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Review Article

ENERGY CONTENT AND PROTEIN QUALITY OF SESAME OIL CAKE –A REVIEW

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Abstract: Sesame oil cake which is produced to a level of 2,55,000 tonnes per annum in India (1997-98) and about 25,000 tonnes in Tamil Nadu (Mehta, 2000) is mostly used for feeding cattle. Lack of much research work on its use in broiler ration in India has impaired its use commercially by broiler farmers. Hence energy content and protein quality of sesame oil cake reviewed.

1.1 METABOLIZABLE ENERGY

Hasan and Khandaker (2000) estimated the metabolizable energy value of ghani cake to be 1650 kcal/kg. The I.S.I. (1980) specification revealed that the metabolizable energy value of 1882 kcal/kg for expeller cake, which was far below the values reported in N.R.C. (1994) (2376 kcal/kg) and Mamputu and Buhr, (1995) (2500 kcal/kg). The metabolizable energy in deoiled sesame oil cake was found to be 2660 kcal/kg by Pathak and Kamra (1989). On the contrary, Robert Swick (2001) and Mehta (2000) reported a lower value of 1930 and 2250 kcal/kg respectively in sesame oil cake.

1.2 PROTEIN QUALITY

1.2.1 Protein Efficiency Ratio (PER), Net Protein Ratio (NPR) and Protein Digestibility

The literatures on protein efficiency and net protein ratio of sesame seeds and sesame oil cakes in chicken are limited. Hence literatures pertaining to protein efficiency and net protein ratio of other vegetable and animal protein feedstuffs for chicken and rats are reviewed.

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1.2.1.1 Sesame seed

Akpapunam and Markakis (1981) evaluated the protein efficiency ratio in rats and reported the value of 1.22 for sesame seed. While Swaminathan (1997) reported a PER of 1.7 which was comparable to groundnut seed (1.7) but the PER of other seeds like soyabean (2.0), cottonseed (2.1) and coconut (2.5) was found to be higher.

1.2.1.2 Sesame meal

Pirie (1975) estimated the PER in sesame meal to be 1.35 in rats. Baghel and Netke (1987) evaluated the PER in broilers at a combination of 23.5% soyabean meal and 28.5% sesame oil meal (1.72) which was comparable to soyabean meal alone (1.70). Veena Grover *et al.* (2001) evaluated the PER in various vegetable protein combinations in broilers. They inferred that the maximum PER was observed in 5% mustard cake + 7.5% sesame cake + 5% guar meal (1.85) than control diets containing groundnut cake alone (1.78).

1.2.1.3 Animal proteins

Johnson and Parsons (1997) evaluated the protein efficiency ratio and net protein ratio values in broiler chicks by conducting chick growth assays. The chicks were reared on nitrogen free diet or 10% protein diets containing any one animal meal as a source of dietary protein. They concluded that the weight gain, feed efficiency, PER and NPR values at the end of 13 days was significantly ($P<0.05$) higher in spray dried whole egg (151, 2.21, 4.5 and 4.83) compared to lamb meal (36.4, 6.13, 1.63 and 2.10) and meat and bone meal (38.3, 7.19, 1.43 and 1.75).

1.2.2 Protein Digestibility

Above 75 – 80% of sesame protein is reported to be digestible (Ravindran, 1982). However, processing of sesame meal at a higher temperature has been found to destroy sulphur containing amino acids (Ravindran *et al*., 1982) and prolonged heating has been found to depress the availability of amino acids (Aherne and Kennelly, 1985). Robert Swick (2001) reported the digestibility coefficient of 88 and 94% for lysine and methionine present in sesame meal when fed to poultry.

Based on the energy content and protein quality the sesame oil cake can be used in livestock and poultry feed.

REFERENCES

[1] Aherne, F.X. and J.J. Kennelly, 1985. Oilseed meals for livestock feeding. In: Recent Developments in Pig Nutrition (Ed) D.J.A. Cole, and W. Haresign. pp. 278-315. Butterworths, London.

[2] Akpapunam, M.A. and P. Markakis, 1981. Protein supplementation of cowpeas with sesame and watermelon seeds. Journal of Food Science, 46: 960-961. Quoted in Nutr. Abstr. Rev. B., 1982, 52: 1779.

[3] Baghel, R.P.S. and S.P. Netke, 1987. Economic broiler ration based on vegetable proteins. Indian J. Anim. Nutr., 4: 24-27.

[4] Hasan, M. and Z.H. Khandaker, 2000. Comparative study of fish meal and other protein concentrates on the performance of broiler. Indian J. Anim. Nutr., 17: 95 – 98.

[5] I.S.I. 1980. Nutrient requirements for poultry IS: 9863–1980, Indian Standards Institution, Manak Bhavan, 9, Bahadur Shah Zafar Marg, New Delhi.

[7] Johnson, M.L. and C.M. Parsons, 1997. Effects of raw material source, ash content, and assay length on protein efficiency ratio and net protein ratio values for animal protein meals. Poult. Sci., 76: 1722-1727.

[8] Mamputu, M. and R.J. Buhr, 1995. Effect of substituting sesame meal for soybean meal on layer and broiler performance. Poult. Sci., 74: 672 – 684.

[9] Mehta, B.V. 2000. Sea Millennium Handbook 2000. 7th Ed., The Solvent Extractors Association of India, Mumbai.

[10] N.R.C. 1994. Nutrient Requirements of poultry. 9th revised Ed., National Academy Press, Washington, D.C.

[11] Pathak, N.K. and D.N. Kamra, 1989. A text book of livestock feeding in tropics. A Falcon Book From Cosmo Publications, New Delhi. pp. 246 – 257.

[12] Pirie, N.W. 1975. Food protein sources. Cambridge University Press, Cambridge, London. pp. 93-96.

[13] Ravindran, V. 1982. Methodology to evaluate the nutritive value of feedstuffs for poultry and swine. M.Sc., thesis submitted to Virginia Tech. University, Blacksburg.

[14] Ravindran, V., E.T. Kornegay, J.R. Webb, and A.S.B. Rajaguru, 1982. Nutrient characterization of some feedstuffs of Sri Lanka. J. Natl. Agric. Soc. Ceylon, 19 : 19-32.

[15] Robert Swick, 2001. Considerations in using protein meals for poultry. Poultry Fortune, 2(10): 30 – 38.

[16] Swaminathan, M. 1997. Principles of nutrition and dietetics. 2nd Ed., The Bangalore Printing and Publishing Co., Ltd., Bangalore. pp. 95-106.

[17] Veena Grover, A.B. Mandal, R.S. Thakur, and V.P. Saxena, 2001. Associative effect of some proteinic by-products on growth and feed conversion efficiency in broilers. Indian J. Poult. Sci., 36: 37-43.