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Article

Use of Palm Wastes as Alternative Flooring Materials in Broiler Chickens Houses Under Prevailing Conditions in New Valley

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Abstract

The objective of this study was to investigate the effects of different types of floor made from palm wastes in New Valley on growth performance, carcass traits, health status and economic efficiency of broiler. A total number of 180 one day old chicks of Cobb broiler strain were used. The study included six treatments, with three replicates for each treatment (3 pens); (wheat straw litter, wire net, plastic net, wooden slats, palm fiber net and palm stem slats floors). The achieved results showed that the floor types had significant (P≤0.05) effect on final body weight, body weight gain and feed conversion at final periods. Broilers reared on wheat straw litter, wooden slats and palm stem slats floors had significant superiority of body weight and gain over the broiler reared on wire net, plastic net and palm fiber mate floors. Also, feed conversion ratio of broiler reared on wheat straw litter, plastic net, wooden slats and palm stem slats floors had significant superiority values over the broiler reared on wire net and palm fiber mate floors. Birds reared on wheat straw litter, wooden slats and palm stem slats floors had significantly (P≤0.05) higher carcass percentage as compared to those of wire net floor. The lowest percentage of abdominal fat is recorded for broilers raised on wire net floor, plastic net and palm fiber net floors in comparison with those raised on wheat straw litter. Broilers raised on wheat straw and palm fiber net floors had a significantly (P≤0.05) higher bursa percentage than those of birds raised on wire net floor and palm fiber net floors. Broilers raised on wheat straw litter, wooden slats and palm stem slats floor had significantly (P≤0.05) lower leg problems than those of birds raised on wire net floor and palm fiber net floors. The difference in body measurements and breast blisters were not significant among the different floor types. Regarding, the economic efficiency, it could be concluded that wooden slats and palm stem slats floors best being used for managing broilers. In addition, palm stem slats (having less health problems than other floor) are recommended in New Valley as a safe and economical alternative floor for any floor.

Keywords: Floor, growth performance, carcass traits, health status, broiler

1. Introduction

Broilers are conventionally housed in deep-litter systems with organic bedding materials. In conventional deep-litter systems, broilers are usually kept in an unstructured housing environment, spending the whole fattening period in direct contact with litter (**Bergmann *et al.*, 2017**; **Farghly *et al.* 2021**). Permanent contact with litter with these properties can lead to foot pad dermatitis, hock burn, plumage contamination, and a reduction in productive performance (**De Jong *et al.*, 2014**). Studies for housing broilers on perforated floors have shown that separating broilers from the litter can be useful to enhance animal welfare and health status (**Farghly *et al.* 2020**). It could be identified that perforated floors can reduce the occurrence of foot pad dermatitis (**Heitmann *et al.*, 2020**), as well as hock burn and plumage contamination (**de Almeida *et al.*, 2017**) compared to deep-litter systems. **Chuppava *et al.* *(*2018)** showed economic advantages for the use of perforated floors due to enhance the productive performance.

The fundamental idea of floor separating birds from their excreta, to avoid the usage of litter and reduce the labor for farmers and it is important determine the appropriate materials for these floors (**Li *et al.*, 2017*;* Farghly *et al.* 2018**). The recommended type of floor should be smooth, non-porous surface, sufficiently strong, friable, non-compressible, easy removal, absorbent, quick to dry, low thermal conductivity (thermal insulation) and low cost. Certain slats and wire floors may cause injury to the feet and legs of birds and cause carcass damage (**Wójcik *et al.*, 20**11;**Farghly *et al.* 2020**).

As a result of the limited availability of floor materials with its previous disorders, also, low supplies and high cost of litter floor as wheat straw and wood sawdust in broiler farms, many broiler producers are searching for alternative floor materials (**Farghly 2017; Farghly *et al.*, 2018; Adler *et al.*, 2020**). In New Valley, the use of the palm residues has shown good potential as alternative flooring materials as palm fiber mate and palm stem slats for raising broilers. Palm fiber and palm stem residues are available and cheap in New Valley. There is little information on growth performance of broiler reared on palm fiber mate and palm stem slats as alternative floors. For that reason, the objective of this study was to evaluate the effect of some palm residues as palm fiber mate and palm stem slats floors on the broilers performance under the prevailing environmental conditions in New Valley.

2. Materials and Methods

Experiment was achieved at broiler farm (د /1/092/108) in Nasser city, El-Kharga, New Valley governorate, Egypt. A total number of 180 one day old chicks of Cobb broiler were used to investigate the impact of different types of floor made from palm wastes in New Valley on the growth performance, carcass traits, health status and economic efficiency of broiler.The study included six groups of treatments, with three replicates for each treatment (10 chicks per each); (wheat straw litter, wire net, plastic net, wooden slats, palm fiber mate and palm stem slats floors). Each replicate was kept in a partition of 1 meter square provided. The chicks were maintained under continuous lighting at the first week, and then raised under 16L: 8D and vaccinated against New castle disease. The feed and fresh water were provided *ad libtum* and management conditions were similar for all treatments throughout the experimental period. The birds fed commercial diets: starter diet from 0-2 wks of age (23% crude protein and 3000 Kcal. ME /kg of diet); grower diet from 3-4 wks of age (21% crude protein and 3100 Kcal. ME /kg of diet); finisher diet from 5-6 wks of age (19% crude protein and 3200 Kcal. ME /kg of diet). The chicks were reared under 32-33°C temperature at one-day of age and then gradually reduced to reach 23°C at the fourth week of age and thereafter.

During the experimental period, individual live body weight (BW, g) was recorded weekly; also feed consumption (FC, g/d) then body weight gain (BWG, g) and feed conversion ratio (FCR, g feed/g gain) were calculated on weekly basis. At the end of the growing period (6 weeks), 2 broilers/ pen for a total of 6 chickens/ treatment were chosen randomly and fasted for 8 hours before slaughtering. The spleen, bursa, thymus glands, empty gizzard and the abdominal fat were removed, weighed and calculated as percentages of carcass weight. The dressing percentage was calculated by dividing the carcass and giblets weights by the pre-slaughter live body weight of birds. At 6 weeks of age, birds per replicate were examined and scored (on a scale of 1 to 5) for leg problems, breast blisters and body measurements. The economical efficiency based on the average costs of feed consumed and litter quantities used as well as the average income/bird were calculated.

The net revenue per bird was estimated as the difference between the total sale price (LE), and the costs (LE) of feeds consumed and litter used, according to the prevailing prices in the local Egyptian market during the experimental period.

Data collected were subjected to analysis of variance by applying the General Linear Models Procedure of SAS software (SAS Institute, version 9.2, 2009). Duncan (1955) was used to detect differences among means of different groups. The percentages of carcass and organs were transformed to Arcsin values before analysis and then re-transformed to the original values after analysis. The following model was adopted for analysis of variance:

$$Xij = \mu + \alpha i + \beta j + Єij$$

Where: Xij = an observation, μ= overall mean, αi= replicates effect, βj = floor type effect and Єij = experimental random error.

3. Results and Discussion

3.1. Body Weight (BW) and Body Weight Gain (BWG):

As shown in Tables (1 and 2), the insignificant differences were existed in BW among the broilers, which were raised on different floor types at all studied ages of the experiment, except at 5-6 weeks of age, where the differences were significant (P≤0.05). At 5 weeks of age, the mean of BW of broilers raised on wooden slats and palm stem slats floors increased significantly (p≤0.05) than those of birds raised on wire net and palm fiber net floors, while broilers raised on wheat straw litter and plastic net floors had an intermediate values. The average of BW for broilers raised on wheat straw litter, wooden slats and palm stem slats floors had significantly (P≤0.05) higher BW at 6 weeks of age as compared to wire net and palm fiber net floors, while plastic net floor group had intermediate value. At 5-6 weeks of age, broilers raised on wheat straw litter floor had significantly (P≤0.05) higher daily BWG as compared to broilers raised on wooden slats, wire net, palm fiber net and palm stem slats floors, while plastic net floor had intermediate value. With respect to the overall mean of daily BWG for broilers raised on wheat straw litter, wooden slats, palm stem slats floors exceeded a significantly (P≤0.05) those of birds raised on wire net and palm fiber net floors. However, the differences in the overall mean of BWG between the broilers raised on wire net and palm fiber net floors were insignificant. The reduction in growth for birds reared on wire net or palm fiber net floors may be due to increased leg disorders and feet lesions by sharp edges in wire net floor that make birds unable to walk. Separating the animals from their feces by using slatted flooring systems is one potential approach to reduce the infection risk of the birds.

Farghly, (2017) found that birds raised on wire mesh cage with wood sawdust litter, plastic net and rubber net floors throughout the experiment had superior body weight and weight gain compared to birds raised wire mesh cage with or without wheat straw litter and

wooden slats floors at any time. It has been indicated that broilers with severe foot lesions show slower live weight (**Amer, 2020**).Also, **Abo Ghanima *et al.*, (2020)** found that cage rearing systems had higher body weight and weight gain followed by litter rearing systems. Whereas birds reared under plastic slate rearing systems recorded the lowest BW. Thus, cage rearing systems and litter rearing systems were preferred for better growth performance. The possible reason for the increased growth of birds reared in cage rearing systems was their lack of direct contact with feces, which maintains better environmental hygiene and thus reduces the incidence of diseases. This was not consistent with **Heitmann *et al.*, (2020)** who reported that flooring system (litter floor and slatted floor) had no effect on body weight and body weight gain of broiler chickens. **de Almeida *et al.*,** (**2017**) found that housings with partially or fully perforated floors had significantly higher weights

In litter and cage rearing systems, litter system improved growth performance of male broilers than that cage system (**Santos *et al.*, 2012 and Lacin *et al.* 2013**). Similarly, **Simşek *et al.* (2014)** showed that caged broilers showed higher growth performance. Also, **Çavuşo_glu *et al.* (2018), Chuppava *et al.* (2018) and Farghly *et al.* (2020**) demonstrated that broiler chicks reared on slatted floor had higher BW than those reared on litter. Contrarily, **Al-Bahouh *et al.* (2012) and Wang *et al.* (2015)** noticed better growth parameters of birds reared in cage system. However, **Bahreiny *et al.* (2013) and Wang *et al.* (2015)** reported insignificant differences in growth performance of broilers reared in cage and litter rearing systems. Also, **de Almeida *et al.* (2018)** showed no differences in body weights of broiler reared on litter or plastic floors. In addition, **Adler *et al.*, (2020)** observed no differences in final body weight under all floor types.

3.2. Feed Consumption (FC) and Feed Conversion ratio (FCR):

The results presented in Tables 3 and 4, showed insignificant differences in the average FC values per day among birds raised on different floor types at all studied ages from 0 to 6 weeks of age. At 4-5 weeks of age, the averages of FCR for broilers raised on wheat wooden slats and palm stem slats floors had significantly ($P \leq 0.05$) better values than those of birds raised on wire net and palm fiber net floors, while broilers raised on wheat straw litter or plastic net floor had intermediate value. The period from 5 to 6 weeks of age, the averages of FCR values for the wheat straw litter, plastic net, wooden slats and palm fiber net floors groups improved significantly ($P \leq 0.05$) than that of wire net floor. Regarding the overall means of FCR for broilers raised on wheat straw litter, plastic net, wooden slats and palm stem slats floors had significantly ($P \leq 0.05$) better values than that of birds raised on wire net floor, while birds raised on palm fiber net floor had intermediate value. **Abo Ghanima *et al.*, (2020)** found that birds housed in plastic slate rearing systems consumed lower feed than those in cage and litter rearing systems. Also, the best values of FCR and European broiler index were shown in cage rearing systems. These findings are in agreement with those of **Liu *et al*. (2011), Karcher *et al*. (2013) and Wang *et al*. (2015)** who found insignificant influences for flooring system on FC. However, **Sunarti *et al*. (2010)** reported that birds raised on litter floor had significantly lower FC and better FCR than those kept on plastic floor**.**

The obtained results are in agreement with the findings achieved by **Farghly *et al*. (2020)** who found that broilers raised on litter or palm stem slats floors had significantly better FCR than those kept on wire net and palm fiber floors. **Santos *et al.* (2012) and Lacin *et al.* (2013)** found that broiler chicks reared in litter rearing systems had lower FCR than those of caged birds. **Farghly, (2017)** found that birds raised on wire mesh cage with wood sawdust litter, plastic net and rubber net floors had superior FCR compared to birds raised wire mesh cage

with or without wheat straw litter and wooden slats floors. **Karcher *et al*. (2013)** found that there ducks reared on slatted floor had best FCR. **Liu *et al.* (2011)** showed that geese raised on the wire floor had significantly the highest FCR. On the contrast of our results, **Zhao *et al*. (2009), Abreu *et al*. (2011) and Wang *et al*. (2015)** found insignificant influences for flooring system on FCR values.

3.3. Carcass characteristics.

From the presented data in Table 5, it could be observed that insignificant differences existed in the percentages of LBW, dressed carcass, giblets, spleen and thymus of broilers raised on different floor types. The wheat straw litter, wooden slats and palm stem slats floors had significantly ($P \leq 0.05$) higher carcass percentage as compared to those of wire net floor, while broilers raised on plastic net and palm fiber net floors had intermediate value. The lowest percentage of abdominal fat is recorded for broilers raised on wire net floor, plastic net and palm fiber net floors in comparison with those raised on wheat straw litter, while birds raised on wooden slats and palm stem slats floors had intermediate value. Regarding, the lymphoid organs, the bursa % in broilers raised on wheat straw litter and palm stem slats floor significantly ($P \leq 0.05$) increased than those of birds raised on wire net floor and palm fiber net floors, while birds raised on plastic net and wooden slats floors had intermediate value. Litter moisture content may influence carcass yield and may cause carcass lesions (**Traldi *et al.*, 2007**). **Farghly, (2017)** found that birds raised on wire mesh cage with wood sawdust litter, plastic net and rubber net floors throughout the experiment had superior dressed carcass compared to birds raised wire mesh cage with or without wheat straw litter and wooden slats floors. Also**, Farghly *et al*. (2020)** observed insignificant differences existed in the percentages of dressed carcass, giblets, spleen and thymus of birds raised on all studied floor types.

The results obtained regarding carcass traits were partially in line with those obtained by **Sogunle *et al.* (2008) and Santos *et al.* (2012)** who documented that breast (%) were increased in floor birds than in caged birds. On the other hand, **Wang *et al.* (2015)** showed no significant alterations in carcass yield and breast relative weight, whereas thigh weight (%) was higher in birds reared in cage rearing systems than those reared in litter rearing systems and net rearing system. Other researches did not find any significant effects of different rearing systems on all examined carcass traits (**Al-Bahouh *et al.*, 2012; de Almeida *et al.*, 2018). Abo Ghanima *et al.* (2020)** found all carcass traits were not affected by different rearing systems except the percentages of dressing, liver and breast, which were elevated in caged system. Relative weights of the gizzard, heart, spleen, abdominal fat, thigh, and shoulder were not influenced by studied rearing systems. Contrarily, **Simşek *et al.* (2014),** observed significant increase in breast weight of caged birds than floored birds, while carcass, thigh, wings, liver and spleen were not affected. **Bahreiny *et al.* (2013)** reported that breast weight was greater in male chickens reared in cage rearing systems.

3.4. Body measurements and health status:

The results presented in Table 6, indicated that there were no significant differences ($P>0.05$) among different floor types in most body measurements and healthy traits except values of leg problems. The lowest leg problems score is observed for broilers raised on wheat straw litter, wooden slats and palm stem slats floors in comparison with those raised on wire net and palm fiber net floors, while birds raised on plastic net floor had intermediate value. Birds with leg problems or disorders (foot sores and hock burns) spend more time sitting and, if the litter is wet and dirty with faeces, this results in burns and sores. Foot and hock burns in turn reduce walking activity because they make walking painful. The

flooring system had a positive effect on animal health and behavior as indicated by welfare indicators without a reduction in production performance. This result is in line with several studies which have also observed a higher foot pad health status for birds kept on perforated flooring systems compared to litter flooring (**Çavuşo_glu *et al.*, 2018; Çavuşo_glu and Petek, 2019**). **Zhao *et al.* (2009)** showed that floor type had greatest effect on the incidence of breast blisters. **Abo Ghanima *et al.*, (2020)** found that immune response against the Newcastle disease virus and avian influenza were not differed by flooring system. **Adler *et al.*, (2020)** showed that the partially perforated flooring system had a positive influence on foot pad dermatitis and hock burn. **Farghly, (2017)** found that the incidence of leg problems, breast blisters and airborne dust particulates inside the poultry house were decreased for birds raised on wire mesh cage with wood sawdust litter, plastic net and rubber net floors. However, no significant differences (P≤0.05) existed in bone measurements. **Farghly *et al.* (2020)** reported that insignificant differences (P>0.05) were existed among different floor types in most body measurements and healthy traits

Concerning the effect of different floor types on physiological and healthy traits, these findings are in agreement with those of **Liu *et al.* (2011).** They showed that geese raised in the wire-floored pens had few opportunities for contact with their feces, and thus had a better health status than those kept in floor pens.

3.5. Economic efficiency:

The results presented in Table (7), showed that, birds raised on wooden slats and palm stem slats floors had higher economic efficiency than those of birds raised on wire net, plastic net and palm fiber nest floors since, the relative economic efficiency was 104.21 and 106.97for wooden slats and palm stem slats floors, respectively. With regard to the EPEF, **De Jong *et al.* (2014)** reported a higher EPEF for animals kept on litter compared tolitter flooring. **Farghly, (2017)** concluded that birds raised on wire mesh cage with wood sawdust litter, plastic net and rubber net floors had high performance and economic efficiency. **Chuppava *et al.* *(*2018)** even showed economic advantages for the use of perforated floors due to an increase in production performance. **Al-Bahouh *et al.* (2012) and Wang *et al.* (2015)** observed better performance and economic efficiency of birds reared in cage rearing systems.

In conclusion, from the economic efficiency, it could be concluded that wooden slats and palm stem slats mate floors best being used for broilers. As well as, broilers kept on palm floor stem slates had the high body weight gain and low feed conversion ratio. However, wire net and palm fiber net floors (having less health problems than other floor) is recommended as a safe and economical replacement as floor for another floor.

Table (1): Means ±SE of body weight (g) as affected by different floor types.

Age (wks) / Floor types	Body weight (g)						
	1 day	1 wk	2 wk	3 wk	4 wk	5 wk	6 wk
Wheat straw litter	42.3	162.3	425.2	880.5	1390.1	1800.6^{ab}	2189.7^{a}
Wire net	41.8	155.6	398.4	838.2	1329.2	1692.3^{b}	1900.5^{c}
Plastic net	40.7	161.1	432.1	864.2	1382.8	1785.4^{ab}	2162.1^{ab}
Wooden slats	41.6	168.2	440.5	912.3	1420.6	1869.8^{a}	2200.8^{a}
Palm fiber net	42.2	159.8	400.0	842.3	1368.5	1735.9^{b}	1986.4^{bc}
Palm stem slats	40.8	167.4	442.6	910.3	1420.3	1855.6^{a}	2186.3^{a}
SEM	1.22	10.11	20.92	32.55	38.63	42.95	46.33
P value	0.1562	0.4215	0.2354	0.3521	0.5246	0.1256	0.0162

a-----c Means within columns followed by different superscripts are significantly different (P≤ 0.05).

Table (2): Means ±SE of body weight gain as affected by different floor types.

Age (wks) / Floor types	Body weight gain (g/bird/day)						
	0-1	1-2	2-3	3-4	4-5	5-6	Mean
Wheat straw litter	17.14	37.56	65.04	72.80	58.64 ^{b}	55.59 ^{a}	51.13 ^{a}
Wire net	16.26	34.69	62.83	70.14	57.87 ^{bc}	29.74 ^{c}	44.25 ^{b}
Plastic net	17.20	38.71	61.73	74.09	57.51 ^{c}	52.39 ^{ab}	50.27 ^{ab}
Wooden slats	18.09	38.90	67.40	72.61	64.17 ^{a}	47.29 ^{b}	51.41 ^{a}
Palm fiber net	16.80	34.31	63.19	75.17	52.49 ^{c}	35.79 ^{bc}	46.29 ^{b}
Palm stem slats	18.09	39.31	66.81	72.86	62.19 ^{ab}	47.24 ^{b}	51.08 ^{a}
SEM	3.01	4.02	5.04	6.14	5.89	5.71	5.11
P value	0.9241	0.6821	0.9251	0.2614	0.0115	0.0352	0.0129

a-----c Means within columns followed by different superscripts are significantly different (P≤ 0.05).

Table (3): Means ±SE of feed consumption ratio as affected by different floor types.

Age (wks) / Floor types	Feed consumption (g/bird/day)						
	0-1	1-2	2-3	3-4	4-5	5-6	Mean
Wheat straw litter	29.11	59.82	90.63	109.56	125.63	132.16	91.15
Wire net	30.65	60.94	91.04	109.72	118.85	125.11	89.39
Plastic net	31.06	61.75	89.92	110.11	122.17	127.67	90.45
Wooden slats	28.54	58.34	88.51	106.28	124.28	131.89	89.64
Palm fiber net	29.22	60.11	90.89	111.08	122.46	128.17	90.32
Palm stem slats	27.86	57.51	87.65	103.16	117.51	127.16	86.80
SEM	2.35	3.19	4.11	4.42	6.02	6.16	5.04
P value	0.7951	0.2652	0.6524	0.1562	0.9165	0.1685	0.5625

Table (4): Means ±SE of feed conversion as affected by different floor types.

Age (wks) / Floor types	Feed conversion (g feed/g gain)						
	0-1	1-2	2-3	3-4	4-5	5-6	Mean
Wheat straw litter	1.70	1.59	1.39	1.50	2.14 ^{ab}	2.38 ^{c}	1.77 ^{b}
Wire net	1.89	1.76	1.45	1.56	2.29 ^{a}	4.21 ^{a}	2.20 ^{a}
Plastic net	1.81	1.60	1.46	1.49	2.12 ^{ab}	2.44 ^{c}	1.82 ^{b}
Wooden slats	1.58	1.50	1.31	1.46	1.94 ^{b}	2.79 ^{bc}	1.75 ^{b}
Palm fiber net	1.74	1.75	1.44	1.48	2.33 ^{a}	3.58 ^{b}	2.06 ^{ab}
Palm stem slats	1.54	1.46	1.31	1.42	1.89 ^{b}	2.69 ^{bc}	1.71 ^{b}
SEM	0.09	0.12	0.09	0.11	0.08	0.06	0.04
P value	0.9571	0.6251	0.4514	0.8519	0.0237	0.0336	0.0216

a---c Means within row followed by different superscripts are significantly different (P≤ 0.05).

Table (5): Means ±SE of carcass traits as affected by different floor types.

Traits / Floor types	Carcass traits, %			Lymphoid organs, %		
	Dressing	Giblets	Abd. fat	Spleen	Bursa	Thymus
Wheat straw litter	75.95 ^{a}	5.30	2.29 ^{a}	0.252	0.476 ^{a}	0.21
Wire net	73.25 ^{b}	4.89	1.33 ^{b}	0.243	0.362 ^{b}	0.19
Plastic net	75.14 ^{ab}	4.99	1.37 ^{b}	0.221	0.433 ^{ab}	0.19
Wooden slats	76.02 ^{a}	5.26	1.91 ^{ab}	0.253	0.438 ^{ab}	0.21
Palm fiber net	74.82 ^{ab}	4.96	1.30 ^{b}	0.232	0.352 ^{b}	0.18
Palm stem slats	75.98 ^{a}	5.9	1.87 ^{ab}	0.255	0.472 ^{a}	0.22
SEM	3.26	0.09	0.42	0.05	0.06	0.05
P value	0.0275	0.5234	0.0185	0.3625	0.0166	0.9522

a---b Means within columns followed by different superscripts are significantly different (P≤ 0.05).

Table (6). Means ±SE of body measurements and health status as affected by different floor types.

Floor types	Body measurements (cm)			Health status	
	Body depth	Keel bone	Shank	Breast blisters	Leg problems
Wheat straw litter	16.01	13.11	6.16	2.00	1.40[b]
Wire net	15.56	12.96	5.88	2.40	2.60[a]
Plastic net	15.82	13.14	6.05	2.00	2.20[ab]
Wooden slats	16.00	13.31	6.21	1.60	1.20[b]
Palm fiber net	15.72	12.92	5.86	1.80	2.40[a]
Palm stem slats	16.25	13.20	6.14	1.60	1.20[b]
SEM	1.75	1.36	0.68	0.55	0.41
P value	0.5362	0.1652	0.6241	0.2654	0.0165

a---b Means within columns followed by different superscripts are significantly different (P≤ 0.05).

Table (7). Economical efficiency as affected by different floor types.

Items		Treatments					
		C	T1	T2	T3	T4	T5
Total costs/ bird/L.E	Litter costs/bird (L.E)	0.40	0.16	0.18	0.20	0.06	0.08
	Feed costs (L.E/bird)	25.27	24.78	25.07	24.85	25.04	24.06
	Total costs/ bird/L.E	25.67	24.94	25.25	25.05	25.10	24.86
Selling price of live bird at 6 weeks of age (L.E)		63.50	55.12	62.70	63.82	57.61	63.40
Net revenue/ bird/L.E (without *constant costs=25%)		**37.83**	**30.18**	**37.45**	**38.77**	**32.51**	**38.54**
Economical efficiency/bird (EE)		**1.50**	**1.22**	**1.49**	**1.56**	**1.30**	**1.60**
Relative economical efficiency/bird (REE)		**100.00**	**81.33**	**99.74**	**104.21**	**86.71**	**106.97**

The price of 1 kg of live body weight = 29.00 L.E. Price of 1 kg of ration = 6.6 L.E L.E = Egyptian pound.
*Constant costs include: housing, labour, heating, cooling, lighting and treatment regimens.

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الملخص العربى

استخدام مخلفات النخيل كمواد ارضية بديلة فى مساكن دجاج التسمين تحت الظروف السائدة فى الوادى الجديد

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أجريت هذه الدراسة لتقييم تاثير استخدام انواع مختلفة من الارضية فى الوادى الجديد على اداء النمو, صفات الذبيحة, الحالة الصحية و الكفاءة الاقتصادية لدجاج التسمين. 180 كتكوت تسمين عمر يوم (كب–500) قسمت إلي ستة مجاميع (3 مكررات لكل مجموعة) طبقا لمعاملات انواع الارضية. كتاكيت المجموعة الأولى كمجموعة مقارنة ربيت على فرشة من تبن القمح, أما مجاميع المعاملات الأولى, الثانية, الثالثة و الرابعة و الخامسة, فربيت الكتاكيت فيها على ارضية من شبك سلك, شبك بلاستيك, سدايب خشب, مجدول الياف النخيل و سدايب جريد النخيل علي التوالي. النتائج المحققة اظهرت ان انواع الارضية لها تأثير معنوى على وزن الجسم, والزيادة فى وزن الجسم و كفاءة التحويل الغذائى فى الفترات النهائية من العمر. الكتاكيت التى ربيت على ارضيات من تبن القمح, سدايب خشب و سدايب جريد النخيل تفوقت معنويا فى وزن الجسم, والزيادة فى وزن الجسم عن الكتاكيت التى ربيت على ارضيات من شبك سلك, شبك بلاستيك ومجدول الياف النخيل. ايضا الكفاءة التحويلية للكتاكيت التى ربيت على ارضيات من تبن القمح, شبك بلاستيك, سدايب خشب و سدايب جريد النخيل تفوقت معنويا عن الكتاكيت التى ربيت على ارضيات من شبك سلك ومجدول الياف النخيل. الطيور المرباه على ارضيات من من تبن القمح, سدايب خشب و سدايب جريد النخيل كانت اعلى معنويا فى نسبة تصافى الذبيحة مقارنة بهذه المرباة على ارضية من السلك الشبك. اقل نسبة دهن فى التجويف البطنى لوحظت فى الكتاكيت التى ربيت على ارضيات من شبك سلك, شبك بلاستيك ومجدول الياف النخيل مقارنة بتلك المرباة على ارضية من فرشة تبن القمح. الكتاكيت التى ربيت على ارضيات من تبن القمح و سدايب جريد النخيل اعطت زيادة معنوية فى نسبة البرسا عن الكتاكيت التى ربيت ارضيات من شبك بلاستيك ومجدول الياف النخيل. الكتاكيت التى ربيت على ارضيات من تبن القمح, سدايب خشب و سدايب جريد النخيل كانت اقل معنويا فى مشاكل الارجل عن الكتاكيت التى ربيت على ارضيات من شبك السلك ومجدول الياف النخيل. الاختلافات فى مقاييس الجسم و فقاقيع الصدر لم تكن معنوية بين انواع الارضيات المختلفة. من نتائج الكفاءة الاقتصادية انه يمكن الاستنتاج ان ارضيات سدايب الخشب و سدايب جريد النخيل كانت الافضل فى رعاية دجاج التسمين. بالاضافة الى ان سدايب جريد النخيل (الاقل فى المشاكل الصحية) يوصى بها فى الوادى الجديد كبديل امن و اقتصادى عن انواع الارضية الاخرى.