Egypt. J. Anim. Prod. 23, No. 1—2, pp. 15-25 (1983)

Nutritional Evaluation of Rice Millings (Khayali Bran) in Metabolism Trials with Sheep

A.K. Abou Raya, Y.I. El-Talty, A.M. Abou El -Hassan and M.B. Sonbol*

Fac. Agric., Cairo Univ, and Ministry of Agric., Egypt.

THE nutritional evaluation of Egyptian Khayali bran (rice millings M) was undertaken in seven metabolism trials with sheep considering that about 350,000 tons of the product are produced at the villages annually. The effect of texture and locality on nutritive composition of M, and that of direct and indirect feeding using three types of basal rations (two levels of clover hay, H, barley grains, B, and maize starch -urea mixture, SU) on intake, digestibity, feeding value and N-balance, were investigated,

Results indicated that M (a mixture of about 70% rice hulls, 25% rice bran, z%rice germs and 3% broken polished grains) had a wide range of percentage nutritive analysis, the average percentage composition of 10 samples being 6.77 + 0.28 CP, 6.60 + 0.29EE, 27.23 ± 2.01 CF, 41.09 ± 2.54 NFE, and 18.32 ± 2.21 ash on DM basis with a moisture content of 9.16± 0.53.

M fed alone had a feeding value of 29.01% TDN, 17.81% SV and 2.65% DCP, but when indirectly fed using four cases of basal rations, wide ranges of digestibilities and feeding values were obtained: 19.78 — 33.9% TDN, 8.90 — 22.88% SV and 0.97 — 3.93% DCP. This supported the view that one type of feedstuff appeared not to have a constant feeding value for the same animal species but differing according to the method used for evaluation, necessitating to record such conditions in tables of feed data. Using SU produced the least DOM%, according to the new Duncan's multiple range test. M alone produced the same results as with H (39.1% level) but both were not significantly different from that with B. Barley grains appeared to be a suitable basal ration with M at a level of about 50%. It produced the least associative effect on the tested ration insuring better energy intake and producing almost neutral N-balance for the mixture.

For reference purposes the metabolism trials data with the four two-component feed mixtures, were recorded including intake and N-balance.

In A.R. Egypt, the annual production of rice grains (the paddy) was recorded as 2·567 Megaton during the years 1969-71, being 2·423, 2·300 and 2·270 during 1975, 1976 and 1977, respectively (FAO[1], 1978*). Taking 2.5 Megaton as a base, rice polishing by products would be about 500, 000 tons rice hulls and 175, 000 tons rice bran representing 20 and 7% of the paddy, respectively. As the General Sector, using modern mills, deals with about 50% of the

1. The data were concurrent with those of Egyptian Ministry of Agriculture.

paddy, therefore, half of the rice hulls and rice bran are produced separately. The other 50% of the paddy is polished by the Private Sector at the villages using simple machines called "Farraka" producing mostly one by-product, beside the polished grains. This by product, locally known as khayali bran (Equinal bran), is about 350, 000 tons containing approximately 70% rice hulls, 25% rice bran, 2% rice germs and 3% broken polished rice granis. Such tonnage amounting to 70%of produced undecorticated cotton seed in Egypt (about 500, 000 tons) is usually added to the ration of draft animals (horses, mules and donkeys) in the nearest towns. A part of this feedstuff is offered by the farmers to other "farm animals and even to poultry. From the foreign litterature, a similar product could be called "rice millings", containing all rice milling by-products (NAS, 1071).

Little informations is known about this product in Egypt, the nutritive analysis was only recorded in one sample by the Ministry of Agric,, 1968 and two samples by El-Hawary, 1968. Therefore, this study was undertaken to investigate the changes in composition and nutritional value of the rice millings (M) under local conditions when fed to sheep in metabolism trials.

Material and Methods

The experimental methods include studying the effect of the texture of rice millings and locality on the nutritive analysis using ten samples (Table 1). Changes in texture and composition were expected according to the machine quality used at the villages and the polishing practice.

For nutritional evaluation of the feed, seven metabolism trials were undertaken with triplicate mature Rahmany rams (30 -35 kg live weight) in five trials and with duplicates in trials 1 and 3, for determining digestibilities, feeding value and N-balances (Table 2).

The effect of the mode of performing the digestion trial on the feeding value was critically studied. This was undertaken by feeding the rice millings (M) alone (Tr. 1), *i.e.*direct feeding, or along with different basal rations, *i.e.*, indirect feeding (the difference method) with three partner (basal) feeds of different nature. The feeds are :.

1. The classical clover hay (H), a suitable roughage feed using two levels Trs. 5 and 6).

2. Barley grains (B) as a suitable concentrated feed which could be fed alone (Tr. 7).

3. A 100 % digestible feed mixture from maize starch* and urea (SU containing 2 % urea) in Tr. 4.

The H level in the first H : M mixture (Tr. 5) was 49.2% (DM basis) being 39.1 in the second one (Tr.6). The proportion of B in B : M mixture was intended to be the same as H with the 1*st* H:M: mixture, being 49.8% (Tri 7). Moreover, the percentage starch in the B:M mixture was also similar to that in US:M mix ture, being 36.8 and 36.4 %, respectively**.

The digestion trials followed the usual procedure applied in the Animal Nutrition Section, Faculty of Agric., Cairo University as indicated by El-Talty and Abou-Raya (1977). The preliminary period was 8-10 days followed with a collection period of 5-8 days.

The ordinary methods of the A.O.A.C., 1970 were used for the conventional nutritive analysis

In feed samples of the metabolism trials, gross energy, silica and total lignin were determined. The calorific value was obtained by using the "Veb" non-a diabatic bomb calorimeter, checked by dried benzoic acid. Lignin was determined by the method recommended by Moon and Abou-Raya, (1966), slightly modified by Abou -Raya and Galal, (1966). Silica determination followed the method of Chapman and Pratt (1961).

Statistical methods followed those of Steel and Torrie (1960), for the analysis of variance and new Duncan's multiple range test.

Result and Discussion

The changes in nutrients of Egyptian rice millings

From the results (Table 1), it was clear that nutrients in the coarse- texture samples (No. 1-3) ranged within narrow limits as well as those in the medium texture ones (No. 4-6). But those of the fine texture samples (No. 7-9) differed widely particularly with ash (or OM), NFE and CF. The very fine texture sample (No. 10) contained distinctly a high ash content (31.36) and the lowest

* The nutritive analysis of maize starch DM was taken as 0.24% ash, 0.36% EE, 0.48% CP, 0.25% CF and 98.67% NFE (pure starch) after Soliman 1968.

** Starch in barely DM was considered .0% as recorded by Galal, 1969.

TABLE 1. Nutritive analysis of different samples of rice millings (Khayali bran).

Sample No.	Texture	Locality	Moisture %	Analysis %, DM basis OM	CP	EE	CF	NFE	As
1	Coarse	Sheno	10.66	83.78	5.82	8.06	30.49	39.41	16.22
2	,,	Kotor	10.08	87.87	7.76	7.66	29.43	42.02	12.13
3	,,	El-Kanater	7.14	78.81	7.65	5.88	31.07	34.21	21.19
4	Midium	Sheno	10.00	84.87	6.57	6.14	30.58	41.48	15.13
5	,,	Abou-Table	8.80	81.53	6.08	7.10	31.63	36.72	18.74
6	,,	Tahanob[2]	9.50	77.68	6.33	5.94	32.55	32.86	22.23
7	Fine	Sheno	11.71	92.81	8.31	7.04	16.80	60.66	7.19
8	,,	Abou-Table	8.87	86.08	7.00	5.94	27.41	45.73	13.92
9	,,	Tahanob	8.83	74.78	6.53	5.12	27.93	32.20	25.22
10	Very Fine	Tahanob	5.98	68.64	5.69	7.07	14.39	41.49	31.36
Range : Min.			5.98	68.64	5.69	5.12	14.39	32.86	7.19
Range : Max.			11.71	92.81	8.31	8.06	32.55	60.66	31.36
Average			9.16	81.68	6.77	6.60	27.23	41.09	18.32
SX±			0.53	2.21	0.28	0.29	2.01	2.54	6.21
S.D.			1.58	6.62	0.84	0.88	6.03	7.62	6.62
C.V.			17.25	8.10	12.41	13.33	22.14	18.54	36.14

TABLE 2. Nutritive analysis and dry matter intake of the experimental rations.

Items	Rice millings B	Clover hay H	Barley grains M	M:SU[1] (37.1% SU)	M:H (49.2% H)	M:H (39.1 %H)	M:B (49.8 %B)
Trial No:	1	2	3	4	5	6	7
% Moisture:	7.14	7.04	10.66	8.94	7.09	7.10	8.89
% Analysis (DM):							
Ash	21.19	15.11	8.59	13.41	18.19	18.81	14.92
CP	7.65	16.36	9.75	6.95[2]	11.94	11.06	8.70
EE	5.88	2.03	2.93	3.82	3.99	4.37	4.41
CF	31.07	32.88	9.14	19.62	31.96	31.78	20.15
NFE	34.21	33.62	69.59	56.20	33.92	33.98	51.82
GE, Kcal./g DM	3.60	3.98	4.46	3.80	3.79	3.75	4.03
Other Data % :							
Total lignin	8.11	5.39	1.85	5.10	6.77	7.05	4.99
Silica	15.81	2.37	5.06	9.94	9.20	10.56	10.49
Intake DM, g:	276.0	863 6	670.0	391.3	905.0	911.0	703.3
Intake/$Kg^{0.75}$:	19.2	60.0	46.5	27.2	62.8	63.3	48.4

1. Starch: Urea mixture containing 2.01% urea (= 5.2% CP equivalent).
2. CP equivalent (28.6% of it from urea).

CF (14·39 %). When comparing the nutrient composition of the organic matter in sample 7 having the lowest ash and sample 10 with the highest ash. the following results are obtained :

	O M	CP	EE	CF	NFE
Sample 7	100·00	8·95	7·58	18·10	65·37
Sample 10	100·00	8·29	10·30	20·96	60·45

This shows the similarity in composition of both samples, and the great increase in ash of sample 10 appeared to be a contamination with dust perhaps associated with fine-texture samples.

From the results with all samples, the range of nutrients (Table 1) was relatively wide particularly with ash followed by CF. The range here was wider than from published Egyptian data (Ministry of Agric., 1968 and El-Hawary, 1968). Morever, the nutritive analysis of the sample published by the NAS, 1971 in USA was very similar to that of sample 8 (Table 1), in all nutrients.

From the average nutrients with the 10 samples and variability, it was clear that the statistical range was wide particularly for ash. The average composition on 10 % moisture basis (6·09 % CP, 5·94 % EE, 24·51 % CF, 36·97 % NFE and 16·49 % Ash) could be taken as a guide for standard specifications. If samples contain higher ash content than perhaps 20 % production in the price could be to allow for the extra ash in the product. Similar suggestion was indicated by El-Hawary (1968) with rice bran samples high in ash than specified.

From the nutritive analysis, this feedstuff appeared to belong to dry roughage feed, *i.e.* Class 1 according to the international feed classification. As its CP is not usually exceeding 7 %, it could not be offered alone for a prolonged period, being expected not to cover protein requirements. Nevertheless, the produced rice millings at the village is richer than rice hulls in CP, EE and NFE, beside being prepared ground in a better physical form. The unground rice hulls accumulated at the General Sector, are still a problem, a waiting solution for economical disposal and utilization of the product.

The nutritional evaluation of rice millings (M) for feeding sheep

In this study, the effect of the chosen procedure in the metabolism trial with sheep was investigated using direct feeding of M (fed alone) and indirectly fed using four cases of basal ration, each along with M being the feed partner (tested ration). The results of the four two-component feed mixtures were also indicated, using in all cases the same sample of M.

Composition, digestibilities, feeding value and N-balance with rice millings fed alone

The used M sample No. 3 (Table 1) in the metabolism Trial 1 (Table 2 and 3) had a nutritive composition approaching that of the average of the 10 studied samples (Table 1), it was slighly higher in ash and CF and somewhat lower in other nutrients particularly with NFE. The sample had lower OM and NFE, higher EE, CF and ash than the sample of NAS, 1971but having similar CP. Moreover, the sample GE (3.60 kcal/g DM) was satisfactory, being 4.57kcal/g OM. It contained less ligninthan rice straw but very high silica which was 74.6% of the ash content.

TABLE 3. **The digestibilities, digestible organic matter and feeding values of rations directly and indirectly fed to sheep, including N-balance.**

Items	Direct feeding trials							Indirect feeding trials			
	M	H	B	M:S.U	M:H	M:H	M:B	Rice millings as tested ration			
	Tr.1	Tr.2	Tr.3	Tr.4	Tr.5	Tr.6	Tr.7	Tr.4	Tr.5	Tr.6	Tr.7
Nutrients digestibility:% :											
OM	28.83	66.00	82.34	53.06	51.40	43.45	59.08	17.98	36.17	28.42	32.42
CP	34.59	64.43	66.77	39.93	59.46	50.24	59.96	12.64	49.18	30.78	51.36
EE	85.84	38.77	72.15	77.09	64.76	64.76	81.99	76.32	73.54	70.50	86.79
CF	4.49	62.29	50.73	5.17	32.24	26.73	16.37	4.72	1.48	2.59	6.13
NFC	39.86	72.06	89.10	69.78	65.04	54.15	73.66	21.17	58.37	44.19	42.23
Digestible OM%b (DM)								c	a	b	ab
	22.7	56.0	75.3	45.9	42.0	35.3	50.3	14.2	c 28.5	a 22.4	b25.6
$S\bar{x} \pm$	0.37	1.30	0.60	0.72	0.44	0.69	0.72	0.78	08.5	1.34	1.50
Feeding value% (DM)											
	17.81	37.05	74.53	43.18	29.93	24.40	47.62	8.90	22.88	16.71	20.68
TDN	29.01	57.02	77.94	49.62	45.22	38.84	54.82	19.78	33.90	27.58	31.98
DCP	2.65	10.54	6.51	2.78	7.10	5.56	5.22	0.97	3.76	2.35	3.93
Av.N-balance,	—1.48	+6.68	+1.93	—1.57	+6.40	+2.85	—0.58	—	—	—	—

1, CF deduction = 0.30 SV/unit CF for M and B.

Considering the daily feed intake (Table 1), it was very low being 276g. This was expected as the feed contained a high proportion of rice hulls which is a very poor roughage, very low in protein.

The digestibility figures(Table 3)were noticeably lower with NFE,CF and CP when compared with results of NAS (1971), the respective figures being 53, 7·0 and 46%. This was reflexed on obtained feeding value being 29 01 % TDN, 17·81 % SV and 2·65 DCP. Figures were about 20% lower than obtained by NAS, (1971). They were also lower than published by Schneider, 1947 and Ghoneim 1964 using a sample having very similar nutrient composition as that of NAS (1971).

The average N-balance (Table 3) was -1·48 g/sheep/day. This was expected because daily DCP intake was about 7·3 g being much lower than suitable maintenace DP requirements, assuming 1·75 g DP/one kg 0·75. Moreover, the energy daily intake was 49 g SV (276 × 0·178) being also far bellow daily requirements for maintenance.

It was therefore, clear from this study that rice millings is a poor roughage, which should not be fed alone and mixed with supplementary rations including concentrates and protein supplements.

Effect of roughage basal ration from clover hay and its proportion on the digestibility and feeding value of rice millings fed to sheep

From Table 2 and 3 with trial 2, the used hay sample could be categorized as good quality clover hay having high level of CP, DCP and energy value. The hay appeared palatable insuring a suitable daily intake of the DM (863·6* g) as well as an energy intake of 320·0 g SV and 91·0 g DP.

When using hay at level of 39·1% in H : Mixture (Trial 6), for calculating digestibilities of the tested ration M, (by difference method), similar digestibilities were obtained as those when M was fed alone (Tr. 1), with slight increase in NFE coefficient and decrease in that of EE. This produced similar feeding value being 16·71 TDN, 27·58 SV and 2·35 % DCP against 17 81, 29 01 and 2·65 with M fed alone, considering the latter as a standard. Therefore, the similarity in results in the two cases (direct feeding of M, or indirect feeding of M using 39·1% hay level) might indicate that the associative effect was negligible between M and H.

On the other hand, when H level was raised to 49·2%, a noticeable increase in digestibilities with OM, CP and NFE was observed being higher than when M was fed alone, with a clear increase in the feeding value becoming 22·88, 33·9 and 3·76 % for SV, TDN and DCP, respectively. In this case using higher level of the hay resulted in a positive associated effect increasing the feeding value of M when charged to the side of the tested feed.

The effect of concentrate basal ration of barley grains on digestibilities and feeding values of rice millings fed to sheep

From Tables 2 and 3 with Tr. 3, results with barley fed alone to sheep showed similar composition, digestibilities and feeding value as already obtain-

ed by El-Talty and Abou-Raya(1977). The barely intake with rams although was more than double that of M when fed alone (970 against 276 g) yet it was still lower than with hay alone. But the energy intake with barley was higher (499.4 g SV) and that of DCP was lower (34.6g DCP) than with hay. With barley both energy and protein levels appeared higher than required for maintenance. This produced a positive N-balance with barley (1.93 g N) but being lower than with H owing to higher DCP intake in the latter case.

When using barley (B) as basal ration at a level of 49.8% in B:M mixture in Tr. 7 (a similar level as with H in H:M mixture, Tr.5), all digestibility figures for the tested ration M were somewhat higher than with M fed alone. This produced feeding values higher than the standard (M fed alone), being 20.68% SV, 31.98% TDN and 3.93 % DCP. Figures were very similar (though slightly lower than) when H was used with the same level as with barely. Here, it appeared that a certain positive associative effect occurred (but with a small magnitude)when using barely as a tested ration.

The effect of using completely digestible basal ration from maize starch and urea (SU) on the digestibility and feeding value of rice millings

In this procedure, the digestion trial with the basal ration is saved as SU ingredients are compietely digestible by ruminants. The calculation of the digestibilities for the tested ration could follow as if it were fed alone. Addition of SU to the very poor ration would insure better total feed intake, higher energy intake as well as a suitable protein equivalent intake.

Results in Table 2 indicated that addition of 37.1 % SU in M : SU mixture increased DM intake to 391.3 g instead of 276.0 g when M was fed alone, the increase being 42%. There was also an increase in DCP intake (from 7.4 to 10.9 g) and an appreciable increase in SV intake (from 49 to 169 g). This would reduce the stress on fed rams during the digestion trial. Here in Tr. 4 it was possible to extend the preliminary period to eight days and that of the collection to four days with the three experimental rams.

Concerning digestibilities and feeding value of rice millings as a tested ration (Tr. 4, Table 3), it was obvious that very noticeable decrease occured in digestibilities (except with CF) when compared with those of Tr. 1. Great reduction was with OM, CP and NFE. This reduced the feeding value to become 8.9, 19.78%TDN and 0.97 %DCP against 17.81, 29.01 and 2.65, respectively when M was fed alone. Therefore, a great deal of negative associated effect happened to the side of the tested ration reducing both digestibilities and feeding value calculated assuming the whole digestion of the prepared starch (from maize), made the microflora to utilize it leaving the crude carbohydrate fraction of M without attack. This might be a quite suitable reason because when barley grains were used as a tested ration to M (Tr. 7), although the percentage starch from the barley in the M : B mixture was similar to that of maize starch in the M : SU mixture, yet the digestibilities of nutrients in the tested ration M, continued to be similar to those

of M fed alone in Tr. 1. In this case with barley, it seems probable that the rate of passage of barley grains and its intact starch might be slower than that of prepared maize starch. It is also highly probable that the availability of barley starch *in situ*, having still the natural form of starch granules surrounded with cell wall constituents, would be slower. In this connection when Soliman (1968) increased maize starch proportion to clover hay in digestion trials with sheep, the calculated feeding value of the hay (assuming starch as a basal ration) was greatly reduced, owing to a great decrease in DM, CF and CP digestibilities. When clover was fed alone, OM digestibility was 61·63 %, being decreased to become 42.8 %when maize starch proportion was 39 % of the mixture and becoming almost null when starch become 72 % of the mixture.

Therefore, application of SU mixture here as 100%digestible feedstuff along with a poor roughage, though would improve digestibility trial conditions, and save a digestion trial with the basal ration yet it might induce a high negative associated effect on the tested ration. This would decrease the calculated feeding value of the roughage than when fed alone, or as a tested ration along with a good roughage basal ration as clover hay or along with a suitable concentrated basal ration as barley grains.

Summing up the results, it was clear that a wide range of digestibilities and feeding values was obtained for rice millings when changing the type of basal ration and its proportionality. In this study the ranges of 19·78 - 33·9 % TDN ; 8·90 - 22·88 % SV ; and 0·97 - 3·93 % DCP were obtained for the same type of feed using the same animal species (sheep and the same individual animals. This might also indicate that a certain feedstuff appeared not to have a constant feeding value for the same animal species. The value differed according to the method used for evaluation, whether the feed is fed alone or according to the proportion and type of feed or feeds associated with the feedstuff. Such results would support the view that in recording digestibility trial data with feedstuff, the conditions of performing the trial should be indicated . This includes whether fed directly or indirectly, as well as the type of associated feedstuffs (basal ration) and its proportion beside the animal species and the level of feed intake.

From the study of new Duncan's multiple range test with DOM %(Table 3), it was clear that results with SU were significantly lower than with all other cases. Results with M alone was the same as with H Tr. 6 but both were not significantly different from that with B, Tr. 7.

The question arose : which would be the suitable basal ration for a certain type of feedstuff as rice millings?. It might be that which would induce no associative effect or the least of it. It was clear here that application of SU mixture would underestimate the feeding value of rice millings.

References

Abou-Raya, A.K., and Galal, A.Gh. (1966) Modification in the semi-micro procedure of the official method for determining methoxyl group along with some facilities in the new lignin determination procedure in feeding-stuffs. *Proc. 2nd Anim. Prod. Conf.*, Cairo, 2, 695-700,1963.

Association of Official Agricultural Chemists (1970) "*Official Methods of Analysis*", 11*th* edn., A.O.A.C., Washington, S.D.C.

Chapman, H.D. and Pratt, P.F. (1961) "*Methods of Analysis for Soils, Plants and Water*" University of California, Division of Agric. Sc.

El-Hawary, M.H. (1968) Chemical composition of rice bran and wheat bran with special. reference to their nutritive value to some farm animals. *M.Sc. Thesis*, Cairo University.

El-Talty, Y.I. and Abou-Raya, A.K. (1977)Critical study of the associative effect of direct and indirect feeding in metabolism trials with sheep using flax-product,clover hay and barley grains. *Egypt. J. Anim. Prod.* 17, 131.

FAO (1977) "*Production Yearbook*", Vol. 32, Food and Agricultural Organization of the U.N., Published (1978).

Galal, A. Gh. (1969) A study of some carbohydrate components of poultry feeds and their relation to the feeding value with reference to lignin fraction. *Ph. D. Thesis, Fac. Agric.*, Cairo University.

Ghoneim, A. (1964) " *Animal Nutrition Principles and Feeding-stuffs*", 1*st* edn. Anglo-Egyptian Library, Cairo (In Arabic).

Ministry of Agriculture, Egypt (1968) Animal and poultry nutrion, *Technical Bull. No.* 3, 1968 (In Arabic).

Moon, F.E. and Abou-Raya, A.K. (1966) The lignin fraction of animal feeding-stuffs. V — A new procedure for lignin determination based on absolute methoxyl in acid lignin fraction and a correction factor. Its application to study lignin content in forage crops. *Proc. 2nd. Anim. Prod. Conf.*, Cairo 2, 647 (1963).

National Academy of Science (N.A.S.) (1971) "*Atlass of Nutritional Data on United States and Canadian Feeds*". N.A.S., Washington, D.C.

Schneider, B.H. (1947) Feeds of the world, their digestibility and composition. *West Virginia Agr. Expt. Sta.*

Soliman, I.M. (1968) A study on the maintenance requirement of energy and digestible protein for sheep. *M. Sc. Thesis*, Fac. Agric., Cairo University, .

Steel, R.G.D. and Torrie, J.H. (1960) "*Principles and Procedures of Statistics*", McGraw-Hill Book Company, Inc., New York.

التقييم الغذائى لمخلوط مخلفات ضرب الارز (الرجيعة الخيالى) فى تجارب تمثيل غذائى مع الأغنام

احمد كمال ابو رية ، يحيى ابراهيم التلتى ، عبد الرؤف ابو الحسن وبركات سنبل

كلية الزراعة ـ جامعة القاهرة ووزارة الزراعة

عنيت هذه الدراسة بتقييم الرجيعة الخيالى (مخلوط مخلفات ضرب الارز) فأجريت سبع تجارب تمثيل غذائى على الغنم لاهمية المنتج الذى يبلغ حوالى ٣٥٠ الف طن من الفراكات بالقرى . وقد شملت الدراسة تأثير درجة الطحن والمصدر على التحليل الغذائى لهذا العلف ودراسة تأثير اسلوب اجراء تجربه الهضم سواء كانت بالتغذية المباشرة أو غير المباشرة مع اختلاف العليقة الاساسية (دريس البرسيم أو حبوب الشعير أو مخلوط النشا مع اليوريا) .

ووضح أن الرجيعة الخيالى (والتى تتكون من نحو ٧٠٪ سرسة ر٢٥٪ رجيعة الأرز و٢٪ جرمة الأرز و٣٪ كسر ارز) يختلف اختلافا كبيرا حيث وجد أن متوسط التركيب الغذائى للمادة الجافة فى عشرة عينات هو ٦ر٧٧ ± ٢٨ر٠ بروتين خام و ٦ر٦٠ ± ٢٩ر٠ دهن خام و٢٣ر٢٧ ± ٢ر٠١ الياف خام و٠٩ر٤١ ± ٥٤ر٢ مستخلص خالى الازوت و٣٢ر١٨ ± ٢١ر٢ رماد خام وتبلغ الرطوبة فى العلف المأكول ١٦ر٩ ± ٥٣ر٠٪ .

وعند تغذية الرجيعة الخيالى بمفردها كانت قيمتها الغذائية ٠١ر٢٩٪ مركبات مهضومة كلية و٨١ر١٧٪ معادل نشا و٦٥ر٢٪ بروتين مهضوم وباستخدام طريقة التغذية غير المباشرة مع أربعة حالات مختلفة من العليقة الاساسية حصلنا على مدى متسع لمعاملات هضمها مما جعل قيمتها الغذائية تتراوح من ٧٨ر١٩ الى ٩ر٣٣٪ مركبات مهضومة كلية ومن ٩٠ر٨ الى ٨٨ر٢٢٪ معادل نشا ومن ٩٧ر٠ الى ٩٣ر٣٪ بروتين مهضوم . وهذا يعضد فكرة أن العلف المعين ليست له قيمة غذائية ثابتة لنوع معين من الحيوان ولكنها تختلف حسب الطريقة المتبعة [illegible] مما يرضح اهمية تسجيل القيم الغذائية فى جداول الاعلاف مشفوعة بالظروف المحيطة بالتجربة . وقد امكن اختبار الفروق بين القيم الغذائية (على اساس مادة عضوية مهضومة) باستخدام اختبار دانكان ، فعند استخدام مخلوط النشا واليوريا كعليقة اساسية كانت القيم الغذائية الناتجة اقل قيمة ، وتشابهت النتيجتان (بدون فرق معنوى) عند استخدام السرسة الخيالى وحدها (تغذية مباشرة) مع المقدرة بطريقة الفرق باستخدام الدريس بمستوى ٣٩ر١٪ وكلا التقديرين لم يختلفا معنويا عما هو مقدر باستخدام حبوب الشعير كعليقة اساسية . وقد اتضح انه يمكن استخدام حبوب الشعير كعليقة اساسية مناسبة لتقييم العلف بمستوى ٥٠٪ حيث نتج اقل تأثير اضافى عند خلط الشعير مع الرجيعة الخيالى كما تحسن مستوى الطاقة الماكولة مع الحصول على ميزان ازوت متعادل تقريبا .

وقد تضمنت الدراسة تسجيل لنتائج تجارب التمثيل الغذائى للمخاليط الثنائية الاربعة المستخدمه وكمية المأكول وميزان الازوت لها .