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Production Testing of One-Day Chikens by Untreated Palm Oil Weever Combustion in Gbadolite, the Democratic Republic of Congo

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Abstract:

This study was conducted in Gbado-Lite; therefore, it had the objective of producing one-day chickens by palm oil weever combustion. The method adopted for this investigation consisted of constructing an incubator using raffia fibers and using the heat offered by the live combustion of palm oil; the eggs were classified in 3 blocks following the rows on a sieve. This source of energy has achieved a temperature threshold of 37.5 to 39.3 ° C, the recommended temperature for artificial incubation; Hatching rate of 88.9 to 93.5% was recorded, a rate close to the natural incubation. This study has a great socio-economic value because with local inputs, chicks are produced in order to be self-sufficient in meat feed.

Keywords:
one-day chicken; palm oil weever combustion; Gbadolite and Democratic Republic of the Congo

I. Introduction

In developing countries, high population growth and urbanization contribute to a growing and urgent demand for animal protein. One of the great challenges of this century is to meet such a demand without compromising the natural environment and biodiversity (CIRAD-GRET, 2007).

The majority of animal biodiversity has not been used for the production of proteins among the 200 species of large herbivores that exist; barely twenty species were domesticated in order to produce meat. The livestock development in tropical countries has been based so far on traditional farm animals that dominate the global livestock: cattle, small ruminants, pigs and poultry (CIRAD-GRET, op.cit).

In the Democratic Republic of Congo to deal with diseases due to dietary deficiency exponentially in recent decades more acute, many people are engaged in agriculture, hunting, gathering of forest products non-timber; but more to the breeding of domestic animals, which is the agricultural economic sector need to contribute to the liquidation of food insufficiency and protein of animal origin (Tudorascu and Petruscu 1979; Huart, 2003).

In this last year, meat needs are an emergency, the factory farming system is to be preferred, unfortunately the eye of the government is still not ensured in that tier; why Huart (op.cit) and Bisimwa (2003) stigmatize certain populations engage more in the livestock farmer oriented short-cycle small numbers of livestock which the number of pups per litter is too low.

Among breeders, some use modern incubators operating with electricity (hydro and thermal), oil and gas as an energy source to produce chicks; unfortunately, it is only accessible to almost majority of the population of DR. Congo, especially the rural better. To this end, Kabasele (1996) and Anzolo (2001) respectively process some observations on the thermal evolution and distribution of heat in the incubator "MVF" green materials and fermentable Attempt egg incubation from coffee coffee hulls. For this study, we assume that the heat provided by rapid combustion of palm oil could hatch the eggs of hens, therefore produce day-old chicks. This investigation aims not only to promote the breeding of chickens, but so little to improve the level of herders and the grassroots community.

II. Material and Methods

2.1 Area

This study was conducted to the tray of Professors of the University of Gbado-Lite Pangoma (50 villas) located at 4 ° 17 'North and 21 ° 2' East, with an altitude of 500 m (Ngbolua et al. 2014).

The vegetation consisted of evergreen equatorial rainforest; but in human action, it was replaced by savanna where there are Imperata cylindrica Penisetum sp; Chromolaena odorata, Panicum maximum (Molongo et al., 2014). The soil is sandy clay of the type, rainfall is relatively abundant with an annual average of 1600 mm and insolation is low, or 45% of total radiation of tropical energy, the intensity of direct solar radiation is 28 gcal / cm2 / min (Archive 1987).

2.2 Material and Methods

The nature of chickens to be good brooders and the functioning of an artificial incubator have been our inspiration to bring within the reach of the peasant community of a more suitable and simple apparatus for producing chicks.

The device has been manufactured using local and rudimentary inputs that are accessible to all including raffia fiber branches. Eggs were arranged in 4 rows corresponding to the device casualised 4 blocks, each row contained 25 selected and numbered eggs. The coefficient of variation (1) and standard deviation (2) were used to assess the dispersion of the values of this study, with the following formulas:

CV (%) = ∂ / X x100 (1)

If CV> 30: there is no homogeneity; CV <30: Homogeneity it. $\delta = \sqrt{}$ (SCE / (n-1) (2)

The size of the unit was dictated by the designer and the size was as follows:

a. The Inner Wall

a. Frame -Thickness: 3 Inches
b. Lattes -Thickness: 1 Inches
c. Design of the inner wall:

- Length: 50 Inches:
- Width: 2/3 length = 50 x 2/3 = 33 Inches
- Height: 2/3 length = 50 x 2/3 = 33 Inches

The photos1 below illustrate the inner wall.

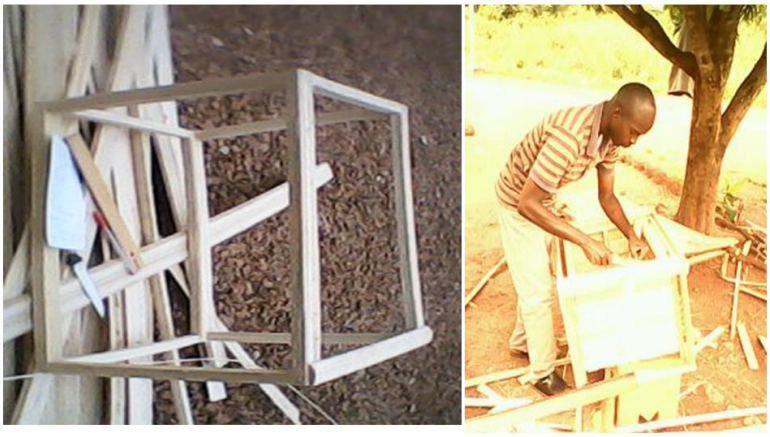

Figure 1. Part of the Inner Wall and Internal Wall

b. The Outer Wall

a. Frame: Thickness: 5 Inches
b. Lattes: Thickness: 1.5 Inches
c. the outer wall Design:

- Length: 70 Inches;
- Width: 2/3 length = 70 x 2/3 = 46 Inches;
- Height: 2/3 length = 50 x 2/3 = 46 Inches

Wallpapers in white were used in preparation for sealing the inner wall and limit the leakage of heat from the work, for against the two walls separated by Meade is a poor conductor of heat.

Figure 2 below show the outer wall of the incubator

Figure 2. *Design of the Outer Wall*
Figure 3. *Sealing of the Inner Wall + & Moistened Sand Sieve Tray*

c. Source of Energy

For this study, the palm oil weever combustion was used to provide the energy and the copper bar as a good conductor of heat to the enclosure wall as Jodogne stigmatize and Dessart (1971).

Figure 4. *Energy and Hatching*

2.3. The Observation

The physical parameter that of the taking of the temperature with a medical thermometer (in °C)

The biological parameter: the hatching rate (in %)= $\frac{\text{Number of hatched eggs}}{\text{The total number of eggs}}$ x 100 Kalambaie et al. (2003).

2.4 Statistical Analysis

The data were tabulated, the results were processed using SPSS 20.0 software, and the results were analyzed using a single-criterion, single-sample analysis of variance (ANOVA 1 SE).

III. Results and Discussion

3.1. Results

a. Temperature

Data on the effect of rapid combustion of crude palm oil on the variation of temperature and hatchability were exploited, the results are recorded in Tables 1 and 2 below:

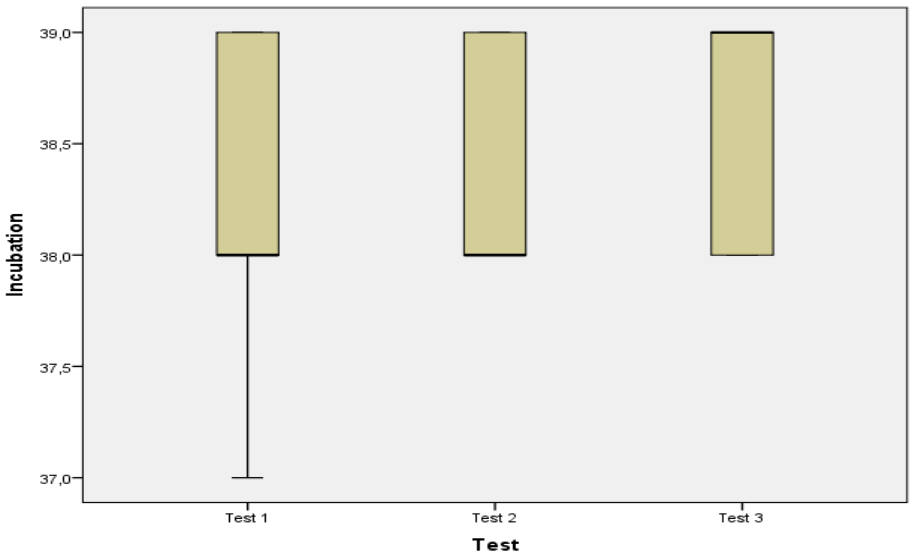

Figure 5. *Average Temperature Change during Testing (in ° C)*

The figure 1 stigmatizes as thermal extremes that have prevailed in the range of 37.5 to 39.4; 37.8 and 39.1; 37.8 and 39.3 respectively for tests 1; 2 and 3 with 1.17% coefficient of variation; 0.96% and 0.93% by which we declare very homogeneous temperatures.

b. Hatching Rate

The hatching rate was evaluated using the formula Putt et al (1987) cited by Kalambaie et al. (2003), the results are recorded in Table 1.

Table 1. Hatching Rate of Different Testing

Parameters	**T est 1**	**T est 2**	**T est 3**	**T .V**
Frequency of reversal	3 -4	3 -4	3 -4	
Broken eggs	5	3	5	6,85
Clear eggs	1 0	5	1 5	0
Hatched out eggs	4 0	8 4	8 6	7,14
Total number of eggs	6 0	1 00	1 12	0,02
Hatching rate (%)	8 8,9	9 1,3	9 3,5	,52

Given in Table 1 compared to the average of different parameters, we realized that with the frequency of reversals 3 and 4, a hatching rate of 88.9%; 91.3% and 93.5% respectively for the first, second and third test.

3.2 Discussion

The average temperature that prevailed during the study for 3 tests varies between 37.5 and 39.3 ° C as was the observation made by Inades (2002) and UNDP & FAO (1996). Adverse fluctuations including temperature of 40 ° C for a few hours can be detrimental to the development of chicks because it can cause death of the embryo or emerging chick deformation (Smith, 1992).

Furthermore, the coefficients of variation with respect to the registered variation of the average temperatures are: 1.2%; 0.96% and 0.93% below 30% respectively for the first, second and third test; hereby we declare that the temperatures that prevailed during this investigation are very homogeneous (Dagnelie, 1975). During this investigation, the frequency of reversals of 4 eggs per day a hatching rate of 88.9 to 93.5%.

These hatching rates were lower than 92% and 94% (Zunga, 1999; Lingbaka; 2001); but higher than those found by Kalambaie et al (2003) in Kisangani 71.15% and 57.89% respectively using local hens as natural incubators and exploiting the electric incubator operating with many risks such as power failure, insufficient humidity, forgetfulness of turning; these were higher than 75% and 92% (Anzolo, 2001). In addition, hatching rates during these investigations were higher than 65-75% (Smith, 1992; Hutu, 2020).

Comparing these hatching rates with those of other researchers, it was observed that they were higher than those from mini-incubators using the sandbox likely to give the highest hatching percentages for chicken eggs, at the scale of 80-85% against 70-75% and 65-68% for

rice husk incubators and far higher than 38% using the automatic incubator (FIDA, 2011; Haddad, 2017).

In view of the above, it is confirmed that as a result of these trials, at present, it is possible to produce day-old chicks using live combustion of crude palm oil as a cheaper and better energy source than rice husks and coffee parchment, as it gives a higher hatching rate than other fuels; an appropriate source of energy for the countryside deprived of the energy source; this is one of the factors likely to create income generating activities for the farmers, such as the production of day-old chicks at lower cost; moreover, it is a sustainable solution because the electric energy remains too expensive until now in some corners of the province of North Ubangi in particular and the world in general.

This form of energy will allow to launch in the countryside where there is an energy shortage a large-scale development program and this will be a revolution, because this innovation will not depend on foreign market especially since the palm oil is produced locally; therefore, it is a decisive development breakthrough because the present development project is self-sufficient in energy capable of achieving a temperature at the threshold of artificial incubation.

IV. Conclusion

A study was conducted Gbado-lite designed to produce day-old chicks by the rapid combustion of crude palm oil and the results of three trials suggest as the following: The average temperature that prevailed fluctuates between 37.5 and 39.3 ° C; With a frequency of three or four times reversals day and once at night, a hatching rate of 88.9 to 93.5% was recorded, rate close to that of natural incubation (100%); Given the present rate of hatching, it emerges that the eggs obtained from galliculteurs peasants were fertilized eggs and good quality. So crude palm oil has proved a good biofuel likely to hatch eggs by its rapid combustion.

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