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Some minerals' content of Egyptian feedstuffs

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With 1 table

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Nutrients requirements of farm animals and poultry must not be fulfilled only with respect to energy, protein and vitamins, but minerals also must be taken into consideration. In the recent practical formulations, minerals are considered as well as the other nutrients. Minerals function as constituents of bone and teeth, structural constituents of soft tissues, in irritability of nerves and muscles, maintenance of osmotic pressure, absorption, transport, excretion and metabolic mechanisms, and in the regulation of pH of blood and tissues. Research work done on minerals' content of Egyptian feed materials needs additional studies to cover all over local feedstuffs.

Abd-Elmotagalli (1) found that, on the dry-matter basis, calcium content between the materials evaluated was highest in clover being 2.14 % and lowest in wheat bran being 0.246 %, phosphorus was highest in rice bran being 1.45 % and lowest in clover hay being 0.158 %. *Allam* (2) found that decorticated cottonseed cake and 2nd cut clover were found to contain the highest amounts of sulfur being 12,510 and 8,810 ppm, respectively. The lowest contents of sulfur were in rice bran and maize grains, being 2,690 and 2,800 ppm, respectively. *Shalaby* (7) mentioned that the general picture for manganese content showed that roughages, green clover and clover hay contained the highest amounts, while wheat straw and green maize contained the lowest amounts. Among concentrates, ordinary maize, yellow maize, barley and horse beans contained low values. But rice bran, fine and coarse wheat bran contained relatively higher values approaching those of clover and its hay. Iron was found with large amounts in clover and clover hay, low amounts in green maize and wheat straw. Grains and beans contained the lowest amounts of iron among feedstuffs.

Material and methods

Representative samples of the twenty more common Egyptian feedstuffs were collected for mineral analysis. Moisture, ash, and calcium of these feed materials were determined according to A.O.A.C. (3). Phosphorus, sulfur, manganese, and iron were determined after *Toth et al.* (9).

Results and discussion

Table (1) shows the content of five minerals in the more common Egyptian feedstuffs. Bone and fish meals contained the highest amounts

Table 1. Some minerals' content in Egyptian feedstuffs.

Feedstuffs	Moisture %	Ash %	Calcium %	Phosphorus %	Sulfur %	Manganese mg/kg	Iron %
<i>Dry roughages</i>							
Clover, dried	8.62	12.83	1.48	0.29	0.21	40.8	0.031
Clover hay	9.35	13.89	0.78	1.69	0.46	33.4	0.025
Corn, aerial part	8.14	9.24	0.15	0.40	0.39	67.3	0.013
Wheat straw	10.48	11.78	0.29	0.23	0.20	55.3	0.007
<i>Concentrates</i>							
Barley	11.41	3.39	0.08	0.33	0.26	15.1	0.004
Bone meal, steamed	6.40	73.40	33.43	12.31	0.18	42.7	0.127
Corn grains	16.69	1.44	0.02	0.26	0.24	7.2	0.005
Cottonseed meal, decorticated	10.31	7.00	0.44	0.99	0.43	31.2	0.041
Cottonseed meal, undecorticated	7.41	8.26	0.48	0.72	0.27	46.3	0.024
Fish meal	6.75	37.46	9.25	1.77	0.68	19.3	0.072
Horse beans	11.90	4.43	0.16	0.33	0.27	17.8	0.010
Linseed meal	7.41	8.26	0.48	0.72	0.27	46.3	0.024
Meat meal	7.83	28.38	8.56	5.06	0.89	14.3	0.084
Rice bran	8.85	10.87	0.11	1.26	0.38	395.3	0.016
Rice germ	9.75	8.61	0.14	0.37	0.23	28.3	0.009
Rice germ meal	8.54	11.32	0.21	0.52	0.36	38.7	0.021
Skim milk, dried	10.68	7.18	1.36	0.96	0.42	3.1	0.004
Sunflower meal	9.82	7.37	0.51	1.23	0.31	25.3	0.029
Wheat grains	12.15	1.78	0.04	0.28	0.22	43.1	0.006
Wheat bran	10.34	5.74	0.11	1.13	0.39	99.8	0.013

of calcium being 33.43 and 9.25 %, the lowest amounts were in wheat and corn grains being 0.04 and 0.02 %. Bone and meat meals contained the highest amounts of phosphorus being 12.31 and 5.06 %, while corn grains and wheat straw contained the lowest amounts being 0.26 and 0.23 %. Meat and fish meals contained the highest amounts of sulfur being 0.89 and 0.68 %, while wheat straw and bone meal contained the lowest amounts being 0.20 and 0.18 %. Rice and wheat brans contained the highest amounts of manganese being 395.3 and 99.8 mg/kg, while corn grains and dried skim milk contained the lowest amounts being 7.2 and 3.1 mg/kg. Bone and meat meals contained the highest amounts of iron being 0.127 and 0.084 %, while barley and dried skim milk contained the lowest amounts being 0.004 % for each feed material, respectively.

It must be noted that not all the feed materials undertaken in this work were evaluated by the previous local authors for this reason the order of the feed ingredients with respect to their mineral content obtained will not necessarily comply with that obtained by the other authors.

Maynard and *Loosli* (4) cited that the cereal seeds are all low in calcium. Legume seeds, notably soybeans, are higher, and the same is true for the oil meals. Much richer in calcium are the animal byproducts containing bone, such as tankage, meat scrap, and fish meal. Concerning phosphorus, the seeds are uniformly higher than the roughages, and seed by-products such as wheat bran and the oil meals are especially rich in phosphorus. Skim milk can be classified as rich in both calcium and phosphorus. The bone-carrying animal by-products are also very rich in both calcium and phosphorus.

Generally the data obtained in this work concerning calcium and phosphorus are in agreement with that cited by *Maynard* and *Loosli* (4) and found by *Abd-Elmotagalli* (1).

Concerning sulfur, the data obtained by *Allam* (2) are somewhat higher than that obtained in this work. In this connection *Morrison* (5) mentioned that when the soil is so low in sulfur, the sulfur content of the crops are much reduced, unless a sulfur fertilizer is applied. *Titus* (8) cited that the mineral content of feedstuffs usually reflects the environmental condition under which it was grown.

The data obtained in this work concerning manganese and iron are generally in agreement with that obtained by *Shalaby* (7) and cited by NAS-NRC (6). In this connection *Titus* (8) mentioned that the iron content of feedstuffs can vary widely, depending upon the iron content of the soil or medium upon which it is grown and upon the equipment used in processing. It was added that some of the values for iron cited were based on analyses in the author's laboratories and differed substantially from iron content reported in the literature for the named feedstuffs.

Summary

Determination of five minerals for the more common Egyptian feedstuffs was conducted. Bone and fish meals contained the highest amounts of calcium, 33.43 and 9.25 %, while wheat and corn grains contained the lowest amounts, 0.04 and 0.02 %, respectively. Bone and meat meals contained the highest amounts of phosphorus, 12.31 and 5.06 %, while corn grains and wheat straw contained the lowest amounts, 0.26 and 0.23 %, respectively. Meat and fish meals contained the highest amounts of sulfur, 0.89 and 0.68 %, while wheat straw and bone meal contained the

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Zusammenfassung

Es wurde die Bestimmung von fünf Mineralien in den häufigsten ägyptischen Futtermitteln durchgeführt. Knochenmehl und Fischmehl haben den höchsten Calciumgehalt mit 33,43 % bzw. 9,25 %, während Weizen und andere Getreidearten die niedrigsten Werte besitzen: 0,04 % bzw. 0,02 %. Knochenmehl und Fleischmehl haben den höchsten Phosphorgehalt: 12,31 % bzw. 5,06 %, während Getreide und Weizenstroh die niedrigsten Werte haben: 0,26 % und 0,23 %. Fleisch- und Fischmehl haben den höchsten Schwefelgehalt, nämlich 0,89 % und 0,68 %, während Weizenstroh und Knochenmehl die niedrigsten Werte besitzen: 0,20 % bzw. 0,18 %. Reis und Weizenkleie haben die höchsten Magnesiumwerte: 395,3 und 99,8 mg/kg. Den niedrigsten Gehalt zeigen Getreidekörner und Magermilchpulver, nämlich 7,2 und 3,1 mg/kg. Knochen- und Fleischmehl haben den höchsten Eisengehalt: 0,127 % bzw. 0,084 %, während Gerste und Magermilchpulver den niedrigsten Eisengehalt von allen Futtermitteln haben: 0,004 %.

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