	1.81	1.68	0.92
645 1902	Wheat . . .	13.07	1.80	13.50*	60.05	2.19		2.49	2.16	..	0.97
296 1903	Cawnpore . . .	12.89	1.75	8.44	73.73	1.52	1.48	0.19	1.41	1.35	0.92
312 1903	Do. . . .	14.21	1.75	7.13	78.41	1.59	1.69	0.19	1.23	1.14	0.92
<i>Flour</i>											
647 1902	Wheat flour . . .	13.17	1.40	13.50*	68.23	1.20	2.50		2.16	..	0.99
389 1909	Lucknow . . .	10.77	2.21	14.29	67.50	2.28	2.66	0.20	2.60	2.29	0.88
173 1910	Military Dairy, Lucknow.	10.93	2.37	9.38	73.31	1.83	1.83	0.13	1.89	1.50	0.79
<i>Flour mill waste</i>											
25 1908	Ambala . . .	11.35	4.62	13.21	54.57	11.00	3.87	2.38	2.14	1.95	0.91
64 1911	Military Farm, Agra	7.99	2.23	7.98	67.99	9.82	2.74	1.37	1.54	1.28	0.83
65 1911	Do. do.	8.06	5.06	11.22	68.70	4.17	2.45	0.31	2.06	1.80	0.88
48 1912	Do. do.	9.85	2.61	12.00	68.25	3.63	2.47	1.10	1.96	1.92	0.98
47 1912	Do. do.	9.32	2.38	9.54	69.35	8.20	2.77	1.46	1.71	1.53	0.89

TRITICUM VULGARE, *Vul.*—contd.*English.*—Wheat.*Vernacular.*—Gehum.

Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Food units
				<i>Wheat product.</i>							
Dst, Ruk . . .	7.27	1.71	4.83	50.20	14.71	7.78	13.41	0.89	0.77	11.23	65.7
Do. Quetta . . .	7.59	1.63	4.06	49.60	14.65	7.71	14.16	0.81	0.75	11.45	65.3
Ground, Quetta . . .	10.07	2.40	11.24	68.92	3.84	2.58	0.95	1.99	1.80	6.62	103.0
Dist. Quetta . . .	9.39	2.97	10.57	66.25	5.06	3.14	2.62	1.85	1.69	6.91	100.1
Thin, Jubbulpore . . .	7.89	9.45	10.37	37.70	3.51	10.20	20.73	1.83	1.66	5.74	87.3
Subh, Aulaha . . .	10.76	1.90	8.52	64.01	9.13	3.64	2.29	1.43	1.32	8.39	89.9
Do. Lahore . . .	6.37	2.02	6.32	44.08	12.40	5.91	22.87	1.15	1.01	7.71	64.9
Dist. Ambala . . .	9.04	1.39	6.44	53.53	12.59	5.28	11.73	1.13	1.03	8.81	73.1
Do. Lahore . . .	9.80	1.01	6.57	54.34	14.82	5.27	8.19	1.20	1.05	8.62	73.3
Toland, Lahore . . .	10.95	3.30	11.01	66.83	4.38	3.32	0.21	1.93	1.76	6.76	102.6
Fine pollard, Ambala . . .	12.61	3.37	10.42	68.74	2.32	2.37	0.17	1.89	1.67	7.34	103.1
				<i>Bran</i>							
Dehra Dun . . .	12.93	4.94	7.56	63.73	5.47	3.14	0.18	1.45	1.21	10.50	87.0
Poona . . .	11.88	4.19	10.90*	58.66	9.37	4.56	0.44	1.74	..	6.27	96.4
Roller mills, Bombay . . .	13.44	2.07	10.30	56.58	10.83	5.36	0.42	1.82	1.65	6.18	90.0
Hand ehaky, Bombay . . .	12.96	2.84	16.10	57.40	7.20	3.60	0.40	2.78	2.57	3.90	103.5
Draa, Kirkee . . .	9.07	4.11	11.93	62.22	6.32	4.80	1.55	2.03	1.91	6.00	102.3
Do. Aden . . .	8.33	4.04	11.61	63.20	7.58	5.09	0.15	2.65	1.86	6.24	102.3
Do. Ruk . . .	9.56	4.65	12.87	60.47	6.89	5.32	0.24	2.23	2.06	5.53	104.3

TRITICUM VULGARE, *Vill.*—contd.*English.*—Wheat.*Vernacular.*—Gehum.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Abstract ratio
294 1914	Barn, Quetta . . .	10.03	4.32	13.97	50.04	7.16	4.87	0.21	2.40	2.23	4%
306 1914	Do. Bangalore . . .	9.13	3.78	12.87	63.46	6.19	4.38	0.19	2.32	2.06	2%
309 1914	Do. Mhow	9.22	3.74	11.33	60.84	8.65	4.65	1.77	1.92	1.86	6%
316 1914	Do. Belgaum	10.82	3.17	11.89	61.69	8.12	4.64	0.17	2.02	1.82	6%
319 1914	Do. Jabulpore	10.83	3.97	12.14	60.61	7.98	4.24	0.23	2.08	1.94	5%
15 1915	Do. Karnal	10.09	2.48	8.72	64.15	9.37	4.10	1.00	1.47	1.50	5%
17 1915	Do. Ambala	10.88	4.12	11.68	60.72	7.43	4.54	0.73	2.03	1.86	6%
18 1915	Do. Allahabad	10.28	3.81	13.02	60.85	8.28	4.59	0.17	2.07	1.92	5%
<i>Straw</i>											
355 1895	L. Gurdikran	7.61	..	3.04	35.33	45.93	3.34	4.75	0.65	0.40	11%
413 1900	L. Cawnpore	9.53	0.74	2.44	40.19	35.43	4.47	7.20	0.53	0.30	17%
498 1900	L. Dudhla, Patna	9.20	0.99	3.75	37.98	31.68	4.15	13.25	0.71	0.60	19%
508 1900	L. Jamati, Gaya	9.15	1.32	3.32	37.17	30.51	4.69	13.80	0.59	0.53	12%
514 1900	L. Champapuri, Gaya	8.17	1.06	3.88	37.12	30.80	4.36	15.11	0.67	0.54	11%
517 1900	L. Nautia, Arariah	8.06	0.80	2.13	39.81	39.78	3.82	5.60	0.37	0.34	19%
365 1902	Pisai wheat straw	8.56	1.46	2.75	45.07	28.38	5.04	8.74	0.51	0.44	17%
460 1902	Wheat straw	9.85	1.60	3.12	49.80	24.89	2.98	7.46	0.49	0.49	17%
309 1903	Cawnpore	10.74	1.14	1.44	47.06	27.23	3.00	9.39	0.34	0.23	20%
313 1903	Do.	10.40	1.49	2.62	37.87	19.18	4.76	23.68	0.48	0.42	15%

TRITICUM VULGARE, *Vill.*—concd.*English.*—Wheat.*Vernacular.*—Gehum.

Description of samples	% Moisture	% Ether extract	Grain					% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
			% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Cellulose					
			<i>Straw—concd.</i>									
Coimbatore . .	11.75	1.55	3.37	40.22	22.40	5.08	15.03	0.55	0.54	13.90	53.5	
Do. . .	12.27	1.25	2.00	41.86	23.76	3.69	11.87	0.41	0.32	23.86	53.0	
			<i>Green fodder.</i>									
Punjab . . .	82.65	9.40	1.87	7.56	5.07	1.52	0.93	0.32	0.30	4.54	13.2	
by state . . .	10.01	2.07	9.70	30.24	26.31	7.84	4.83	1.66	1.56	4.54	68.7	

VICIA SATIVA, *Linn.**English.*—Common vetch, Tare.*Vernacular.*—Akta.

Description of samples	% Moisture	% Ether extract	Grain					% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
			% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Cellulose					
Akta, Pusa . . .	9.08	1.06	25.74	54.06	5.78	3.10	0.13	4.65	4.12	2.23	122.0	

VIGNA CATJANG, *Walp.**English.*—Cow pea.*Vernacular.*—Lobia, Chavli, Barbati.

Description of samples	% Moisture	% Ether extract	Grain					% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid ratio	Feed units
			% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Cellulose					
Poona . . .	7.26	1.35	20.13	63.30	4.07	3.41	0.48	3.68	3.22	3.30	117.0	
Rawan, Punjab . . .	10.45	1.42	16.81	65.51	2.33	3.58	0.10	2.72	2.69	4.05	110.0	

ZEA MAYS, Linn.

English.—Maize, Indian corn.

Vernacular.—Makai, Bhutta.

Laboratory No.	Description of Samples	% Moisture	% Ether extract	% Albuminoids	% Soluble carbohydrates	% Woody fibre	% Soluble mineral matter	% Sand and silica	% Total nitrogen	% Albuminoid nitrogen	Albuminoid nitrogen
40 1906 L	Maize grain (white), Punjab	11.83	4.53	8.25	72.03	1.16	1.95	0.25	1.42	1.92	9.99
41 1900 L	Maize grain (orange), Punjab	11.98	4.49	7.37	72.68	1.03	2.45	0.10	1.27	1.18	11.25
410 1900 L	Maize grain, local (yellow), Cawnpore	10.54	4.73	9.38	72.53	1.43	1.34	0.05	1.57	1.51	8.46
411 1900 L	Maize grain, "Jaunpore" (white), Cawnpore	8.04	5.13	9.32	74.33	1.53	1.60	0.05	1.53	1.49	9.24
412 1900 L	Maize grain "King Philip," (large, red, imported), Cawnpore	10.72	4.22	11.62	70.29	1.46	1.59	0.10	1.88	1.86	6.69
413 1900 L	Maize grain, Early American, (large, white, imported), Cawnpore	11.02	4.29	9.57	72.20	1.53	1.39	0.20	1.62	1.53	8.33
414 1900 L	Maize grain extra early (large, orange-imported), Cawnpore	10.50	4.60	9.69	71.96	1.43	1.54	0.10	1.63	1.56	8.51
415 1900 L	"Sweat Corn," (Large white, imported), Cawnpore	9.94	6.42	12.07	66.81	2.06	2.25	0.45	2.04	1.93	6.76
310 1914	Maize grain, Mhow	10.66	3.98	7.58	74.82	1.03	1.63	0.30	1.24	1.21	11.08
621 1902	Maize flour (home made)	13.25	2.19	9.12*	71.61	1.29	1.54		1.46	..	8.66
582 1900 L	Maize plant (fresh), Punjab	88.92	0.31	1.13	4.65	3.11	1.04	0.84	0.24	0.19	4.74
	Maize plant, dry state	10.04	2.32	9.17	37.76	25.25	8.44	6.82	1.95	1.51	4.03
					<i>Maize flour.</i>						
					<i>Green fodder.</i>						
ZINGIBER OFFICINALE, Roscoe.											
English.—Ginger.											
Vernacular.—Adi, Ada, Adrak, Sunt.											
54 1911	Ginger, Jamaica	85.87	1.99	1.91*	8.12	1.00	1.61	0.00	0.31	..	6.65
55 1911	Do. Cochin	87.38	1.63	1.56*	7.11	0.88	1.41	0.00	0.25	..	6.83
56 1911	Do. Calicut	87.74	1.32	1.37*	7.28	0.92	1.37	0.00	0.22	..	7.55
57 1911	Do. Country	85.47	1.46	1.80*	8.74	0.95	1.58	0.00	0.29	..	6.78

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