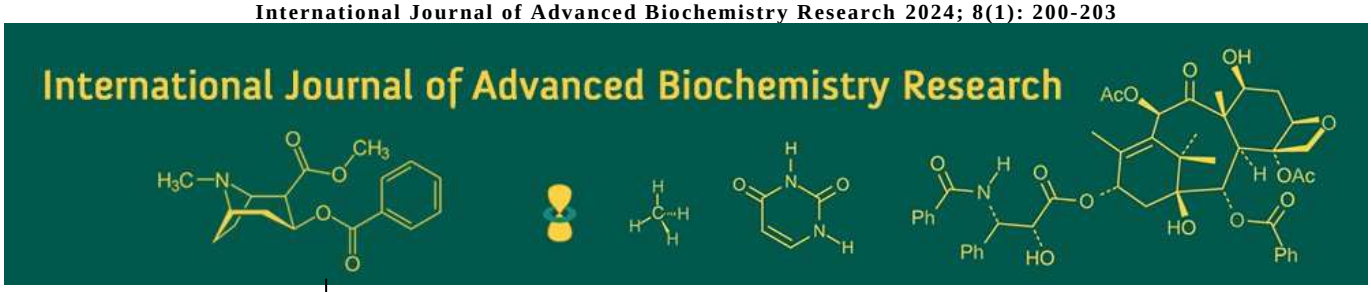

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Efficacy evaluation of some polyherbal preparations in management of bloat in large ruminants

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Abstract
The present investigation was conducted on 24 large ruminants (cattle and buffaloes) suffering from bloat at Veterinary Clinical Complex, Apollo College of Veterinary Medicine, as well as in animals of individual house holding in Jaipur district of Rajasthan to evaluate efficacy of polyherbal preparations "Afanil and AV/ATB/35"which was provided by M/s. Ayurvet Limited, India, in management of bloat in large ruminants. Affected animals were divided randomly into three groups, group T_1, group T_2 and group T_3. Group T_1 was treated with Afanil @ 50 ml twice daily for two days. group T_2 was treated with preparation AV/ATB/35 @ 50 ml twice daily for two days and group T_3 was treated with brand X (Bloatosil) @ 100-200 ml on the basis of severity of case for two days. Various parameters *viz*. type of bloat, abdominal distension and respiratory distress, rumination frequency, time for visible reduction in abdominal distension, resumption of normal feeding, ruminal activity and passage of dung, pH and MBRT of rumen liquor before and after therapy till recovery was recorded. Looking to the recovery status it was concluded that product Afanil and AV/ATB/35 are efficacious in management of bloat in large ruminants.

Keywords: Large ruminants, bloat, herbal preparations

Introduction
Ruminant animals carry an active population of micro-organisms (bacteria, fungi, and protozoa) in the fore stomach of their digestive system. Without these organisms, the animal would be unable to digest fibrous feeds, such as grasses and legumes. In the process of digesting these materials, the micro-organisms produce large quantities of gas that must be expelled (Majak *et al*., 2003) [4].

Bloat occurs when the eructation mechanism is impaired or inhibited and the rate of gas production exceeds the animal's ability to expel the gas. Because large volumes of gas are produced in the rumen, bloat can develop very quickly. In both legume and feedlot bloat, the eructation mechanism is commonly inhibited by frothy or foamy rumen contents. The gas remains trapped in the rumen fluid, forming an emulsion of small bubbles about 1 mm in diameter. The frothy rumen contents expand, filling the rumen cavity and inhibiting the nerve endings that control the opening into the esophagus. This condition is known as frothy bloat. Bloat can result in loss of animal performance and in severe cases, death (Lehmkuhler *et al*., 2011) [3]. Some current practices have been used for many years. For example, placing an animal's front feet on a mound so that the front feet are higher than the back feet helped to ease bloat because the esophagus was thus elevated, and the gas was expelled more easily. Enforced moderate exercise, such as walking, was a commonly-used treatment for bloat and was often effective if used before bloat reached the acute stage. Another method involved placing a stick or rope through an animal's mouth to encourage salivation, which breaks down rumen foam. (Majak *et al*., 2003) [4].

The approach to treatment depends on the circumstances in which bloat occurs, whether the bloat is frothy or due to free gas, and whether or not the bloat is life threatening (Radostits *et al*., 2010) [5]. For the treatment of bloating in emergence cases stomach tube or rumenotomy may be advisable and also the animals have to treated with antifoaming agents like paraffin oil, detergents and antibiotics. In frothy bloat, it may be impossible to reduce the pressure with the tube, and an antifoaming agent should be administered through the stomach tube.

Herbal medicines have gained importance due to their less toxicity, lesser side effect and being organic in nature. The use of herbal based preparations attracted many researchers for management of bloat due to their biodegradability, target efficiency and cost effectiveness. In perspective, the present study was aimed to evaluate efficacy of some polyherbal preparations "Afanil and AV/ATB/35" which are provided by M/s. Ayurvet Limited, India, in management of bloat in large ruminants

Materials and Methods

In this study, polyherbal formulations namely "Afanil and AV/ATB/35" which are provided by M/s. Ayurvet Limited, India, were used to evaluate efficacy of some polyherbal preparations in management of bloat in large ruminants. The investigation was conducted on 24 bloat affected large ruminants (cattle and buffaloes) presented at Veterinary Clinical Complex, Apollo College Veterinary Medicine as well as in animals of individual house holding in Jaipur district with history of bloat.

These animals were divided randomly into three groups, group T_1, group T_2 and group T_3 having eight animals in each group. Group T_1 was treated with Afanil @ 50 ml twice daily for two days; initial dose may be doubled in severe cases, group T_2 was treated with preparation AV/ATB/35 @ 50 ml twice daily for two days; initial dose may be doubled in severe cases and group T_3 was treated with Bloatosil @ 100 to 200 ml depending upon the condition for 2 days. Various parameters *viz.* Type of bloat, abdominal distension and respiratory distress, rumination frequency, Time (in nearest multiple of 30 minutes) for visible reduction in abdominal distension, resumption of normal feeding, ruminal activity and passage of dung, pH and MBRT of rumen liquor before and after therapy till recovery, were recorded.

Results and Discussion

Number of large ruminants (Cattle and buffalo) having different type of bloat in different groups (Group T_1, T_2 and T_3) are presented in Table 1.

Table 1: Number of large ruminants having different type of bloat in different groups

Parameters		Group of cattle	Number of animals (N=8)
Type of bloat	Frothy	T_1	2
		T_2	1
		T_3	3
	Free-gas bloat	T_1	6
		T_2	7
		T_3	5

Pre-treatment (Day 0) and post-treatment (Day 3) number of large ruminants (Cattle and buffalo) having different type of abdominal distension (based on severity of condition), respiratory distress, ruminal frequency in different groups (Group T_1, T_2 and T_3) are presented in Table 2, Table 3 and Table 4, respectively.

Table 2: Pre-treatment and post-treatment number of large ruminants having different type of abdominal distension in different groups

Severity of condition		Group of cattle	Number of animals (N=8)	
			Pre-treatment (Day 0)	Post-treatment (Day 3)
Abdominal distension	Normal	T_1	0	7
		T_2	0	8
		T_3	0	7
	Mild	T_1	1	1
		T_2	2	0
		T_3	3	1
	Moderate	T_1	4	0
		T_2	4	0
		T_3	1	0
	Severe	T_1	3	0
		T_2	2	0
		T_3	4	0

Table 3: Pre-treatment and post-treatment number of large ruminants having different type of respiratory distress in different groups

Severity of condition		Group of cattle	Number of animals (N=8)	
			Pre-treatment (Day 0)	Post-treatment (Day 3)
Respiratory distress	Normal	T_1	0	8
		T_2	0	8
		T_3	0	7
	Mild	T_1	2	0
		T_2	4	0
		T_3	3	1
	Moderate	T_1	4	0
		T_2	2	0
		T_3	3	0
	Severe	T_1	2	0
		T_2	2	0
		T_3	2	0

Table 4: Pre-treatment and post-treatment number of large ruminants having different ruminal frequency in different groups

Parameters		Group of cattle	Number of animals (N=8)	
			Pre-treatment (Day 0)	Post-treatment (Day 3)
Ruminal frequency (per 2 minutes)	2 or below	T_1	3	0
		T_2	2	0
		T_3	2	1
	3	T_1	1	8
		T_2	1	7
		T_3	0	7
	4 or above	T_1	4	0
		T_2	5	1
		T_3	6	0

Pre-treatment (Day 0) and post-treatment (Day 3) number of diseased animals and status of complete recovery (Yes/No) in different groups of large ruminants (Group T_1, T_2 and T_3) are presented in Table 5.

Table 5: Pre-treatment and post-treatment number of diseased animals and status of complete recovery in different groups of large ruminants

Group of cattle	Status of complete recovery		
	Number of diseased animals (N=8)		Complete recovery (Yes/No)
	Pre-treatment (Day 0)	Post-treatment (Day 3)	
T_1	8	1	No
T_2	8	0	Yes
T_3	8	1	No

Mean±SE values of time required for visible reduction in abdominal distension, resumption of normal feeding, resumption of normal ruminal activity and time required for passing of dung (in nearest multiple of 30 minutes) after therapy in different groups of large ruminants (Group T_1, T_2 and T_3) are presented in Table 6, Table 7, Table 8 and Table 9, respectively.

Table 6: Mean±SE values of time required for visible reduction in abdominal distension after therapy in different groups of large ruminants

Group of cattle	Time to reduction in abdominal distension (in minutes)
T_1	60.88^{c}±6.79
T_2	50.45^{b}±4.90
T_3	42.43^{a}±5.66

Means having different superscript in a column (a, b, c) differ significantly (p<0.05)

Table 7: Mean±SE values of time required for resumption of normal feeding after therapy in different groups of large ruminants

Group of cattle	Time to resumption of normal feeding (In hours)
T_1	3.47^{c}±0.37
T_2	2.96^{b}±0.35
T_3	2.22^{a}±0.32

Means having different superscript in a column (a, b, c) differ significantly (p<0.05)

Table 8: Mean±SE values of time required for resumption of normal ruminal activity after therapy in different groups of large ruminants

Group of cattle	Ruminal activity time (In hours)
T_1	3.0^{c}±0.30
T_2	2.65^{b}±0.32
T_3	1.94^{a}±1.88

Means having different superscript in a column (a, b, c) differ significantly (p<0.05)

Table 9: Mean±SE values of time required for passing of dung after therapy in different groups of large ruminants

Group of cattle	Dung passing time (In hours)
T_1	2.75^{b}±0.30
T_2	1.92^{a}±1.69
T_3	2.80^{b}±0.30

Means having different superscript in a column (a, b, c) differ significantly (p<0.05)

Pre-treatment and post-treatment mean ± SE values of pH (0-14) and methylene blue reduction test (MBRT) (in minutes) of rumen liquor in different groups of large ruminants (Group T_1, T_2 and T_3) are presented in Table 10 and Table 11, respectively.

Table 10: Pre-treatment and post-treatment mean ± SE values of pH (0-14) of rumen liquor in different groups of large ruminants

Group of cattle	pH of rumen liquor (0-14)		
	Pre-treatment (Day 0)	2 hours after first dose	Post-treatment (Day 3)
T_1	5.88^{x}±0.46	6.02^{x}±0.36	6.71^{y}±0.12
T_2	5.42^{x}±0.27	5.73^{x}±0.20	6.54^{y}±0.08
T_3	5.54^{x}±0.23	5.88^{x}±0.23	6.42^{x}±0.17

Means having different superscript in a column (a, b, c) differ significantly (p<0.05) and means having different superscript in a row (x, y, z) differ significantly (p<0.05)

Table 11: Pre-treatment and post-treatment mean ± SE values of methylene blue reduction test in rumen liquor in different groups of large ruminants

Group of cattle	MBRT (In minutes)	
	Pre-treatment (Day 0)	Post-treatment (Day 3)
T_1	7.25^{z}±1.36	2.17^{y}±0.37
T_2	6.86^{z}±1.66	1.99^{y}±0.33
T_3	7.65^{z}±1.42	2.34^{y}±0.47

Means having different superscript in a column (a, b, c) differ significantly (p<0.05) and means having different superscript in a row (y, z) differ significantly (p<0.05)

All animals of group T_1, T_2 and T_3 had mild to moderate abdominal distension and respiratory distress before treatment which is turned to normal within 3 days of treatment except one animal in group T_3.Ruminal frequency was found decreased or increased in bloat affected animals before treatment in most of animals. Lehmkuhler *et al.* (2011) [3] also reported similar findings in bloat affected animals and reported that respiratory distress and grunting are marked and are accompanied by mouth breathing, protrusion of the tongue, extension of the head and frequent urination. If the bloat continues to worsen, the animal will collapse and die. Mean±SE values of time required for visible reduction in abdominal distension (in nearest multiple of 30 minutes) and for resumption of normal feeding and ruminal activity (in hours) was highest in group T_1 and lowest in group T_3. Lehmkuhler *et al.* (2011) [3] reported that in a group of affected cattle, there are usually several with clinical bloat and some with mild to moderate abdominal distention.

Dung passing time (in hours) was highest in group T_3 and lowest in group T_2. The pH of ruminal fluid was decreased in all groups as compare to normal values which turned towards normalcy within 2 hours of treatment and was found normal within 3 days of treatment. Majak *et al.* (2008) [4] reported that bloat can be secondary to the acute onset of ruminal atony that occurs in anaphylaxis and in grain overload. This causes a reduction in rumen pH and possibly an esophagitis and rumenitis that can interfere with eructation. Rumen pH is low on high concentrate and finely ground rations. Rumen motility ceases at low rumen pH and it has been assumed that eructation may also be impaired. However, a direct effect of acidity on eructation has not been shown and there is only circumstantial evidence that low rumen pH causes bloat. Rumenitis is related to acidosis

in that associated with feeding high grain rations. Lesions in the area of the cardia can impair eructation and cause a free gas bloat. To the extent that free gas bloat may be caused by acidosis or rumenitis, it may be prevented by exercising appropriate care in starting animals on high grain rations (Galyean and Rivera, 2003) [2]. Methylene blue reduction test time was increased in all groups before treatment which was found normal on day 3rd post-treatment. As similar to this study Asrat *et al.* (2015) [1] also reported increased time for methylene blue reduction test in bloat affected cattle.

Conclusion

It was observed that Afanil and AV/ATB/35showed comparable therapeutic effect in management of bloat in large ruminants. Looking to the recovery status in abdominal distension, respiratory distress, rumination frequency, resumption of normal feeding, ruminal activity and passage of dung, pH and MBRT time in treated animals it was concluded that product Afanil and AV/ATB/35 are efficacious in management of bloat in large ruminants.

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