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Effect of dietary supplementation of herbal mixture on post weaning growth performance and health status of LWY young pigs

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Abstract
The study was conducted to investigate the effect of dietary supplementation of herbal mixture on growth performance and health status of Large White Yorkshire weaned piglets during the post-weaning period (from 28 to 70 days of age) reared under farm conditions of Mizoram. A total number of 144 (18 litters) Large White Yorkshire young pigs weaned at 28 days old were taken for the study period of 42 days (Day 28-70) and were randomly divided into three groups *viz.*, Control (C) fed basal diet, Treatment-1 (T_1) fed basal diet incorporated with 0.6% herbal mixture and Treatment-2 (T_2) fed basal diet incorporated with 1.2% herbal mixture in such a way that there were 6 replicates in each group with 1 litter as one replicate. Findings of the study revealed significantly (p<0.05) higher average body weight on day 42, 49, 56, 63 and 70 as well as significantly (p<0.05) improved average daily gain on 5th, 6th, 7th, 8th and 9th week of age as well as on the overall average daily gain. Feed conversion efficiency on 5th and 6th week of age (first two weeks of post weaning period) and the overall FCE in weaned piglets reared under Treatment-1 and Treatment-2 were found to be significantly (p<0.05) better as compared to weaned piglets under control group. A significant (p<0.05) decrease in the occurrence rate (%) of diarrhoea, general appearance and faecal consistency were observed in weaned piglets under treatment groups when compared to control group. The study demonstrated that dietary supplementation of herbal mixture (0.6% and 1.2%) significantly improved growth performance and reduced the occurrence rate (%) of diarrhoea in Large White Yorkshire weaned piglets during the post-weaning period (day 28-70).

Keywords: Herbal mixture, piglets, weaning, growth, diarrhoea

Introduction
The animal husbandry plays a crucial role in rural upkeep and national economic growth. Piggery is a favoured livelihood option for the weaker sections of society in the North-eastern region (NER) of India due to its low infrastructure and equipment requirements, as well as the fact that pigs are renowned for their high fecundity, early maturity within short generation intervals and better feed conversion efficiency in comparison to other livestock. Despite the promising scope and commercial importance, pig farmers face many challenges. One such challenge is health management, particularly alleviating post weaning stress. Weaning is a critical and stressful phase in the life of pigs, marked by significant dietary, physical and social changes. These stressors often result in reduced feed intake, poor weight gain, episodes of diarrhoea and increased risks of morbidity and mortality. Traditionally, antibiotics have been incorporated into weaner diets to mitigate these issues. However, rising concerns about antibiotic resistance and associated health hazards have prompted global restrictions on their use. This shift has posed substantial challenges in swine production, particularly in managing the health and growth of early weaned piglets without relying on antibiotic growth promoters (Borazjanizadeh *et al.*, 2011) [4]. Phytogenic additives, including turmeric (*Curcuma longa*), guava leaves (*Psidium guajava*), garlic (*Allium sativum*) and ginger (*Zingiber officinale*), have emerged as promising alternatives to antibiotics in animal nutrition (Manzanilla *et al.*, 2004) [13]. These botanicals possess well-documented antibacterial, antioxidant and growth-promoting properties, making them effective in alleviating post-weaning stress and enhancing pig health and performance (A. Amalraj *et al.*,

2017; Shaheena *et al.*, 2019; Jacob *et al.*, 2019; Townsend *et al.*, 2013) [17, 24, 9, 28]. Findings of research work on the effect of turmeric, guava leaves, garlic and ginger on performance of livestock and poultry are promising. However little information are available regarding the combined effects of herbs on pigs particularly during post-weaning period. Considering the importance of the above facts in mind, the present experiment was conducted to study the growth performance and health status of Large White Yorkshire young pigs fed diet supplemented with Herbal mixture during post weaning period.

Materials and Methods

Location and period of study

The study was carried out at the piggery unit of Livestock Farm Complex, College of Veterinary Sciences & Animal Husbandry, Central Agricultural University, Selesih, Aizawl, Mizoram, India. The study was conducted for a period of 6 months i.e. January to June, 2024.

Experimental design and dietary treatment groups

For the purpose of the study, a total of 144 (18 litters) Large White Yorkshire young pigs (28-70 days of age) were utilized. All the animals in their respective litters were randomly allotted into three groups *viz.*, Control (C), Treatment-1 (T_1) and Treatment-2 (T_2) in such a way that there were 6 replicates in each group with 1 litter as one replicate. Piglets of group C were fed with basal diet, without any supplementation of herbal mixture and therefore, served as control. Feed containing 0.6% (0.1% turmeric, 0.1% guava leaves, 0.2% garlic and 0.2% ginger) and 1.2% (0.2% turmeric, 0.2% guava leaves, 0.4% garlic and 0.4% ginger) dried herbal mixture powder were fed to the weaned piglets of group T-1 and T-2 respectively. Different rations such as starter and grower feed (Starter feed : 5-11kg body weight and Grower feed : 11-25kg body weight) were prepared as per the standards of National Research Council (2012) by using conventional feed ingredients with the inclusion of skimmed-milk powder. The trial was conducted for 42 days (Day 28-70). Parameters recorded were as follows:

Average body weight (ABW) in kg)

The body weight of all the weaned piglets were measured in the morning hours before feeding on weekly basis from day 28 to day 70 by using digital weighing balance.

Average daily gain (ADG) in gram

The average daily gain of body weight of weaned piglets was calculated by using the following formula:

$$R = \frac{W_2 - W_1}{T_2 - T_1} \text{ X } 1000 \text{ (g)}$$

Where,

R = Average daily weight gain (ADG) (in gram)
W_1 = Initial body weight in kilogram
W_2 = Final body weight in kilogram
T_1 = Initial age in days
T_2 = Final age in days

Average daily feed intake (ADFI) in gram

Ad libitum feeding was practiced for the weaned piglets from day 28 to day 70 of age. Daily feed offered in morning and evening as well as residual feed in the following morning were recorded. After making correction of dry matter (DM) of residual feed and the feed offered, daily feed intake (on DM basis) was determined by subtracting the residual feed from the feed provided.

Feed conversion efficiency (FCE)

FCE of weaned piglet was calculated by dividing the feed intake (kg) with body weight gained (kg) during the same period of time by using the following formula:

$$FCE = \frac{\text{Total feed intake during that period}}{\text{Weight gained during that period}}$$

General appearance

The experimental piglets were observed daily in the morning hours (after feeding) and were scored based on their general appearance as described by Meeuwse *et al.*, (2002) [15]. The collected data were analyzed and interpreted on weekly basis.

Occurrence rate of diarrhea

The weaned piglets under study were examined visually for any signs of diarrhoea on a daily basis which were recorded and interpreted on a weekly basis. The occurrence rate of diarrhoea was then determined using the following formula:

$$\text{Occurrence rate of diarrhoea (\%)} = \frac{\text{No. of animals suffering from diarrhoea}}{\text{Total no. of animals}} \text{ X } 100$$

Faecal consistency score

The intensity of diarrhoea was evaluated using the faecal consistency scorecard as described by McLamb *et al*. (2013) [14] and was interpreted on a weekly basis**.**

Statistical analysis

The recorded data from the study were subjected to statistical analysis using IBM SPSS version-27 software and Chi-square test (X^2) for meaningful and accurate comparison and interpretation (Snedecor and Cochran, 1994) [25].

Results and Discussion

The mean (± SE) ABW (kg) of Large White Yorkshire (LWY) weaned piglets from day 28 to 70 are presented in Table 1. Statistical analysis revealed no significant differences between control and treatment groups on days 28 and 35. However, on days 42, 49, 56, 63 and 70, the average body weight (ABW) of weaned piglets in groups T_1 and T_2 were significantly higher ($p<0.05$) than that of the control group. The initial lower ABW observed during the first two weeks post-weaning is likely due to weaning stress and the transition to solid diets. The increase in ABW of weaned piglets supplemented with herbal mixture were in accordance with the observations of Onyimonyi *et al.*, (2013) [18], Alagbe *et al*., (2017) [2], Pachuau M. (2019) [19], Vanlalpianpuia (2020) [29] and Thuy and Ha (2023) [27]. Onyimonyi *et al.*, (2013) [18] observed that incorporating sun dried garlic powder @ 100 (T_2) and 200g/100kg (T_3) of basal feed in the weaner pigs ration had significant ($p<0.05$) increased on the average final body weight (AFBW), indicating that allicin, a phytochemical found in garlic, may suppress pathogenic microorganisms, enhancing nutrient digestion and absorption. Vanlalpianpuia (2020) [29] reported

that incorporating 0.35% and 0.7% guava leaf powder into the diets of weaned piglets led to highly significant (p<0.01) increases in body weight on days 35, 42, 49, 56, 63 and 70 compared to a control group. The study suggests that the antioxidant and antimicrobial properties of guava leaves may inhibit pathogenic growth, promote beneficial intestinal microflora and enhance nutrient utilization, thereby improving the health and growth performance of weaned piglets. The incorporation garlic and ginger in the post weaning diet of pigs, might have improved the intestinal morphology and created a favorable gut microflora leading to lower incidence rate of diarrhoea and resulted in better ABW (Pachuau M, 2019) [19]. Platel and Srinivasan (2000) [20] also reported the beneficial effects of turmeric on growth performance, which could be attributed to the elevated secretion of amylase, trypsin, chymotrypsin, and lipase enzymes. Guava leaves are rich in quercetin, a flavonoid with potent antioxidant properties which exhibit fungistatic, bacteriostatic, antiviral and anti-inflammatory contributing to their effectiveness in disease prevention and treatment (Naseer *et al.*, 2018) [16]. Thus, the improved result of ABW in the present experiment could be attributed to synergistic effect herbal mixture powder containing turmeric, guava leaves, garlic and ginger in diet, which might have improved the intestinal morphology and created a favorable gut microflora leading to lower incidence rate of diarrhoea, thereby improving ABW in weaned piglets.

Table 1: Mean (± SE) average body weight (kg) of LWY weaned piglets under different groups

Age (Day)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
28	5.65±0.17	5.75±0.14	5.63±0.18	0.87
35	6.36±0.20	6.68±0.19	6.71±0.13	0.22
42	7.33^{b}±0.22	7.89^{a}±0.26	7.98^{a}±0.15	0.02*
49	8.75^{b}±0.25	9.48^{a}±0.22	9.61^{a}±0.21	0.05*
56	10.41^{b}±0.28	11.35^{a}±0.29	11.49^{a}±0.19	0.04*
63	12.37^{b}±0.25	13.52^{a}±0.24	13.58^{a}±0.27	0.001**
70	15.02^{b}±0.31	16.23^{ab}±0.28	16.38^{a}±0.24	0.03*

(*) Significant (p<0.05), (**) Highly Significant (p<0.01)

The mean (± SE) ADG (g) of Large White Yorkshire (LWY) weaned piglets from 5th to 10th week of age during the post weaning period are presented in Table 2. Statistical analysis revealed significantly (p<0.05) higher observations in Treatment 1 and 2 as compared to Control (C) on the 5th, 6th, 7th, 8th and 9th week as well as on the overall ADG. The non-significant differences in ADG observed between the different groups in the 10th week of the present study may be attributed to the weaned piglets' physiological and immunological adaptation to their new diet and environment, leading to stabilized gut health, reduced diarrhoea risk and compensatory growth as the piglets aged.The better ADG of weaned piglets supplemented with herbal mixture recorded in the present study were in accordance with Grela and Klebaniuk (2007) [8], Adebiyi *et al.*, (2014) [1], Stevenson J.L. (2022) [26] and Thuy and Ha (2023) [27]. Grela and Klebaniuk (2007) [8] found that supplementing weaned piglets' diets with lyophilized garlic powder improved average daily gain (ADG) more effectively than both control and antimicrobial growth promoter (AGP) diets during the post-weaning period (days 28–56), likely due to garlic's allicin and sulfur compounds possessing strong antimicrobial and antioxidant properties. Also, Adebiyi *et al.* (2014) [1] found that adding garlic to weaner pig diets significantly increased ileal villus height, suggesting that improved intestinal morphology contributed to enhanced average daily gain (ADG). This was further corroborated by Stevenson J.L. (2022) [26], who reported that supplementing weaned piglet diets with 0.5% and 1% turmeric powder significantly (p<0.01) improved post-weaning average daily gain (ADG) compared to a control group, attributing this enhancement to turmeric's antioxidant and antimicrobial properties, as well as its ability to stimulate bile secretion. Moreover, the research of Thuy and Ha (2023) [27] found that supplementing weaned piglet diets with 2 g/kg of garlic powder and 2 g/kg of guava leaf powder improved average daily gain (ADG) compared to a control group. They concluded that these phytogenic additives enhance nutrient digestibility and reduce microbial concentrations, thereby promoting better growth performance. Therefore, the combination effects of the above-described characteristics of the phytogenics on weaned piglets may account for the improved ADG outcome in the present experiment.

Table 2: Mean (± SE) average daily gain (g) of LWY weaned piglets under different groups

Age (Weeks)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
5th	101.24^{b}±5.73	132.83^{a}±8.10	152.90^{a}±9.37	0.001**
6th	135.35^{b}±8.15	172.05^{a}±16.84	181.88^{a}±6.26	0.001**
7th	203.06^{b}±13.52	227.88^{a}±17.93	233.85^{a}±9.24	0.03*
8th	232.16^{b}±12.13	267.42^{a}±13.43	274.30^{a}±15.94	0.04*
9th	262.19^{b}±8.81	305.34^{a}±18.04	307.38^{a}±23.85	0.01**
10th	371.41±21.35	387.86±20.92	395.01±16.60	0.62
Overall	218.63^{b}±7.34	248.27^{a}±12.57	254.95^{a}±9.63	0.001**

(*) Significant (p<0.05), (**) Highly Significant (p<0.01)

The mean (± SE) ADFI (g) of Large White Yorkshire (LWY) weaned piglets from 5th to 10th week of age during the post weaning period are presented in Table 3. The ADFI of Control (C), Treatment 1 (T_1) and Treatment 2 (T_2) groups on the 5th week of age (i..e.1st week of post weaning) were 230.61±4.53, 241.93±5.35, 257.00±11.03, which increased upto 906.17±22.39, 921.07±25.11 and 926.51±30.96 during 10th week of age, respectively for each group. There was no significant difference in ADFI during different weeks of post weaning period among the experimantal groups. Our results are in agreement with those obtained by Maneewan *et al.*, (2012) [12], Ebrahimnezhad *et al.*, (2014) [7], Pachuau M. (2019) [19], Vanlalpianpuia (2020) [29] and Thuy and Ha (2023) [27]. Maneewan *et al.*, (2012) [12] reported that dietary turmeric supplementation on nursery pigs at doses of 0.05%, 0.10%, and 0.20% did not significantly influence ADFI. Pachuau M (2019) [19] also reported that supplementation of garlic and ginger on ADFI of weaned piglets was found non-significant among the different groups during the post weaning period. The present results also support the findings of Vanlalpianpuia (2020) [29], who reported that supplementation of guava leaves powder on weaned piglets showed non-significant difference in ADFI during the post weaning periods among the different groups. Contrary to the present findings, Onyimonyi *et al.*, (2013) [18] recorded better feed intake in weaned pigs fed a diet containing ginger and garlic and mentioned that ginger and garlic enhanced the flavour, palatability and taste of feed. The possible explanation of the current finding on ADFI can be attributed to the fact that phytogenic feed additives may be

more effective at improving gut health, immunity and feed efficiency rather than directly boosting the feed intake. These benefits may lead to better ADG or FCE without significantly impacting ADFI.

Table 3: Mean (±SE) average daily feed intake (in gram) of LWY weaned piglets under different groups

Age (Weeks)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
5th	230.61±4.53	241.93±5.35	257.00±11.03	0.37
6th	290.07±8.87	324.80±12.44	314.63±16.36	0.67
7th	410.96±13.29	427.06±9.07	419.58±23.68	0.54
8th	561.61±24.65	571.86±20.75	568.23±15.33	0.81
9th	735.76±17.90	715.42±18.46	723.52±19.82	0.94
10th	906.17±22.39	921.07±25.11	926.51±30.96	0.50
Overall	519.86±38.74	533.02±40.13	535.25±35.72	0.95

The mean (± SE) feed conversion efficiency (FCE) of Large White Yorkshire (LWY) weaned piglets from 5th to 10th week of age during the post weaning are presented in Table 4. The mean (± SE) overall FCE in Control (C), Treatment 1 (T_1) and Treatment 2 (T_2) were 2.40±0.13, 2.18±0.10 and 2.07±0.17, respectively. Statistical analysis revealed significantly (p<0.05) higher observation in the treatment groups as compared to control group on the 5th and 6th week (first two weeks of post weaning period) as well as on the overall FCE. The better FCE of weaned piglets supplemented with herbal mixture recorded in the present study were in accordance with Cullen *et al.*, (2005) [6], Onyimonyi *et al.*, (2013) [18], Pachuau M. (2019) [19] and Thuy and Ha (2023) [27]. Cullen *et al*. (2005) [6] observed that supplementing pig diets with 10 g of garlic per kg improved feed conversion ratio (FCR) and body weight gain compared to control diets. Caicedo *et al.* (2021) [5] found that supplementing post-weaning piglet diets with 1 g/100 g dry matter (DM) of guava leaf meal and 10 mL/100 g DM of cooked guava leaf extract improved feed conversion ratio (FCR) and reduced diarrhoea incidence, attributing these benefits to the antioxidant effects of guava foliage. The orange-yellow color contains in turmeric have antibacterial, anti-inflammatory and facilitates bile secretion (Purwanti *et al.*, 2018) [21]. Thuy and Ha (2023) [27] found that supplementing weaned piglet diets with 2 g/kg of garlic powder and 2 g/kg of guava leaf powder improved FCE compared to a control group, attributing these benefits to enhanced nutrient digestibility and reduced microbial concentrations. Incorporating herbs into pig diets can enhance production efficiency by promoting beneficial bacteria and suppressing pathogens, thereby improving productivity, immunity and overall animal health (Radzikowski and Anna, 2022) [22]. The improved FCE observed in weaned piglets fed diets supplemented with the herbal mixture (T_1 and T_2) in the present study can be attributed to the antioxidant and antimicrobial properties of the supplements, as well as their ability to increase intestinal villus height which may enhance nutrient absorption especially during the initial weeks of post-weaning, a period known for its stress-related challenges.

Table 4: Mean (± SE) of LWY weaned piglets under different groups

Age (Weeks)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
5th	2.21^{b}±0.21	1.78^{a}±0.17	1.69^{a}±0.08	0.001**
6th	2.14^{b}±0.12	1.86^{a}±0.14	1.72^{a}±0.12	0.01**
7th	2.01±0.22	1.88±0.15	1.79±0.15	0.82
8th	2.38±0.09	2.17±0.20	2.07±0.05	0.45
9th	2.57±0.12	2.38±0.13	2.31±0.10	0.59
10th	2.68±0.18	2.56±0.11	2.52±0.15	0.94
Overall	2.40^{b}±0.13	2.18^{a}±0.10	2.07^{a}±0.17	0.02*

(*) Significant (p<0.05), (**) Highly Significant (p<0.01)

The mean (± SE) general appearance score of Large White Yorkshire (LWY) weaned piglets from 5th to 10th week of age during the post weaning period are presented in Table 5. The mean (± SE) overall general appearance score in Control (C), Treatment 1 (T_1) and Treatment 2 (T_2) were 0.87±0.04, 0.44±0.03 and 0.30±0.05, respectively. Significantly (p<0.05) better observation was found in the treatment groups as compared to control group on the 6th, 7th week as well as on the overall mean. The beneficial effects of turmeric, guava leaves, garlic and ginger such as antioxidant, cardiovascular protective, anticancer, anti-inflammatory, immunomodulatory, anti-diabetic, anti-obesity and antibacterial properties (A. Amalraj *et al.*, 2017; Shaheena *et al.*, 2019; Jacob *et al.*, 2019; Townsend *et al.*, 2013) [17, 24, 9, 28], might have contributed to better general appearance and health status in weaned piglets. The present result aligned with Stevenson J.L. (2022) [26], showing significant (p<0.05) improvement in the general appearance of weaned piglets fed diets with 0.5% (T_1) and 1% (T_2) turmeric powder, likely due to improved gut health.

Table 5: Mean (±SE) general appearance in LWY weaned piglets under different groups

Age (Weeks)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
5th	1.36±0.06	0.85±0.12	0.63±0.10	0.15
6th	1.48^{b}±0.05	0.64^{ab}±0.10	0.59^{a}±0.08	0.04*
7th	1.04^{b}±0.02	0.45^{ab}±0.06	0.32^{a}±0.04	0.05*
8th	0.84±0.10	0.28±0.05	0.12±0.03	0.12
9th	0.31±0.12	0.22±0.12	0.08±0.02	0.54
10th	0.21±0.04	0.20±0.05	0.08±0.06	0.36
Overall	0.87^{b}±0.04	0.44^{a}±0.03	0.30^{a}±0.05	0.001**

(*) Significant (p<0.05), (**) Highly Significant (p<0.01)

Occurrence rate of diarrhoea (%) of Large White Yorkshire (LWY) weaned piglets from 5th to 10th week of age during the post weaning period are presented in Table 6. The

overall occurrence rate of diarrhoea (%) in Control (C), Treatment 1 (T_1) and Treatment 2 (T_2) were 15.02%, 9.23% and 6.42%, respectively. Statistical analysis showed significant (p<0.05) reduction in the occurrence rate of diarrhoea (%) on 5th , 6th, 7th week and the overall occurrence rate of diarrhoea under treatment groups as compared to control group. The significant effect of herbal mixture in reducing the occurrence rate of diarrhea (%) were in accordance with the observations of Caicedo *et al.*, (2021) [5], Pachuau M. (2019) [19], Vanlalpianpuia (2020), Stevenson J.L. (2022) [26] and Thuy and Ha (2023) [27]. Caicedo *et al.* (2021) [5] found that guava foliage meal (1 g/100 g DM) and extract (10 mL/100 g DM) reduced diarrhea and improved growth in post-weaning piglets, likely due to their antioxidant effects. Also, Pachuau M. (2019) [19] reported lower diarrhoea rates in weaned piglets treated with ginger and garlic, likely due to their inhibitory effects on diarrhoea-causing agents. Guava leaf extract's antibacterial activity is linked to flavonoids, while its antidiarrheal effects are due to quercetin, which relaxes intestinal muscles and prevents spasms (Joseph and Priya, 2011) [10]. This was further corroborated by Mahmoud *et al.* (2013) [11], who found that quercetin in guava leaves acts as a calcium antagonist, providing anti-spasmodic and anti-motility effects on intestinal smooth muscles. The herbal mixture used may likely reduced diarrhoea through its antimicrobial effects, muscle relaxation, inhibition of bowel contractions and improved water reabsorption, synergistically enhancing gut health of weaned piglets in the present study.

Table 6: Occurrence rate of diarrhoea (%) in LWY weaned piglets under different groups

Age (Weeks)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
5th	36.58^{b}	23.17^{ab}	19.24^{a}	0.05*
6th	27.50^{b}	17.02^{a}	12.91^{a}	0.001**
7th	12.12^{b}	10.91^{b}	4.61^{a}	0.03*
8th	7.11	3.13	1.75	0.07
9th	5.41	0	0	0.29
10th	1.39	1.21	0	0.07
Overall	15.02^{b}	9.23^{a}	6.42^{a}	0.001**

(*) Significant (p<0.05), (**) Highly Significant (p<0.01)

The mean (± SE) faecal consistency score of Large White Yorkshire (LWY) weaned piglets from 5th to 10th week of age during the post weaning period are presented in Table 7. The mean (± SE) overall faecal consistency score in Control (C), Treatment 1 (T_1) and Treatment 2 (T_2) were 1.37±0.05, 0.79±0.03 and 0.58±0.07, respectively. A significantly (p<0.05) decrease in the faecal consistency score was observed on 5th, 6th week as well as on the overall faecal consistency score under treatment groups compared to control group. Similar pattern of results were reported by Caicedo *et al.,* (2021) [5], Recharla *et al.,* (2021) and Stevenson J.L. (2022) [26]. Caicedo *et al.* (2021) [5] reported improved fecal consistency in post-weaning piglets supplemented with guava foliage meal and extract, attributed to their antioxidant and antidiarrheal effects. Inclusion of 1% (w/w) turmeric powder in the diet resulted in a lower fecal consistency score in weaned piglets, indicating improved fecal quality among the treatment groups during the post weaning period (Recharla *et al.*, 2021). In further support the relevance of the current findings, Stevenson J.L. (2022) [26] also reported that feeding 1% turmeric powder in the pigs diet significantly (p<0.01) improved faecal consistency scores in weaned piglets during the post-weaning period. The beneficial effects of turmeric, including its antibacterial, anti-stress, anti-oxidative, anti-inflammatory and anti-hepatotoxic properties, as well as its content of ascorbic acid, tannins and flavonoids, likely contributed to the reduction of diarrhoea. Therefore, this may in turn, led to the observed improvement in faecal consistency in weaned piglets during the present study.

Table 7: Mean (±SE) faecal consistency score in LWY weaned piglets under different groups

Age (Weeks)	Control (C)	Treatment-1 (T_1)	Treatment-2 (T_2)	p-value
5th	2.64^{b}±0.11	1.67^{a}±0.13	1.25^{a}±0.15	0.04*
6th	2.17^{b}±0.10	1.09^{a}±0.08	0.86^{a}±0.08	0.03*
7th	1.54±0.08	0.85±0.05	0.71±0.04	0.12
8th	1.02±0.12	0.63±0.04	0.51±0.04	0.30
9th	0.69±0.10	0.37±0.07	0.16±0.07	0.87
10th	0.24±0.07	0.11±0.03	0.09±0.02	0.81
Overall	1.37^{b}±0.05	0.79^{a}±0.03	0.58^{a}±0.07	0.01**

(*) Significant (p<0.05), (**) Highly Significant (p<0.01)

Conclusion

It may be concluded that dietary supplementation of herbal mixture at 0.6% and 1.2% during post weaning period led to better growth performance and health status of the LWY piglets. However, further scientific research works with dose variations and different treatment methods of herbal mixture with large number of experimental animals might be of great help for better understanding and to fully exploit the benefits of herbal mixture in improving the production performances in pigs.

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