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Journal Name:	Journal of Experimental Agriculture International
Manuscript Number:	Ms_JEAI_34863
Title of the Manuscript:	Performance and Carcass Characteristics of Rabbits Fed Bamboo (<i>Bambusa arundinacea</i>) as a Replacement for <i>Tridax procumbens</i> Leaves
Type of the Article	Original Research Article

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This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

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PART 1: Review Comments

	Reviewer's comment	Author's comment <i>(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)</i>
<u>Compulsory</u> REVISION comments	There are several grammar, stylistic and syntax errors that should be corrected. In some cases, these errors negatively influence the understanding of the text. Small number of animals for estimating significant differences in the examined parameters (Statistical Power Analysis?). 3 and 2 rabbits of different genotype per sex for the evaluation of performance and carcass parameters, respectively, are not adequate. Rabbits were hybrids or of pure breeds? The effect of sex is not examined in your study. In general, sex affects growth and carcass characteristics.	Thank you for the corrections. I have effected all. I believe the sample size of 36 is fair for big animals like rabbit. I agree that genotype and sex affect performance evaluations and carcass parameters. However, the rabbits used in this study were cross-breds (NewZealand X Chinchilla). The error has been corrected in the text. The effect of sex was taken care of while randomizing. The treatment groups were balanced both for sex and weight. (3 males and 3 females)
<u>Minor</u> REVISION comments	Title: "Performance and Carcass Characteristics of Rabbits Fed diets with total or partial replacement of Tridax procumbens by Bamboo (Bambusa arundinacea) Leaves" Aim: "The evaluation of performance parameters and carcass characteristics of rabbits fed diets with various ratios of bamboo (Bambusa arundinacea) and Tridax procumbens leaves." Study design: A completely randomized design was applied. Methodology: "36 weaned mixed sex rabbits of heterogenous stocks with an average weight of 1075g were randomly assigned to six dietary treatments of 6 rabbits (3 does and 3 bucks) per	What do you mean by "the feed restriction trial adopted"? The feeding trial was a form of feed restriction in the sense that that rabbits were not fed <i>ad lib</i> but were fed based on the percentage of their live weight (i.e. 4% of their live weight (2% concentrate and 2% leaves)). All corrections have been effected.



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	treatment. Apart from the concentrate feed (50%), freshly harvested <i>B. arundinacea</i> and <i>T. procumbens</i> leaves were offered to the animals at 2% of their live weight at the ratio of 0:0 (T1), 100:0 (T2), 75:25 (T3), 50:50 (T4), 25:75 (T5) and 0:100 (T6). Proximate analysis of the experimental leaves and concentrate diets were carried out at the end of the trial. Performance parameters (final live weight (g), weight gain (g/d) and feed conversion efficiency (gain/intake)), dry matter intake of experimental leaves and of concentrate diets were also recorded. Results: "The use of leaves in the rabbits' diets had no significant effect ($P>.05$) on final live weight, total dry matter intake and Feed Conversion Efficiency (FCE). Significant effect ($P<.05$) was observed in total and average weight gain of rabbits fed with the forage diets. Non-significant effect ($P>0.05$) was observed in slaughter weight and dressing percentage between control (T1) and T2 (100% bamboo leaves) group of rabbits. Liver, kidney and heart weights were not significantly different ($P>0.05$) between T2 and T6 groups. Addition of leaves in the diet of rabbits did not have a significant effect on the offal (head, blood and pelt) of rabbits. Conclusion: Please delete "Giving the perennial nature of bamboo leaves." L10-18: "The nutritional level of the Nigerian population is characterized by inadequate intake of protein both in quality and quantity. Animal protein consumption is very essential for covering protein requirement of the organism. The average daily protein intake per adult is still far less than the value of 35g per adult per day recommended by FAO [1]. Therefore, efforts are directed towards the evaluation of all reasonable options that cover the recommended level at an affordable price [2]. In order to maximize food production and meet protein requirements, viable options should be evaluated [3]. Among such alternatives is the use of livestock species most especially rabbit that could play a major role in animal production of a developing country. Rabbit production has proven to be a veritable mean of alleviating animal	
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	protein deficiency [4]. The rabbit has excellent properties that include...” L21-22: “...its consumption is not influenced by cultural...” L22-25: “...are ubiquitous and apart from a nutritional food, serve as research models, and as pets. Rabbit meat appears as a great alternative to reduce the shortage of animal protein in developing countries, where grains are mainly used for human consumption [6,7].” L26-33: “Rabbits do not compete directly with human for both cereal and legume grains and can subsist on a diet consisting primarily of grass as monogastric herbivores. In contrast to these characteristics of rabbits compared to the rest of livestock, the cost of production remains high due to the increasing cost of concentrate formulated feeds. It is reported however that a non-conventional feedstuff (NCF) can serve as a great alternative for the reduction of feeding cost which ultimately leads to reduction in the price of animal products [8]. This production-cost reduction could be accomplished after the optimization of availability, procurement and processing of this non-conventional feedstuff.” L34-58: “Rabbits could utilize forages [9] <u>(these reference is not included in the reference list)</u>, a fact that minimizing the cost of feeding compared to poultry which competes with man for cereal and legume based feed resources. Linga et al. [10] stated that the development of high quality forage based diets with simple supplements is a priority research area in developing countries. Although rabbits can survive by consuming virtually all forage diets, optimum performance can only be achieved by offering a mixed feeding regime including forage and formulated feeds [11, 12]. Bamboo is a woody plant that belongs to the subfamily Bambusoideae of the Gramineae family. It is recorded to be the fastest growing plant on earth since culms of some species, in just 4 months, can reach 40m in height and 30cm in diameter [13]. It is estimated that worldwide there are over 1200 species under 87 genera of bamboo with a natural distribution across a broad range of environments (humid, tropical, subtropical and temperate region) in all continents apart from Europe and Antarctica [14,15].	
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	In addition bamboo is an adaptable plant, with some species being deciduous and other evergreen [16]. Bamboo (<i>B. arundinaceae</i>) leaves contain flavonoids and bioactive compounds, and are already used in folk medicine [17, 18], due to their anti-inflammatory and anti-ulcer properties [19]. The chemical composition of the leaves from different species of bamboo leaf strengthens the possibility of their utilization as a potential forage in rabbit diet. The crude protein (CP) and fibre of four different bamboo species (<i>B. vulgaris vittata</i>, <i>B. vulgaris vulgaris</i>, <i>B. ventricosa</i> and <i>O. abyssinica</i>) range from 18.39 to 19.39% and 25.88 to 33.19% respectively [20]. These CP levels exceed that of <i>Penisetum purpureum</i> (11.95%), <i>Panicum maximum</i> (5.5%) [21] and <i>Leucaena</i> (12.80%) [22]. The crude fibre level is also appreciably higher compared to that of <i>Gliricidia sepium</i> (18.10%) [23]. Leaves from various species of bamboo leaves have already been used to feed livestock/ruminants; <i>Arundinaria racemose</i> in the Himalayas [24] and <i>Arundinaria tecta</i> (cane breaks) in North Carolina [25] have been evaluated as fodder for cattle. Numerous bamboo species are fed to horses, cattle and sheep worldwide [25]. However, the nutrition of rabbits in Nigeria is primarily based on <i>Tridax procumbens</i> and/ or <i>Centrosema pubescens</i> leaves whose growth and availability cannot sustain rabbit production the whole year [26]. Therefore, this study was carried out to evaluate performance and carcass characteristics of rabbit fed diets with total or partial replacement of <i>Tridax procumbens</i> by Bamboo leaves.” L64-71: “Thirty six (36) weaned rabbits of heterogeneous stocks of the three common breeds found in Nigeria (New Zealand White, California White and Chinchilla) of both sexes, were purchased from peasant farmers in Akungba. The age and weight of rabbits ranged from 5 to 6 weeks and from 1.0 to 1.15 kg, respectively. The rabbits were housed individually in hutches made of wood and galvanized iron (40x60x70 cm), equipped with windows for proper ventilation. Each hutch was also equipped with a drinker and a trough to prevent feed wastage. During the first week, rabbits were allowed to acclimatize and Vitalyte	
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	(Phoenix pharmaceuticals U.S.A) which is an anti-stress agent was administered.” L73-80: “Fresh, young Bambusa arundinacea foliage leaves were harvested from trimmed branches of bamboo trees within Adekunle Ajasin University. Tridax procumbens leaves were also collected from the same area. The leaves were washed and chopped into smaller pieces and fed to the animals. Freshly harvested Bambusa arundinacea and Tridax procumbens leaves were offered to the animals at the ratios of 0:0 (T1), 100:0 (T2), 75:25 (T3), 50:50 (T4), 25:75 (T5) and 0:100 (T6), respectively. Concentrates were fed at a rate of 50% of the offered diets. The animals were daily fed at a level of 4% of their body weight on dry matter basis (2% concentrate and 2% forage). Table 1 shows the ingredients and the nutrients composition of the experimental basal diet.” L81-84: “During the 5 days of the pre-experimental period, rabbits were fed with the basal concentrate diet. After this period, the rabbits were randomly assigned to six dietary treatments (6 rabbits per treatment) in a completely randomized design. Water was provided ad libitum and similar routine management procedures at the rabbit farm unit (Adekunle Ajasin University, Akungba-Akoko) were followed.” L85: Reference [27] is not included in the reference list L96-100: “Variations in the nutrient composition of Bambusa arundinacea and Tridax procumbens leaves (Table 2) were very marginal apart from ash and crude protein with an approximate difference of 4% in favour of bamboo leaves and tridax leaves, respectively. Mineral percentages were comparatively higher in tridax compared to bamboo leaves (Table 3).” L101-114: “The performance of rabbits fed the experimental diets is shown in Table 4. Final live weights of rabbits fed with the examined leaves were not significantly different ($P>.05$). Total weight gain and average weight gain of rabbits on tridax leaves and concentrate alone (T6) was significantly lower ($P<0.05$) compared to the other experimental groups. Feed intake and feed conversion ratio were not significantly influenced by the varying	
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	ratio of the experimental leaves. Gradual increase in the levels of bamboo leaves up to 50% in combination with tridax leaves (T4) resulted in improved performance (total and average weight gain). This finding indicates that bamboo leaves could be effectively combined with tridax leaves up to 50%. Increase in bamboo leaves levels beyond 50% resulted in gradual decrease of performance (not significant). This could be attributed to the concomitant increase of anti-nutrients that are present in the bamboo leaves. The control rabbits (T1) had significantly higher values ($P<0.05$) for feed intake, final live weight, total weight and average weight gain compared to the other rabbits. This is expected considering the fact that the control diet comprised only of concentrate containing ...” L116: Is this a significant difference? Superscripts in Table 5? L118-122: “The weights of carcass, organ and by-products of rabbits fed the experimental diets are shown in Table 5. T2 (100% bamboo levels) and T1 (control) groups were not significantly different ($P>0.05$) from each other (<u>Are you sure? Different superscripts in Table 6</u>). There were significant differences ($P<0.05$) among animals fed experimental diets in fore-leg and hind leg percentages. Animal fed experimental leaves had significantly ($P<0.05$) higher kidney and lung weight than the control. (<u>Incorrect statement. Similar superscripts. Please be specific</u>)” L125: Your conclusion is that “bamboo leaves can replace tridax leaves”. However, from these results it is only concluded that bamboo leaves did not affect organs weight compared to tridax leaves. Table 2: Proximate composition of concentrates, Bambusa arundinacea and Tridax procumbens leaves. L143-144: Please remove this part under the Table 4. “...within the same column...” Table 6: Weights of carcass, organs and by-products of rabbits fed the different experimental diets How were the percentages of carcass parts, organs and offal calculated? As a percentage of SW or HCW?	
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	L163-185: This part should be removed after L100. L163-185: "The crude protein levels of <i>B. arundinacea</i> (21.85%) is higher than other species of bamboo leaves; <i>B. vulgaris vittata</i> (18.75%), <i>B. vulgaris vulgaris</i> (18.39%), <i>B. ventricosa</i> (19.02%) and <i>O. abyssnica</i> (19.39%) [20]. However the CP content of bamboo leaf used in this study was lower than that recorded for cassava (<i>M. utilisima</i>) and <i>T. Triangulare</i> leaves (24.85 and 31.00%, respectively) [28,29]. The high crude fibre concentration (13.79%) suggests that animals will prefer them less compared to alternatives that have lower crude fibre levels such as <i>P. Purpureum</i> (9.09%) [30]. This support previous findings [25] that bamboo leaves can impart superior physical tone and stamina to horses since fibre speeds up the process of digestion by improving peristalsis. It has long been established that dietary fibre supply also plays a major role in the prevention of digestive disorders in growing rabbits [31]. Fibre is also known to promote caecal fermentation in fattening rabbits [32,33,34]. A sufficient level has been linked with improved digestive health [33,35,36] and especially in cases of epizootic rabbit enteropathy, an increased dietary fibre level has been proven to reduce mortality in growing rabbits [37,38]. Investigations made by previous researchers [39, 40] revealed that high crude fibre content could be critical in preventing colon cancer and gastrointestinal disorders. The bamboo leaves used in this study had low content of crude fat and moisture. Low moisture content makes bamboo leaf resistant to deterioration, since the growth of decay micro-organisms is limited and storage life is prolonged [41]. The crude fat content of the bamboo leaves (2.71%) is low compared to that of 5.90% reported for <i>T. Triangulare</i> and of 4.80% for <i>Amaranthus hybridus</i> [28,29]. The ash content of the bamboo leaves (15.29%) is lower than 18.18% reported for <i>P.purpureum</i> [28]. The ash content in the bamboo leaves is higher than that of <i>Tridax</i> leaves (11.77%) and both levels suggest their content in a large deposit of minerals [42] <u>(This reference is not included in the reference list)</u>. The ash contents of plant are directly related to the mineral composition of the soil. This	
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	situation is proven by the fact that previous studies for various bamboo species collected from different parts of the world [43] ranged from 3.3% especially for <i>Arundinaria canna viera</i> collected in Brazil to 16.9% for <i>B.vulgaris</i> collected in Jamaica [44]. L188 and 202-203: What do you mean by “the feed restriction trial adopted”? L192-200: “Previous researchers [48] also reported a non-significant difference in weight gain of rabbits fed different inclusion levels of <i>Alchornea cordifolia</i> leaves. T2 rabbits (100% of bamboo leaves) had numerically better weight gain than T6 (100% of Tridax leaves). This finding suggests that rabbit can thrive well if fed solely with bamboo leaves or in combination with other forages. This conclusion is also in support with previous researchers [49] who stated that rabbits are pseudo-ruminants and as such are able to utilize forages as well as concentrates. There are significant differences between the daily weight gain of rabbits fed varying levels of bamboo and tridax leaves (2.38 to 4.63g/d) and that of the controls (9.13g/d). This is also found in a previous study [46] <u>(Please correct the reference list. There are two studies with the number 46)</u> where significant differences in daily weight gain of weaner rabbits fed varying levels of concentrate, cynodon and centrosema combinations (10.13-6.51g/d) and that of rabbits fed only with concentrates (19.22g/d) were reported.” L208: “Values of organ/carcass weights...” L210: “...levels of bamboo and tridax leaves agrees with the findings of Omole et al. [52] who observed...” L212: “...purpureus forage. The results of the present study are also similar with that of Amata [53] who reported non-significant...” L213-215: Please be more specific L218: “Increased metabolic rate of the organs in an attempt to convert toxic...” L222: “...to the anti-nutrient agents present...” L223: “...leaves used in this study contain...” L226-229: “...inclusion levels) were not significantly ($P>.05$) higher than that of rabbits on diet T6 (100% tridax leaves inclusion	
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	levels), a fact that implies similar effects of bamboo and tridax leaves on the health status of rabbits. This result is similar to the report of Ogunsipe et al. [58] who observed not significant differences in lung, kidney, heart and pancreas..." L232-233: "...in this study are within a critical threshold for the animals since no death were recorded through the 70 days..."	
<u>Optional/General</u> comments		