The Effect of Urea Molasses Multi-Nutrient and Medicated Block for Beef Cattle, Beef and Dairy Cow

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ABSTRACT

Urea molasses multi-nutrient block (UMMB) is a feed supplement and one of the best formulas constructed by the National Nuclear Energy Agency (BATAN). This supplement contains soya bean meal (SBM) and has been developed using different protein sources, such as *Enterolobium cyclocarpum (*Ec*),* soya bean waste sauce (SBWs), wheat pollard (WP) and WP bypass protein (WPBp). It has also been developed using medicated block (MB). The objective is to introduce the P-32 tracer for obtaining a new feed supplement, to apply UMMB-SBM on beef cattle for fattening, and to test UMMB-MB on cows in the field. Parameters measured include microbial protein synthesis (MPS) in rumen liquid, daily live weight gain (DLWG), milk production and total count of worm in feces. Statistical analysis used were Latin squares, Student's t-test, and completely randomized design. The UMMB-SBM was better than UMMB-Ec, UMMB-SBWs, and UMMB-WP, because it was able to increase MPS by up to 205.67%, superior to the other feed supplements (51.01%, 34.04%, and 73.94% respectively). On the other hand, with UMMB-WPBp supplementation, MPS was enhanced by 425.27%. The UMMB-SBM was able to increase DLWG by 0.34, 0.30, 0.38 and 0.36 kg/head/d on Bali cattle, Ongole, Simmental, and Frisian Holstein cross breed respectively. The increase of cost benefit ratio was affected by increasing DLWG. These values were 1:1.89; 1: 1.34; 1:1.45 and 1:1.35 respectively. UMMB-MB-*C. aeruginosa* and albendazole increased milk production by 4.23% and 46.56%, respectively. In the first communal group, beef cows that received UMMB-MB albendazole were able to increase feed consumption, including dry matter, organic matter, crude protein, and total digestible nutrient, at $P<0.05$. The second communal group, feed consumption significantly differed from control at $P<0.05$ on crude protein, and total digestible nutrient. UMMB-MB tends to be effective only for ten days on the total amount of egg worm in feces.

INTRODUCTION

The feed supplement Urea-Molasses Multi-nutrient Block (UMMB) was a result of studies at the Centre for the Application of Isotopes and Radiation (CAIR), BATAN by several research workers, and it has been presented in several papers [1,2]. The best formula selected was obtained by using P-32 tracer to determine microbial protein synthesis in the rumen liquid [3,4].

The introduction of UMMB has been undertaken in the field in several provinces of Indonesia, namely which Central Java, West Java, East Java, and West Nusa Tenggara. The researchers reported that UMMB supplementation increased daily live-weight gain, milk production, milk quality and reproductive performance [5-7]. In several countries, it has been used as a feed supplement for beef cattle, dairy cows and a small ruminant [8]. The UMMB feed supplement is not only applied on ruminant animals, but also introduced to the farmers in order to create a small business. The results showed that it has economic benefits for farmers in a short time of three months [9,10]. The introduction of UMMB in the field gathered information about the available local feed resources which could be used for composing new formulas of feed supplement related to the areas where their test were carried out. Some materials, including agricultural and industrial byproducts, leguminous leaves, herbal and

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anthelmintic agents, have a potential role for further explorations of their benefits when used as feed supplements for ruminant animals. Other information obtained in the field was about internal parasitic infection in beef and dairy cows that could decrease their productivity [11]. By addition of medicated urea, molasses multinutrient blocks were able to increase milk production of dairy cows and buffaloes [12]. The studies have indicated that the use of medicated blocks in dairy cows decreased internal parasitic burden and improved the persistence of the lactation curve [13]. Regarding all information, three activities were carried out. The first activity was a review of the utilization of tracer of P-32 for biological evaluation of formulas of feed supplements that contain protein sources from soybean waste sauce (SBWs), Wheat Pollard (WP) and *Enterolobium cyclocarpum (*Ec*)* compared to UMMB-SBM. The second activity was the development of UMMB application on some breeds of beef cattle in difference areas. The third activity was the test of UMMB-MB on beef and dairy cows.

The overall objectives of the current project are to review the utilization of tracer of P-32 for obtaining other feed supplement, to develop UMMB on some breeds of beef cattle for fattening at difference areas, and to utilize medicated block (UMMB-MB) herbal and anthelmintic for parasite control as well, so that the productivity of beef and dairy cows could be expected to increase.

EXPERIMENTAL METHODS

The activities of research were conducted in laboratory-scale and field trials. These were *in vitro* and *in vivo* studies respectively. Biological evaluation of feed supplement for measuring microbial protein synthesis (MPS) were carried out *in vitro*, whereas *in vivo* for testing UMMB-SBM and UMMB medicated block (UMMB-MB) in field.

Biological evaluation of feed supplement

The MPS in the rumen liquid of etawa cross breed (CB) dairy goat, buffaloes and beef cattle had been measured by using P-32 tracer. These animals were supplied feed supplements UMMB-SBM, UMMB-Ec, UMMB-SBWs, UMMB-WP, and UMMB-WPBp.

Development of UMMB application on some breeds of cattle

The activities of the pilot project of UMMB feed supplement were carried out in several provinces of Indonesia, namely Central Java, Yogyakarta, East Java, Bali, West Nusa Tenggara, South Sumatra, West Sumatra and South Sulawesi. Those activities are presented in Tables 1.

Table 1. The UMMB supplementation of beef cattle for fattening program at various provinces in Indonesia.

No.	Name of provinces	No *)	Breeds
1	Bali	20	Bali
		12	Bali
2	West Nusa Tenggara	16	Bali
3	South Sulawesi	20	Bali
4	Central Java	12	Ongole CB
		16	Ongole CB
		10	Simental CB
5	Yogyakarta	10	Ongole CB
		16	Simental CB
6	South Sumatra	12	Ongole CB
7	West Sumatra	20	Simental CB
		20	Simental CB
8	Central Java	20	FH CB
		16	FH CB
		12	FH CB
9	West Sumatra	8	FH CB

*) Total amount of animal used

These were different from previous UMMB application. These distinguished was shown on different location, and animal breed used. The UMMB supplementation was evaluated more extensively with males of Fries Holstein (FH) cross breed (CB) and beef cattle for fattening program. As a general procedure, the available beef cattle were allocated randomly into two groups, namely a control group that received the roughage and concentrate that were normally fed to beef cattle on the location and a second group which received the same diet as the control group with the addition of UMMB as a supplement at the rate of 0.1% of their body weight. Growth rate was measured at monthly intervals during three months. Results were analyzed using Student's t test [14].

Test of UMMB-MB (medicated block) on beef and dairy cows

The UMMB-MB is one of the feed supplements developed from UMMB by adding an anthelmintic and a herbal agent. These are albendazole and *Curcuma aeruginosa* (*C. aeruginosa*), respectively. The dose of the agent in the UMMB was either 5 g/80 kg/head or 21 g/500 g/head respectively. These were tested in Yogyakarta at four locations and East Java Provinces in one location. At each location in Yogyakarta, the UMMB-MB was applied to nine and twelve animals, whereas at the location in East Java six animals received UMMB-MB.

The experimental animals used in Yogyakarta were dairy cows of FH CB and beef cows

Simmental Ongole (SIMPO) CB, whereas in East Java only dairy cows of FH CB was used. Beef and dairy cows were given UMMB-MB which contained herbal and anthelmintic medicine. The *C. aeruginosa* was given to dairy cows in East Java and beef cows in Yogyakarta (Sleman and Gunung Kidul). The UMMB-MB that contained albendazole was feed to dairy cows in Yogyakarta (Sleman), including beef cows in Bantul 1 (Manunggal Karyo) and Bantul 2 (Andini Mulyo). Manunggal Karyo and Andini Mulyo are the name of communal groups at Bantul.

Test of UMMB-MB on dairy cows

Treatment of UMMB-MB supplementation on dairy cows in both East Java and Yogyakarta was divided into three groups of six cows and nine cows respectively. The first group acted as a control that received normal feed usually given by farmers. The second group was supplemented with UMMB and the third group was as the first group plus UMMB-MB-*C. aeruginosa* or albendazole. Each animal in the group treatment was given 500 g/day of both UMMB and UMMB-MB. Regarding the UMMB-MB treatment, cows were only supplemented once in 5 days on the first week a long of the duration14 weeks. Milk production was recorded per day and intake feed was also measured.

Test of UMMB-MB-*C. aeruginosa* on beef cows

The activities were conducted at Sleman and Gunung Kidul, Yogyakarta and used SIMPO cross breed respectively. The treatments were the same as test of UMMB-MB on beef cows in Bantul. This was distinguished from group III where UMMB-MB-*C. aeruginosa* was supplied.

The process of this block was identical as UMMB, but to the composition was added 5 g albendazole/80 kg body weight or 21 g *C. aeruginosa* /500 g UMMB. The medicated block (MB) was given to the experimental animals and only for 3-5 days from the beginning of the treatment. The parameters measured consist of dry matter, organic matter, crude protein and total digestible nutrient consumption, and also feed composition and daily live weight gain. The experimental design used was a completely randomized design; afterward, the data was analyzed by Duncan's multiple range tests to determine if any significant difference occurred among the treatments [14].

Test of UMMB-MB-Albendazol on beef cows

A treatment with UMMB-MB-Albendazole was given to Simental Ongole cross breed (SIMPO). The SIMPO beef cows were identified approximately six weeks after calving. The cows were used as experimental animals that were kept at Bantul 1. Nine beef cows were randomly assigned into three groups. Group I received a basal diet and concentrate mixture based on daily feed used by farmers as control. Feed treatments are presented in Table 2.

Table 2. Feed treatment at Bantul 1.

Group	Feed treatment	Feed supplement	Remarks
I	Control	-	daily feed used by farmers
II	I	500 g UMMB/head/d	Given every day
III	I	500 g UMMB-MB-Albendazol	5g/80 kg body weight

The UMMB-MB treatment at Bantul 2 used twelve Ongole beef cows cross breed that were divided randomly into four treatment diet groups. The first group was ration I (R1) as control that was fed as usually given by farmers. The details of feed treatments are shown in Table 3.

Table 3. Feed treatment at Bantul 2.

Ration	Feed treatments	Feed supplement	Remarks
I	Control	-	Feed as given every day by farmers
II	I	Albendazole	5 g/80 kg body weight
III	I	500 g UMMB/head/d	Given every day
IV	I	500 g UMMB-MB-Albendazole	5g/80 kg body weight

The cows were maintained at a communal group at Andini Mulyo, Bantul 2, Yogyakarta. Beef cows were monitored over three months for live-weight change and rectal faecal samples were taken at 0, 10, 30, 60 and 100 days for faecal worm eggs count [15].

RESULTS AND DISCUSSION

Biological evaluation of feed supplement using tracer P-32

The results of previous studies of MPS in rumen liquid of etawa dairy goat CB, buffaloes and cattle are presented in Table 4.

The MPS in the rumen liquid of these animals increased due to the feed supplement supplied. It seems that UMMB-SBM supplementation increased MPS by up to 67.56%, 205.67% and 37.99%. The UMMB-Ec increased MPS by 51.01% and 292.65%, whereas UMMB-WPBp given increased MPS by up to 425.27. Kapok seed meal as bypass protein was a component in the UMMB-WP.

Table 4. Microbial protein synthesis in rumen liquid due to UMMB supplementation with different protein sources (mg/l/hour)*

Feed treatments	MPS (mg/l/hour) Etawa dairy goat CB	Increase (%)
NG	77.94	-
NG+UMMB-SBM	130.6	67.56
NG+UMMB-Ec	117.7	51.01
	Buffaloes	
NG	142	
UMMB-WP	247	73.94
NG	65.3	-
NG+UMMB-SBM	199.6	205.67
NG+UMMB-SBM+Ec+Conc	256.4	292.65
UMMB-WPBp	343	425.27
	Beef Cattle	
NG	189.5	-
NG+UMMB-SBSw	254	34.04
NG+UMMB-SBM	261.5	37.99

*) Source : Suharyono [16-19]

MPS : Microbial protein synthesis
NG : Native grass
SBM : Soy bean meal
SBWs : Soy bean waste sauce
Ec : *Entrolibium cyclocarpum*
WP : Wheat pollard
WPBp : Wheat pollard_bypass protein

A perusal of Table 4 showed that the increase of MPS was capable of increasing 292.65%, when the animals were given UMMB-SBM+Ec+concentrate. It means that additional meal of Ec, SBM and concentrate contributed to supply defaunation agent, bypass protein and energy. Leng *et al.* (1992) reported that leaf of Ec is able to reduce protozoa amount in rumen liquid [20]. Supplying of protein and energy ratio for ruminant animal in balance condition would enhance daily live weight gain and milk production [1,2,20]. With the feed supplements of UMMB-Ec and UMMB-WPBp, the increase of MPS in rumen liquid tend to be higher than when UMMB-SBM was given. These were 292.65 and 425.27% compared to 205.67%. On the other hand, UMMB-Ec and WPBp could not applied in the field as the leaf of Ec powder, WP and kapok seed meal were difficult to obtain for composing an adequate amount of feed supplement. Therefore, UMMB-SBM are used as standard for getting others feed supplement.

Development of UMMB application on some breeds of cattle

The results of UMMB supplementation on DLWG in beef cattle are shown in Table 5.

Table 5. Average of increase DLWG Bali cattle, Ongole and Simmental and FH CB (kg/head/d).

Experimental animals	Average of DLWG (kg/head/d) - UMMB (A)	+ UMMB (B)	(B-A)	Profit B/C	Rp./ head/d
Bali cattle	0.28[a]	0.62[b]	0.34	1:1.89	2682.5
Ongole CB	0.35[a]	0.65[b]	0.30	1:1.34	1202.5
Simmental CB	0.68[a]	1.06[b]	0.33	1:1.45	1850
FH CB	0.63[a]	0.99[b]	0.36	1:1.35	1480

Within lines means different superscript differed significantly $P<0.05$.
DLWG: Daily live weight gain .

Daily live-weight gain of unsupplemented Bali cattle was 0.28 kg/head/d, whereas the group that received UMMB was 0.62 kg/head/d. A similar response to supplementation also occurred on the increase of DLWG of Ongole, Simmental and FH CB. The increase of DLWG was higher with than without supplement. The values were 0.65, 1.06 and 0.99 kg/head/d compared to without supplement 0.35, 0.68 and 0.63 kg/head/d respectively. The cost-benefit ratio was calculated as proportion of additional net economic gain (Table 5).

The cost-benefit ratio for Bali cattle was higher than for the other breeds used in this study, namely Ongole, Simmental and FH cross-breed (Table 5). Bali cattle are indigenous Indonesia. They have a higher dressing percentage than Brahman and Ongole CB. The dressing percentage was 56%, 54%, and 45% respectively [21].

The UMMB was not only introduced to be applied to beef cattle; instead, training courses on UMMB were also given to farmers and trainers. Participants came from Central Java, Yogyakarta, Bali, West Nusa Tenggara, West Sumatra, South Sumatra and South Sulawesi. The material presented in the course was not only theoretical but also practical, such as making UMMB and standard operational procedure to be done for ruminant animals (beef and dairy cattle, buffaloes, goat and sheep). This feed supplement is easy to make and is an appropriate technology and beneficial for farmers. Based on this they are expected to be able to produce UMMB and build small business. After having been trained, the local farmer groups and farmer cooperatives should be encouraged to manufacture UMMB using locally available resources. In Central Java, Bali and Yogyakarta, some farmers also ventured into UMMB manufacturing as a business enterprise. From these trials, UMMB's business resulted in additional farmer income of Rp. 150,765-Rp.301,625/month [22]. The outcome of the introduction of UMMB include not only increased productivity of beef cattle but also potential job creation for farmers.

Due to differences in the feed resources available locally, the composition of the blocks made in Yogyakarta, Central Java, East Java, West Java, West Sumatra, Bali and South Sulawesi were different from the formula used by BATAN. This is assumed to have a good effect on the sustainability of the technology. In some areas the price of materials use for UMMB is cheap, therefore quality and availability of UMMB will be guaranteed and sustainable in the future. The specific materials for the composition of UMMB locally are different from BATAN's UMMB (Table 6).

Table 6. Nutrition source of UMMB composition (%).

Formula BATANs UMMB	Carbo-hydrate	Protein	Non Protein nitrogen	Mineral
Molasses	33	-	-	-
Rice bran	18	-	-	-
Tapioca waste	6	-	-	-
Soy bean meal	-	13	-	-
Lime stone	-	-	-	6
Salt	-	-	-	7.5
Bone meal	-	-	-	6
Urea	-	-	4.25	-
Lacta mineral	-	-	-	1.25

Source: Suharyono, 2010 [22] and BATAN (2005) [23].

The illustration in Table 6 indicates that UMMB has a multi-nutrient content as it contains carbohydrate, protein, non-protein nitrogen, and minerals coming from materials such as byproducts of agriculture and agriculture industries.

Farmers from different areas have made UMMB which differed in certain nutrition sources. For example, in Central Java, Yogyakarta, and West Java, as protein source, soybean powder is used as a substitute for soybean meal. In East Java, the soybean meal is replaced by kapok seed meal and wheat pollard as a protein source. In West Sumatra and South Sulawesi, soy bean meal is replaced with oil coconut cake. Molasses as a carbohydrate source has been used for making UMMB composition in some provinces as previously mentioned, except West Sumatra where saka is used. Saka is liquid sugar from sugar palm and it is a traditional sugar which is found in West Sumatra. UMMB not only has a multi-nutrient content but it is also formed as a solid block form which could be licked by ruminant animals every day. In East Java, West Sumatra and South Sulawesi, cement is used to make a solid form. The quality of the block is indicated by its protein, dry matter and ash content (Table 7).

Table 7. Nutrient Content (g/Kg DM) of UMMB made in some areas.

UMMB Formulas	Nutrient content (g/kg)			
	Dry matter	Organic matter	Ash	Crude protein
Jakarta	730.12	671.14	328.90	230
(BATAN)	777.40	657	343	237
	728.83	599	401	200
Central	758.21	730.31	269.71	235
Java	827.83	698.13	311.93	255.60
Yogyakarta	767.91	676.72	323.37	300
West Java	820	700.52	299.52	227.94

The protein content of BATAN's UMMB ranges from 200 g/kg to 237 g/kg, whereas for Central Java, Yogyakarta and West Java, the range is 227.94-300 g/kg. The ash which is representative of the mineral source in UMMB show different values for different blocks. For BATAN, the ash content of the block is 328.90-401 g/kg, which is higher than in blocks found in Central Java, Yogyakarta and West Java, which are 269.71, 323.37 and 299.52 g/kg respectively. The dry matter content of BATAN's UMMB is lower than UMMB from Central Java, Yogyakarta and West Java. Their values is in the 728.83-777.40 g/kg range compared to 758.21-827.83 g/kg respectively. Mold does not grow well, when UMMB is wrapped in plastic bags properly.

The lower or higher crude protein content of the UMMB formula reflects the lower or higher crude protein content of the ingredients used. Soybean meal is a byproduct of soybean oil; indeed it will be different with powder of soybean. Crude protein content is 29.33% and 32.33% respectively [22]. The ash concentration reflects mineral content in feed; the higher ash content, the higher the mineral in feed. The mineral content of UMMB usually includes potassium (K), cobalt (Co) and sulfur (S) [24]. In addition, it was reported that Co and S are minerals essential for growing microbial in rumen liquid [2,25]. The dry matter content of BATAN's UMMB was under 86%, meaning that water content was higher and made it easier to be contaminated by mold. The standard of water content in feed is 14% [26].

Test of UMMB-MB (medicated block) on beef and dairy cows

The results of feed supplement UMMB-MB *C. aeruginosa* test are presented in Table 8, whereas for the suplementation with UMMB-MB-albendazole, the results are given in Table 9.

In Table 8 it is given that milk production tends to increase 14.20 l/head/d when dairy cows were supplied with UMMB-MB-*C. aeruginosa*. However, when they were supplied with UMMB and control feed, milk production were 16.14 and 13.60 l/head/d, respectively. It means that the increase of milk production was 4.23% and 15.74% compared to control feed.

Table 8. The effect of UMMB-MB-*C. aeruginosa* on milk production.

Place	Control	UMMB	UMMB-MB - *C. aeruginosa*
East Java		Dairy cows	
Intake of forages(kg/d)	9.50	7.95	8.25
Intake of concentrate (kg/d)	5.20	5.81	5.47
Milk production (l/head/d)	13.60	16.14	14.20

Table 9. Intake, growth and milk production in dairy cows supplemented with UMMB and UMMB-MB- albendazole.

Places	Control	UMMB	UMMB-MB-Albendazol
Yogyakarta		Dairy cows	
Intake of forages (kg/d)	7.35	7.95	8.25
Intake of concentrate (kg/d)	6.43	6.18	6.43
Milk Production (l/ head/d	10.81	11.43	10.11
Mean of increase milk production (l/head/d)	0.70[a]	0.81 [a]	1.31 [b]
Average daily weight gain (kg/head/d)	-1.13	-0.90	-0.20

Within lines, different subscription means significantly difference ($P<0.05$).

Supplementation of UMMB-MB-albendazole and UMMB on dairy cows increased the average of milk production up to 1.31 and 0.81 l/head/d compared to 0.70 l/head/d (control). The increase with UMMB-MB-albendazole was 46.56% while with UMMB alone it was 13.58%. Recent evidence from studies in Europe, North America and Australia indicate that in high producing dairy cow significant production losses can occur even when very low levels of nematode infections are evident. This is thought to be due to the nutrient cost of the immune response in suppressing worm egg output and possibly worm establishment. Similar results have been shown to occur in Indian dairy cattle [27]. In the present study with UMMB-MB- *C. aeruginosa,* there did not appear to be any additional benefits from inclusion of this herbal remedy in the UMMB formulation. This may be due to the lack of anthelmintic effects of this herb in this formulation or insufficient parasites to warrant treatment. Further studies should be conducted to confirm these observations.

In contrast to the results for the herbal preparation, with UMMB-MB-albendazole, the treatment resulted in a high increase in milk production. In this study UMMB alone increased milk production by 13.58%, whereas cows receiving UMMB-MB-albendazole increased milk production by up to 46.56% compared to cows receiving the control diet. This response is similar to other studies with dairy cows [12] where negligible levels of nematode eggs were present in the feces.

The DLWG of beef cows was supplied by UMMB and UMMB-MB-*C. aeruginosa* tend to increase from 0.14 to 0.15 kg/head/d, whereas in the control it was only 0.11 kg/head/d. Beef cows in other places which have been given UMMB and treated with *C. aeruginosa* decreased their body weight by 0.17 kg/head/d (Table 10) compared to control, the decrease was -0.37 kg/head/d.

Table 10. Intake and growth in beef cows were supplemented with UMMB-MB-*C. aeruginosa*.

Places	Control	UMMB	UMMB –MB-*C aeruginosa*
Gunung Kidul Yogyakarta		Beef Cows	
Intake of forages (kg/d)	5.40	6.84	6.30
Intake of concentrate (kg/d)	2.80	3.30	1.70
DLWG (kg/head/d	0.11	0.14	0.15
Sleman, Yogyakarta		Beef Cows	
Intake of forages (kg/d)	7.60	7.60	7.60
Intake of concentrate (kg/d)	5.20	5.81	5.47
DLWG (kg/head/d	-0.37	-0.09	-0.17

The results at the communal group of Manunggal Karya (Bantul 1) give information on the chemical composition of feed used. Table 11 displays five chemical compositions of feed used in this experiment.

Table 11. Chemical composition of feed based on dry matter (%).

Kind of Feed	DM	OM	CP	CF	TDN
Rice straw	77.44	82.25	5.85	29.57	34.79
Local grass	52.68	86.45	3.76	29.54	47.20
Elephant grass	48.23	84.92	4.57	15.43	47.39
Peanut leaves	70.23	87.91	11.09	15.43	63.90
UMMB	76.76	62.61	11.1	15.04	42.60
Commercial concentrate	88.32	84.75	14.67	4.65	42.60

Dry matter	:	DM
Organic matter	:	OM
Crude protein	:	CP
Crude fiber	:	CF
Total digestible nutrient	:	TDN

The beef cows received a basal diet which consisted of rice straws, local grass, elephant grass and peanut leaves. The dry matter (DM) content of basal diet consumed was 77.44%, 52.68%, 48.23%, and 70.23% respectively. The organic matter (OM) content was 82.25-87.91%. The lowest OM content was found in UMMB, namely 62.61%. The crude protein (CP) content in rice straw, local grass and elephant grass were lower than peanut leave, these were 5.85%, 3.76% and 4.57% compared to 11.09%. It indicates that peanut leaves has an important role to supply protein feed treatment, including commercial concentrate and UMMB which contained 12.14% and 14.67% respectively. Crude fiber content in basal diet was 15.43-29.57%, on the other hand, commercial concentrate and UMMB were lower in basal diet consumed, the value were 4.65-15.04%. The highest of total digestible nutrient (TDN) was peanut leaves, it was 63.9%. TDN of rice straw, local grass, elephant grass, commercial concentrate and UMMB was around 34.79-47.39%.

Table 11 shows that the dry matter contents rice straw, local and elephant grass at Bantul 1 were 77.44%, 52.68%, 48.23%, respectively. These contents were not the same as Hartadi's [28] measurement. The result of DM rice straw, local and elephant grass were 86%, 40%, and 28% [28]. This was caused by age and cutting time [29]. Water content of plants will decrease - the older the plants, the lower its water content [30]. The results of crude protein analysis was different as well as its DM content result (Table 9). Hartadi *et al.*, [28] reported that the crude protein contents of rice straw, local and elephant grass were 3.57%, 5.9%, and 8.7% [28]. This is in line with our finding that there are differences in the crude protein contents in feed. Probably it was due to raping level, growing environment of the plants, time of harvesting, and processing [31].

Measurements of nutrient consumed beef cow showed that most of nutrient consumed differed significantly, except crude fiber consumed. Treatments in Group III showed that the average values of DM, OM, CP and TDN was higher than group II and I, however group II did not differ significantly from Group III (Table 12).

Table 12. The average of DM, OM, CP, CF and TDN consumed.

Consumption of	Treatment of		
	Group I	Group II	Group III
DM (g/Kg $W^{0.75}$)	99.89^a	112.71^b	120.11^b
OM (g/Kg $W^{0.75}$)	84.24^a	92.68^b	99.33^b
CP (g/Kg $W^{0.75}$)	7.29^a	9.29^b	9.97^b
CF (g/Kg $W^{0.75}$)	24.73	25.18	26.23
TDN (g/Kg$W^{0.75}$)	42.82^a	48.27^b	51.43^b

Within lines mean different supersecript differed significantly P<0.05.

The feed treatment of medicated block on beef cows located at communal group Bantul 1 gave significant (P<0.05) positive respond in nutrient intake of DM, OM, CP and TDN. The ration of group III where the treatment with UMMB-MB-albendazole was carried out tend to fulfill nutrient requirement of cows. DM, OM, CP and TDN consumptions were 120.11, 99.33, 9.97, and 51.43 g/kg $W^{0.75}$/day. The researchers reported that cows on lactation period after calving need DM intake to be 100.16 g/kg $W^{0.75}$ (300 Kg) or 100.11 g/kg $W^{0.75}$ [32]. The higher the DM consumption of the cows, the more they consumed other nutrient, such as OM, CP and TDN [33]. This was supported by CP requirement of cows, which was 9.51 g/Kg $W^{0.75}$ day (300 kg) or 8.91 g/Kg $W^{0.75}$/day (350 Kg) [34]. It means that the CP intake in this experiment exceeded the CP intake required by cows after calving. In addition, TDN consumption also exceeded the required TDN intake. Some factors which tended to increase nutrient consumption were DM intake, supplementation of UMMB, the better quality of feed consumed, the higher CP intake, and the tendency that the more DM consumed, the higher the intake of other nutrients [34-36]. Whether TDN was high or low was influenced by the total amount of nutrients digested [28].

The DLWG cows group III tend to be higher than II and I, the value was 0.34 kg/head/d compared to 0.24 and 0.20 kg/head/d respectively, although significant differences were not found (Table 13).

Table 13. Average of DLWG in kg/head/d.

Repetition	Feed treatment		
	Group I	Group II	Group III
1	0.16	0.18	0.31
2	0.28	0.34	0.42
3	0.17	0.19	0.29
Mean value ^{ns}	0.20	0.24	0.34

ns: not significant

By feeding medicated block treatment, no significantly difference was found in DLWG. However, cows that received medicated block tended to be slower in their DLWG decrease. This was caused by lactating period after calving. When cows have calfs, they usually produce milk for the calf and the nutrient reserve in their body will be more mobilized for milk production. However, in cows that received medicated block, the mobilization of nutrient reserve seem to be slower or lower. Animal condition, age, gender, environment condition, management, palatability and feed consumption have potential roles for increasing daily live weight gain [37]. In addition, physiologically, after calving, cows will utilize energy reserve in their body for milk production, so their body weight always decreases [38].

The results of nutrient analysis at communal group Andini Mulyo (Bantul 2) are presented in Table 14.

Table 14. Nutrient contents of feed consumed based on DM (%).

Kind of Feed	DM	OM	CP	CF	TDN
Rice straw	77.50	77.40	4.08	33.47	38.61
Fermented rice straw	75.87	78.07	6.25	31.35	49.72
Local grass	35.69	85.81	9.33	29.89	54.27
Elephant grass	29.99	84.92	8.79	28.46	54.16
UMMB	80.79	73.44	11.1	8.56	35.94
Commercial concentrate	86.82	86.85	8.68	15.30	59.91

Some parts of the feed consumed were different; it contains not only rice straw, but also included local and elephant grass, as well as fermented rice straw, but no added peanut leaves. The results of nutrient analysis show differences from the nutrient content of feed at Bantul 1; this is shown clearly in crude protein content. The values were 4.08%, 6.25%, 9.33%, 8.79%, 11.1%, and 8.68%. Fermented rice straw is capable of increasing crude protein content. In Manunggal Karya and Andini Mulyo, the crude protein content were 5.85% (Table 11) and 4.08% and was increased to 6.25% (Table 14). The crude protein content of fermented rice straw was 6.25%; it was slightly different from the result of other researchers which was 7.72%. This was brought about by the utilization of urea in the processing of fermented rice straw [31]. They also mentioned that fermented rice straw has a good quality in terms of nutrient including chemical composition, digestibility and palatability.

Some of nutrient content feed consumed indicated that there were no significant difference ($P>0.05$), such as DM, OM and CF, however, CP and TDN were significantly different ($P<0.05$). Treatment of R IV, CP intake was higher than R I, II and III, namely 10.80 g/Kg $W^{0.75}$ vs 7.56, 8.21 and 8.51 g/Kg $W^{0.75}$. In addition, TDN intake was significantly different ($P<0.05$) and its value was also higher than R I, RII and R III. This was 69.30 g/ Kg $W^{0.75}$ vs 57.41, 61.11 and 61.28 g/ Kg $W^{0.75}$ (Table 15).

Table 15. The average of DM,OM,CP,CF and TDN in g/Kg $W^{0.75}$.

Consumption of	Feed treatments			
	R I	R II	R III	R IV
DM (g/Kg $W^{0.75}$)	122.6	130.09	130.24	134.06
OM (g/Kg $W^{0.75}$)	99.22	105.70	107.53	108.22
CP (g/Kg $W^{0.75}$)	7.56^{a}	8.21^{a}	8.51^{a}	10.08^{b}
CF (g/Kg $W^{0.75}$)	34.65	36.55	35.48	34.09
TDN (g/Kg $W^{0.75}$)	57.41^{a}	61.11^{ab}	61.28^{ab}	69.30^{b}

Within lines, means different superscript differed significantly($P<0.05$).

The DLWG seem to decrease and it did not differ significantly ($P>0.05$), however its value of R IV tend to be higher than R I and R III. Its value was -0.05 kg/head/d vs -0.27 and -0.12 kg/head/d (Table 16).

Table 16. The average of body weight alteration (kg/head/d).

Repetition	Feed treatment			
	R I	R II	R III	R IV
1	- 0.30	- 0.20	0.10	- 0.16
2	- 0.28	0.03	- 0.15	- 0.03
3	- 0.24	0.18	- 0.30	0.03
Average value ^{ns}	- 0.27	0.003	- 0.12	- 0.05

ns: not significant

Beef cows were maintained at Andini Mulyo (Bantul 2) and only differed significantly in CP and TDN consumed. Basal diet + fermented rice straw + concentrate + UMMB-MB albendazole (R IV) tend to fulfill the nutrient requirement of the cows. DM, OM, CP and TDN consumed were obtained as 134.06, 108.22, 10.08 and 69.30 g/Kg $W^{0.75}$/day. Nutrient requirement of beef cow is positive balance as well as beef cows at Bantul 1.

Result of total amount of worm egg count was not significant, however, based on time period of albendazole treatment, total amount of worm egg decreased from 18.66 to 2.42 g, when counted from zero to 10 days, after that it increased 7.33 g on 30 days (Table 17).

Table 17. Total of worm egg/gram.

Feed treatment	Faeces samples on day			
	0	10	30	Mean values
R I	30.66	5.33	10.33	15.44
R II	13.33	0.00	11.33	8.22
R III	18.00	2.00	3.33	7.77
R IV	12.66	2.33	4.33	6.64
Mean values	18.66^{a}	2.42^{ab}	7.33^{ab}	

Within lines, means with different superscript differed significantly ($P<0.05$).

Medicated block tend to respond positively to decrease of total amount worm egg in faeces. The decrease was shown on ten days, and then increased in 30 days. Medicated block seem to be effective only for ten days; after that it was not able to decrease the total amount of worm egg. Two factors tend to influence it, namely feed supplied and power of medical effect. Weather has potential role in the decrease or increase of parasite population [39]. Dry seasons with high temperatures and more sunlight is capable of breaking parasite life cycle [39]. On the other hand, rainy season, with high humidity, will increase parasite population. The maximal effectiveness of anthelmintics given to cows was only 10 days.

CONCLUSION

The tracer P-32 has potential role for biological evaluation ruminant feed and UMMB-SBM has a positive impact farmers incomes. Their income increased based on cost benefit ratio. There did not appear to be any advantage in the inclusion of *C. aeruginosa* in the UMMB formulation as an anthelmintic since this formulation did not improve animal output compared to UMMB alone. The formulation containing albendazole was capable of increasing nutrients consumed and milk production. Further work is required to confirm this finding.

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