

COMPOSITION OF A NUMBER OF TROPICAL AND SUBTROPICAL FEEDSTUFFS

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ABSTRACT.

The search for protein rich feedstuffs is a continuous one, particularly in developing areas where there is direct competition for food between man and animals.

This study indicates the nutritive value of certain feed ingredients available in the Territory of Papua and New Guinea by analysing their crude protein, fat, fibre, dry matter and ash contents. The analyses could assist in the formulation of livestock rations making use of such materials.

INTRODUCTION.

The search for protein-rich feedstuffs is a continuous one, particularly in developing areas where there is direct competition for food between man and animals. In these areas, in many cases it would be more advantageous to feed the protein directly to the population than to pass it through pigs and poultry. However, where pigs and poultry raising form a major industry, it is generally accepted that some protein material must be fed to these animals to increase production. Increased growth rates of both pigs and poultry, and increased egg production should in turn improve the diet and health of the people.

This study indicates the nutritive value of certain feed ingredients by analysing their crude protein, fat, fibre, dry matter and ash contents (Table 1). The analyses could assist in the formulation of livestock rations making use of such materials. The results are expressed on an air dry basis, which is the most convenient

form for the calculation of rations. Materials containing a high proportion of water may be used; the method of calculation is given in the respective handbooks for feeding poultry and pigs in the Territory (Ross and Springhall 1965 and Springhall and Burgess 1969).

A number of the figures shown have been made available by the Department of Agriculture, Stock and Fisheries, Territory of Papua and New Guinea; others have been extracted from an F.A.O. (1965) publication; whilst the remainder have been obtained by the author. Many of the materials have been analysed and test fed to livestock [Ross and Springhall (1963); Springhall (1964); Ross and Springhall (1965); Springhall and Ross (1965 a and b); Springhall (1967 a and b); Springhall and Dingle (1967); and Springhall (1968)].

MATERIALS AND METHODS.

All analyses were based on the methods of the Association of Official Agricultural Chemists (1955). Comments on the suitability of the feedstuffs are based on literature reports or unpublished results of the author. They refer to both pig and poultry nutrition.

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Table 1.—Composition of a Number of Tropical and Subtropical Feedstuffs.

All figures are percentages, calculated on an air dry basis.

(The symbol 0 indicates that the amount present is negligible; indicates unknown.)

ENERGY SOURCES.

Feedstuff.	Crude Protein.	Crude Fat.	Crude Fibre.	Dry Matter.	Ash.	Remarks.
Banana (ripe, unpeeled), <i>Musa Sapientum</i>	3.9	1.0	1.0	86	6.7	**
Bean seed (French), <i>Phaseolus vulgaris</i>	20.6	3.5	3.7	85.2	2.7	Should not be used in quantities greater than 15% for poultry.

Table 1.—Composition of a Number of Tropical and Subtropical Feedstuffs—*continued*.
ENERGY SOURCES—*continued*.

Feedstuff.	Crude Protein.	Crude Fat.	Crude Fibre.	Dry Matter.	Ash.	Remarks.
Breadfruit seeds, <i>Treculia africana</i>	15.1	1.1	1.1	83	1.3	**
Cocoa bean pods, <i>Theobroma cacao</i>	12.3	37.2	7.7	87	4.0	Toxic for poultry even in small quantities.
Copra, <i>Cocos nucifera</i>	8.3	62.7	6.4	96	1.4	Oxidises if not treated with antioxidant.
Carob pods, <i>Ceratonia siliqua</i>	6.1	0.7	10.8	84.9	2.3	** More than 5% may depress poultry growth.
Dates, dried with kernel, <i>Phoenix dactylifera</i>	2.1	0.8	4.8	74.3	4.2	** Up to 10% may be included in chick rations.
Dates, dried	3.1	0.8	3.4	78.9	2.0	** ditto.
Manioc, unpeeled (Cassava, Yuca, Tapioca), <i>Manihot utilissima</i>	2.2	0.6	2.2	88	2.5	** As some varieties contain prussic acid, it is suggested that the material be dried or heated before use.
Manioc roots, peeled	1.8	0.6	0.9	88	3.4	**
Manioc meal, roots dried	2.8	0.5	5.0	94.4	2.0	** Up to 10% may be used in chick rations.
Sugar cane Molasses, <i>Saccharum officinarum</i>	3.0	0	0	73.4	8.6	*
Passionfruit seed, <i>Passiflora edulis</i>	10.7	24.1	44.4	93.8	1.6	
Papaw fruit <i>Carica papaya</i>	4.1	0.4	5.1	88	6.8	*
Peanut kernel (whole unextracted), <i>Arachis hypogaea</i>	30.4	48.3	0.9	94.3	2.4	
Rice Paddy, rough rice, <i>Oryza sativa</i>	7.9	1.8	9.0	88.8	5.2	**
Rice, Brown	9.1	2.0	1.1	87.8	1.1	**
Rice, Polished	7.4	0.4	0.4	87.8	0.5	**
Rice Bran	12.4	13.6	11.6	90.8	13.3	Rancidity is a problem.
Rice Pollard	11.0	12.0	10.0	....	....	**
Sago, <i>Metroxylon spp</i>	0.6	0.4	0.6	88	0.4	It is suggested that 30% be maximum quantity used for poultry, but up to 50% for pigs.
Sweet Potato tuber meal	4.9	0.9	3.3	90.2	4.1	As above.
Taro tubers, <i>Colocasia spp.</i>	3.8	0.6	13.1	88.6	4.7	As above.
Water lily seeds, <i>Nymphaea copensis</i>	15.0	....	....	91.2	....	*
Yam tubers, unpeeled, <i>Dioscorea spp.</i>	7.3	7.3	2.2	88	3.7	**
Yam tubers, peeled	6.1	0.4	1.2	88	3.3	**
PROTEIN SOURCES (animal origin).						
Beche-de-mer (Sea slug, Trepang)	44.3	1.2	0	95.9	42.3	Should not be used in quantities greater than 10%. Ca & P levels should be adjusted.
Crab meal	74.0	14.8	....	90	....	**
Fish bone meal	39.9	....	2.0	91.9	44.0	**

Table 1.—Composition of a Number of Tropical and Subtropical Feedstuffs—*continued*.
 PROTEIN SOURCES (animal origin)—*continued*.

Feedstuff.	Crude Protein.	Crude Fat.	Crude Fibre.	Dry Matter.	Ash.	Remarks.
Fish meal (Tilapia)	59.3	2.8	0	88.9	25.0	Quantities greater than 10% of the ration may taint the flesh.
Lobster Waste meal	36.8	5.7	0	88.6	39.5	**
Shrimp meal	46.7	2.8	11.1	89.7	27.8	**
Silkworm Pupae meal, not extracted	58.9	18.1	5.4	92.0	3.2	**
PROTEIN SOURCES (vegetable origin).						
Coconut meal, hydraulic or expeller process, <i>Cocos nucifera</i>	21.2	6.7	11.2	93	6.5	**
Coconut meal, solvent process	21.4	2.4	13.3	91.1	6.6	**
Cottonseed oil cake <i>Gossypium</i> sp.	41.6	6.0	10.7	92.9	6.5	**
Cowpea seeds, <i>Vigna unguiculata</i>	22.5	2.2	1.1	91.3	3.5	**
Lupin seeds, sweet yellow, <i>Lupinus luteus</i>	39.8	4.9	14.0	88.9	4.5	*
Mango kernels, <i>Mangifera indica</i>	33.3	9.8	2.3	94.8	1.7	Not recommended for poultry.
Peanut oil cake, <i>Arachis hypogaea</i>	43.4	6.8	12.1	91.8	5.5	**
Pea seeds, <i>Pisum sativum</i>	23.0	1.3	6.5	90.8	3.5	
Pea pods	59.7	1.5	17.8	82.7	5.2	
Pyrethrum marc <i>Chrysanthemum cinerariifolium</i>	14.9	2.1	24.9	71.3	7.6	
Rubber seed cake meal, <i>Hevea brasiliensis</i>	30.2	8.7	5.0	91.2	5.6	** Prussic Acid (?)
Sesame Oil meal, <i>Sesamum indicum</i>	43.3	9.0	6.2	93.7	11.6	**
Soybean, raw, <i>Glycine max</i>	40.7	17.6	5.3	92.3	4.7	Recommended for adult poultry only.
Soybean oil meal	44.0	4.9	5.9	91.0	6.2	
Sunflower seed cake meal, <i>Helianthus annuus</i>	49.5	4.9	5.4	94.3	5.9	** Hulls must be removed.
GREEN FEEDS AND FIBROUS MATERIALS.						
Abika, <i>Hibiscus manihot</i>	15.6	2.9	11.2	86.9	16.9	
<i>Albizia stipulata</i>	26.9	2.1	25.1	94.7	6.6	
Banana stems	6.5	2.1	27.6	92	12.9	Very low nutritive value.
Banana leaf	14.6	4.4	21.3	91	11.7	
<i>Centrosema pubescens</i>	15.0	2.1	40.5	94	5.4	Should not be used in quantities greater than 15% for poultry.
Cocoa pods, <i>Theobroma cacao</i>	8.4	2.5	23.5	90.6	6.7	Should not be used in quantities greater than 5% for poultry.
Coffee pulp, <i>Coffea arabica</i>	9.2	2.1	20.6	91.8	8.9	Should not be fed to poultry.
<i>Crotalaria anagyroides</i>	22.1	3.4	21.0	91.1	5.4	More than 10% may depress growth of poultry.
Elephant grass <i>Pennisetum purpureum</i>	10.5	1.8	32.2	92.2	11.5	Should not be used for chickens.

Table 1.—Composition of a Number of Tropical and Subtropical Feedstuffs—continued.
GREEN FEEDS AND FIBROUS MATERIALS—continued.

Feedstuff.	Crude Protein.	Crude Fat.	Crude Fibre.	Dry Matter.	Ash.	Remarks.
Guinea grass, <i>Panicum maximum</i>	10.0	2.1	33.0	92.8	10.5	
Kikuyu grass, <i>Pennisetum clandestinum</i>	17.4	5.4	10.9	78.9	6.9	
<i>Leucaena leucocephala</i>	28.0	4.5	11.8	89.9	6.0	
Passionfruit shell	6.9	0.9	24.9	90.1	5.4	More than 5% may depress growth of poultry.
Papaw leaf meal, <i>Carica papaya</i>	23.4	10.6	7.6	92.7	12.5	
Peanut hay	8.6	4.3	29.8	95.6	7.5	Can be fed to pigs up to levels of 20%.
Peanut plant meal	16.6	20.5	23.3	88.0	8.2	Can be fed to adult birds up to levels of 30%. For chickens, quantities should not exceed 20%.
Pit Pit, <i>Saccharum robustum</i>	5.7	2.0	12.6	89	14.4	*
Russian Comfrey, <i>Symphytum officinale</i>	17.3	1.4	8.0	88.9	13.6	
Sweet Potato tops	15.8	2.5	17.5	91	11.1	
Taro leaf	23.5	....	13.7	88	8.6	*
Taro shoots	5.2	0	....	88	3.2	*
<i>Tephrosia candida</i>	15.7	3.6	32.5	92.2	5.0	Should not be fed to poultry in quantities greater than 5%.

Note.—* D.A.S.F., T.P.N.G. figures.

** F.A.O. figures (corrected to air dry basis).

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