THE VALUE OF RICE BRAN IN BROILER RATIONS

G. L. MALYNICZ*

ABSTRACT

Rice bran was used to substitute for sorghum and protein concentrate in a broiler ration. The ration was balanced with respect to micro-nutrients. No detrimental effects were observed up to a level of 50 per cent inclusion in the diet, which was the highest level used. Economically, it appears that rice bran could substitute for sorghum in pig rations.

IN the preparation of rice for human consumption, the first process is the removal of the very hard husk. This is essential as it contains a high proportion of silica which, in sufficient quantities, can damage the digestive tract. The kernel which remains is enclosed in the bran layer. Further milling removes the bran layer and the germ. Finally, if the rice is polished, the epicarp, mesocarp and testa are removed as the polishings. (Arnott and Lim 1966a). Some simpler mills remove bran and polishings in a single process. Zwankhuisen (1961) has calculated that the average milling figures for larger Malaysian mills were 63.5 per cent milled white rice, 15.1 per cent husk, 17.1 per cent coarse bran (which includes a little husk) and 4.3 per cent fine bran plus polishings.

Bran and polishings contain considerable amounts of highly unsaturated fat and if fed to poultry or pigs would tend to cause softening of fat deposits in these animals (Arnott and Lim 1966b). The chemical composition of the rice bran used in this experiment is shown in *Table* 1. The bran was obtained from the Bainyik Rice Mill in the East Sepik District.

Rice bran, or pollard, as the mixture of bran and polishings may be called, has been used by a number of workers in rations for poultry. Sidhu (1969) has successfully used up to 25 per cent polishings in starter and finisher rations, whilst Malik and Ichhponani (1969) successfully fed up to 61 per cent rice polishings. Patil (1969) suggested that maintaining a constant energy/protein ratio in experimental rations was more important than using isonitrogenous diets, due to the high content of metabolisable energy in rice pollard. The present studies were conducted to investigate the potential of rice bran in rations for broiler chickens.

MATERIALS AND METHODS

Three hundred day-old Hyline strain unsexed broiler chicks were used in the experiments. These were allocated on arrival at the

*Tropical Pig Breeding and Research Centre, D.A.S.F., Goroka.

Table 1—Chemical composition of rice bran

	India[1]	Malaysia[2]	Australia[3]	PNG[4]	PNG[4]
Dry Matter %	94.7	89.9	90	86.3	88.4
Crude Protein %	10.9	12.3	13.7	13.1	13.4
Ether Extract %	12.0	12.1	14.6	N/A	N/A
Crude Fibre %	12.0	11.3	4.7	N/A	N/A
N.F.E. %	47.4	N/A	N/A	N/A	N/A
Ash %	12.4	10.2	9.5	6.3	7.4
Met. Energy (Kcals/kg)	29.37	N/A	N/A	N/A	N/A

[1]Sidhu, 1969.
[2]Arnott and Lim, 1966.
[3]Air Dry Basis, Patil, 1969.
[4]Turner, W. J., unpublished, 1971.

Table 2—Composition of rations used to evaluate rice bran for broilers

	RATION NUMBER				
	1	2	3	4	5
Rice Bran (kg)	0	10	25	35	50
Protein Concentrate (kg)	28	27	25	24	23
Sorghum (kg)	72	63	50	31	27
Vitamin/Mineral Mixture[1] (g)	66	68	73	75	77
Coccidiostat[2] (g)	51	51	51	51	51
Anti-oxidant[3] (g)	22	22	22	22	22
Bone Ash (g)	0	121	352	484	704
Salt (g)	0	40	119	158	198

[1]Nutrigain Vitamin-mineral supplement, Nicholas Pty Ltd, contains vitamins A1, D3, E, K, Riboflavine, Pantothenate and Manganese sulphate.
[2]Pancoxin, Merck, Sharp and Dohme, Granville, N.S.W.
[3]Embanox, May & Baker, Dagenham, England.

centre to five groups of 60 in such a way that the mean and standard deviation for each group was quite similar. Groups were allocated at random to kerosene brooders where they remained for three weeks. During this time the chicks were fed one of the five experimental rations whose composition is shown in *Table* 2. Rice bran was used to replace sorghum in the diets which were balanced for levels of protein, vitamins, calcium and phosphorus and salt. A commercial coccidiostat and an anti-oxidant were added at the same level to all diets.

After three weeks each group of 60 was divided into three groups of 20, each subgroup forming a replicate. Housing was provided on a deep litter of coffee hulls in pens measuring 3 x 1.5 metres. The same feed was used from three to nine weeks as had been used in the brooders. Feed and water were provided *ad libitum*. Birds were weighed weekly, food consumption was calculated weekly, and a record kept of all mortalities.

The method used to assess the value of rice bran was the cost of producing 1 kilogram of liveweight gain using the five rations. The prices assumed for sorghum, protein concentrate and rice bran were $80, $250 and $50 per tonne.

RESULTS AND DISCUSSION

The physical results of the experiment are shown in *Tables* 3 and 4. The data for the second part of the experiment were analysed for variance but no significant treatment differences were found for any of the parameters. In both phases of the experiment there was a trend for food consumption to fall with increasing levels of rice bran. This is not unexpected due to the high metabolisable energy content of rice bran, although the increasing crude fibre levels would tend to cancel out this effect. As the differences in weight gain were not large, there was a tendency for feed conversion ratio to improve with higher levels of rice bran.

Table 3—Performance of chicks fed rations containing rice bran—up to three weeks of age

	Level of Rice Bran (%)				
	0	10	25	35	50
Initial weight (g)	39.0	39.3	39.3	38.5	40.0
Mean daily weight gain (g)	10.73	11.03	9.59	12.26	12.76
Mean daily feed consumption (g)	27.12	26.34	23.91	25.48	25.16
Mean feed conversion ratio	2.53	2.39	2.49	2.08	1.97

Table 5 shows the cost of the rations and the feed costs required to produce 1 kilo of liveweight gain. The most economic level of inclusion at the prices studied was 35 per cent. At the present price of $40 per tonne the inclusion of rice bran at levels up to 50 per cent is strongly recommended.

ACKNOWLEDGEMENTS

The author would like to thank Mr Mangari Kipo for technical supervision of the experiment.

REFERENCES

ARNOTT, G. W. AND LIM, H. K. (1966a). *Malaysian Agric. Journal*, 45, 370-386.

ARNOTT, G. W. AND LIM, H. K. (1966b). *Malaysian Agric. Journal*, 45, 387.

MALIK, N. S. AND ICHHPONANI, J. S. (1969). *Indian Journal Anim. Sci.*, 39, 410-415.

PATIL, M. S. (1969). World Poultry Science Association, Australian Branch, Proc. Austral. Poult. Sci. Conf., Surfers Paradise, 65-78.

SIDHU, G. S. (1969). World Poultry Science Association, Australian Branch, Proc. Austral. Poult. Sci. Conf., Surfers Paradise, 1-17.

SPRINGHALL, J. A. (1968). Composition of a number of tropical and Sub-tropical feedstuffs. *Papua New Guinea Agric. J.*, 20, 85-88.

ZWANKHUISEN, M. (1961). *Survey of the possibility of processing animal feedstuffs from locally available by-products and raw materials.* F.A.O. Report 1381.

(Accepted for publication December, 1974)

Table 4—Performance of broilers fed rations containing rice bran—three to nine weeks of age

	Level of Rice Bran (%)				
	0	10	25	35	50
Mean initial weight (g)	228.6	234.8	206.2	261.9	259.4
Mean daily weight gain (g)	25.67	27.50	26.53	27.81	26.41
Mean daily feed consumption (g)	69.75	72.79	71.88	67.30	65.49
Mean feed conversion ratio	2.73	2.65	2.71	2.42	2.48

Table 5—Feed cost of producing one kilo of liveweight gain

	Level of Rice Bran (%)				
	0	10	25	35	50
Cost per kg ration (c)	12.7	12.3	11.5	10.2	10.4
Cost per kg gain (c)	34.7	32.6	31.2	24.8	25.8