

Effect of Aloe Vera Leaf Powder on Quality of Boar Semen

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ABSTRACT

Aloe vera (*Aloe barbadensis miller*) is an evergreen perennial plant that is commonly found in proprietary herbal medicines and is widely employed in current herbal practice. The goal of this study was to look at the quality of boar semen after feeding Aloe vera leaf powder. The study was employed eight-month-old sexually matured boars weighing 90 to 120 kg. The boars were employed as a control group (before feeding) and treatment (after feeding of Aloe vera leaf powder). The gloved hand method was used to collect the semen from the boar. The Aloe vera leaf powder was fed @ 5 mg / kg body weight to the boars 3 month later of initial semen collection. Standard methods were used to examine the boar's spermogram. The use of Aloe vera leaf powder on a regular basis reduced sperm motility, concentration and percentage viability of sperm in boar ($P < 0.01$). The spermogram of a boar was negatively influenced by aloe vera leaf powder. The herbs could diminish boar semen quality, so it is advised not to use Aloe vera leaf powder in case of boar, especially those utilized for breeding.

HIGHLIGHTS

- Feeding of Aloe vera leaf powder on regular basis reduced sperm motility, concentration and percentage viability of spermatozoa in boar.

Keywords: Aloe vera, boar, semen quality

Aloe vera (*Aloe barbadensis miller*) is a slow-growing evergreen perennial plant with a height of 0.8 to 1 meter. It's a well-known herbal treatment with a lengthy history of use. Aloe vera is a common ingredient in herbal supplements and is widely employed in current herbal medicine. Chevallier *et al.* (1996) reported that burns, and other skin ailments, since it forms a protective layer over the damaged region, speeding healing and minimizing infection risk. Wolverson *et al.* (1996) used internally, aloe vera (usually bitter aloes) is used to relieve persistent constipation, poor appetite, and digestive disorders, in addition to its external application on the skin. Bown (1995). Pig farming is a vital part

of the traditional agricultural system, especially in Mizoram, one of India's eight North Eastern states. Farmers in this region have a lot of opportunities to grow in this sector because the vast majority of residents in this area aren't vegetarians. The average Mizo consumes roughly 14 kg of meat per year, compared to the national average of 7.5 kg (Statistical Handbook Mizoram 2010). The majority of the pig population in the region is made up of indigenous pigs, and the region's pig population

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is improving. This is made possible by extensive crossbreeding. AI is the only way to improve this pig population due to a lack of superior germplasm and challenges in rearing. Sperm morphology investigations in there have been reports of WAD bucks treated with pumpkin plant (*Cucurbita pepo*) and West African Dwarf rams treated with *Euphorbia hirta* (Oyeyemi 2000; Oyeyemi (2006). Nonetheless, there is a scarcity of information about the effects of Aloe vera plant on male fertility, particularly on spermatozoa morphology and semen image. As a result, the purpose of this study was to examine the spermatozoa morphology and semen quality of boar fed with Aloe vera leaf powder.

MATERIALS AND METHODS

In the present study, three healthy Large White Yorkshire (LWY) crossbred (75% LWY and 25% Zovwak) boars of about eight months old were used, obtained from All India Coordinated Research Project on Pig, College of Veterinary Sciences and Animal Husbandry, CAU, Selesih, Aizawl, Mizoram. The boars were employed as a control group (pre treatment) and post treatment i.e. feeding of fresh Aloe vera leaf powder on regular basis for three months, after that semen was collected from the respective boars. The Aloe vera leaf at first washed thoroughly in a clean water. Leave them upside down for 20 minutes allowing the yellow latex to drop off. Wash them again and start with cutting the spiky edges on the leaves into thin slices. Spread the pieces on parchment paper in a dry place for 1 week until dried completely. To speed up the process can use a dehydrator or oven just make sure not to use a higher temperature than 50 °C to keep as many valuable substance as possible. The powder blender was used to ground the dried leaves into a fine powder. The Aloe vera leaf powder was fed @ 5 mg / kg body weight to the boars 3 month later of initial semen collection. For semen collection, IMV dummy was used and a total of 10 ejaculates from each boar were collected by using gloved hand method. Semen was collected on a regular basis, at least three days apart, without altering the quality of the sperm. Standard methods were employed to examine the boar's spermiogram i.e. semen volume, colour, initial sperm motility, per cent live sperm and sperm concentration (Blom 1950).

RESULTS AND DISCUSSION

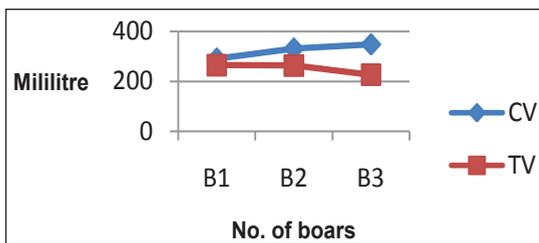
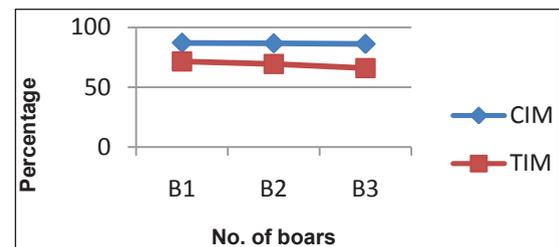
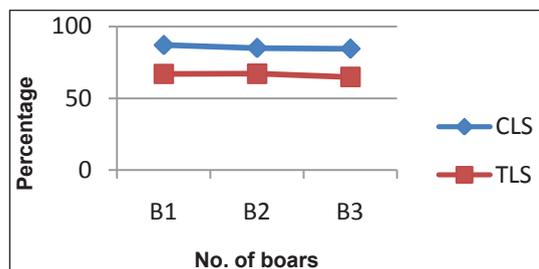
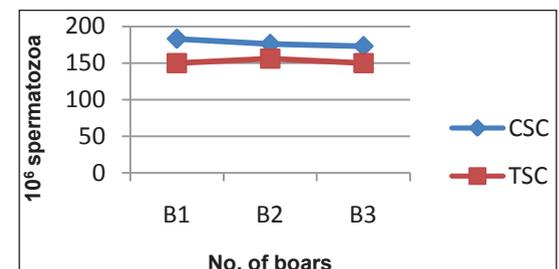
The average volume of ejaculate i.e. volume observed throughout the trial were 290 ± 24.12 , 330 ± 16.57 , and 347 ± 15.42 for pre-treatment and after 3 months of Aloe vera fresh leaf powder feeding post treatment were 264 ± 11.37 , 262 ± 16.31 and 226 ± 8.32 , respectively. These results demonstrated significant difference ($P < 0.05$) after 3 months of treatment. The entire semen sample observed in the investigation was milky white in colour. In this investigation, the mean percentages of progressive sperm motility for pre-treatment were 87.00 ± 1.33 , 86.50 ± 1.50 and 86.00 ± 1.63 and treatment with Aloe vera extract, were 71.50 ± 1.83 , 69.50 ± 1.16 and 66.00 ± 1.63 , respectively. These results demonstrated significant difference ($P < 0.05$) after 3 months of treatment. The mean percentage of spermatozoa viability pre-treatment were 87.00 ± 1.69 , 85.00 ± 1.97 and 84.50 ± 1.38 and fresh extract of Aloe vera leaf post-treatment, the mean percentage spermatozoa viability fell from 66.90 ± 1.04 , 67.10 ± 1.13 and 64.80 ± 1.04 , respectively. These results demonstrated significant difference ($P < 0.05$) after 3 months of treatment. The means sperm concentrations were $183 \pm 3.34 \times 10^6$ spermatozoa/ml, $176 \pm 3.71 \times 10^6$ spermatozoa/ml and $173 \pm 3.95 \times 10^6$ spermatozoa/ml; for the control group and fresh extract of Aloe vera leaf post treatment $150 \pm 2.26 \times 10^6$ spermatozoa/ml, $156 \pm 2.91 \times 10^6$ spermatozoa/ml and $150 \pm 2.47 \times 10^6$ spermatozoa/ml, respectively. These results demonstrated significant difference ($P < 0.05$) after 3 months of treatment (Table 1).

In the present findings it was observed that the semen volume was decreased significantly ($P < 0.01$) after feeding of Aloe vera (Fig. 1). The current findings were similar to the ones mentioned by Khan *et al.* (2007). Borah (2009) found that the current mean volume was larger than that of Hampshire and crossbred boars. The results were; however, lower than those found by Bania (2017) in Hampshire and Rani boars might be due to different genetic make-up, age of boars, body weight of boars, frequency of semen collection, and method of semen collection. The findings of Aloe vera post treatment in the investigation showed variation, which might be because of steroid, alkaloid, tannins, and terpenoid, the phytochemical elements of the Aloe vera plant. It could be the cause of the negative influence on crossbred boar semen quality. The

Table 1: Pre and post treatment of Aloe vera leaf powder on the quality of boar semen

Parameter	Treatment	Boar 1	Boar 2	Boar 3	F-values
Volume of semen (ml)	Pre-treatment	290±24.12	330±16.57	347±15.42	2.951 ^{NS}
	Post-treatment	264±11.37	262±16.31	226±8.32	
	t-values	0.766*	2.858*	9.671**	
Initial motility (%)	Pre-treatment	87.00±1.33	86.50±1.50	86.00±1.63	3.147 ^{NS}
	Post-treatment	71.50±1.83	69.50±1.16	66.00±1.63	
	t-values	8.188**	7.520**	7.746**	
Live sperm (%)	Pre-treatment	87.00±1.69	85.00±1.97	84.50±1.38	2.063 ^{NS}
	Post-treatment	66.90±1.04	67.10±1.13	64.80±1.04	
	t-values	9.476**	6.214**	12.833**	
Sperm concentration (×10 ⁶ spermatozoa/ml)	Pre-treatment	183±3.34	176±3.71	173±3.95	2.063 ^{NS}
	Post-treatment	150±2.26	156±2.91	150±2.47	
	t-values	6.960**	3.905**	5.355**	

NS: Non significant; *P<0.05; **P<0.01.

**Fig. 1:** Volume of semen (ml) for pre and post treatment of Aloe vera leaf powder on the quality of boar semen**Fig. 2:** Initial motility (%) of sperm for pre and post treatment of Aloe vera leaf powder on the quality of boar semen**Fig. 3:** Per cent live sperm at pre and post treatment of Aloe vera leaf powder on the quality of boar semen**Fig. 4:** Boar sperm concentration at pre and post treatment of Aloe vera leaf powder

colour of the fresh semen was noted to be milky white in all of the samples in this investigation, which is comparable to other pig breeds (Borah 2009).

In crossbred LWY boars, the mean initial sperm motility was 86 to 87% for pre-treatment and 66 to 71% for post-treatment (Fig. 2). The present finding was in close acceptance of the observation reported by Oyeyemi *et al.* (2011). Male catfish treated with Aloe vera gel extract were studied by Owoyemi *et al.* (2015). They discovered that sperm motility was dramatically lowered when they applied 2 and 3 percent Aloe vera gel. In this study, there was no

significant difference in the initial sperm motility among the boars. Steroid, Alkaloid, Tannins, and Terpenoid, which are phytochemical elements of the Aloe vera plant, could be the cause of the negative influence on crossbred boar semen quality.

In the present study, the averages live sperm was 84 to 87 per cent for pre-treatment and post treatment of Aloe vera with a range of 64 to 67 per cent (Fig. 3). Barbosa *et al.* (2020) investigated the cryopreservation of sperm from domestic cats' epididymis using Aloe vera extract at concentrations of 10% and 20%. They noticed that spermatozoa viability has decreased. Aloe vera's



effect could explain the existing data's variations. The percentage of boars with live sperm did not differ considerably. For individual variation, their inherent characteristics are to blame for significant differences among the boars.

The sperm concentration was 173×10^6 spermatozoa/ml to 183×10^6 spermatozoa/ml for pre-treatment and for post treatment with fresh extract of Aloe vera were 150×10^6 spermatozoa/ml to 156×10^6 spermatozoa/ml (Fig. 4). The present study was in close acceptance of the observation reported according to Fakhrildin and Zohreh *et al.* (2014). Aloe Vera fresh extract has been demonstrated to protect rat testicular tissue and improve spermatogenesis due to its antioxidant properties. The differences in sperm concentration between studies could be ascribed to differences in breed, age, body weight, and size of boar testes, season, frequency and method of semen collection, semen estimation method, and environmental factors. The amount of spermatozoa in the boars' sperm differed considerably ($P < 0.01$).

CONCLUSION

The spermiogram of a boar was negatively influenced by Aloe vera leaf powder. Because of the diminished boar semen quality after feeding of Aloe vera, it is advised not to use Aloe vera leaf powder in case of boar, especially those utilized for breeding.

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