



## **Construction Of A Design Mounted Poultry De-Feathering Machine As A Self Reliance And National Building**

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### **ABSTRACT**

This paper construction of a design mounted poultry de-feathering machine gives a good appearance and quality to birds being de-feathered. It entails existential risk in emerging technology. The design describes the types of innovation done and actualize using a drawing software known as CorelDraw as per specifications. Components were used to construct and actualize the principle working of operation successfully. Certain recommendation was carried out; positioning protein in economically possible form, it removes feathers of different types of poultry being slaughtered; helps farmer/processor works faster, its cost and time effective.

**Keywords:** Design, De-feathering, Technology, Poultry, Construction.

### **INTRODUCTION**

Protein is a daily requirement in food diet as it is essential for multiple functions in our body which includes building tissues, cells, muscles, as well as making hormones and anti-bodies. This class of food is gotten from plant and animal sources alike. Animal sources of protein include poultry meat and eggs, beef, fish, pork, milk, etc. The World Health Organization (WHO) recommends that the daily intake of protein (mainly leucine) should be 39 mg/kg per day (WHO, 2017). Leucine is the most abundant amino acid in tissue and food proteins, and it is contained in poultry and lean meat. In a bid to observe this recommendation, people often find themselves patronizing various slaughterhouses. Slaughterhouses in Nigeria are faced with public health requirements and environmental problems, (Mohammed et al.,2015). These slaughter operations are carried out in unregulated manner without recourse to the safety of the food. According to world health organisation (WHO, 2015) unsafe food poses global health threats, endangering everyone. Infants, young children, pregnant women, the elderly and those with an underlying illness are particularly vulnerable. Every year, 220 million children contract diarrhoea diseases and 96000 die.

It is against this backdrop that this study intends to develop an efficient low cost of Constructions of poultry de-feathering machine that will ensure an improvement in the hygiene, food safety and poultry de-feathering processes involved in poultry meat production. Poultry processing plants and meat products have gained lots of recognition in markets around the world today. The daily demand for the products is being met by the increasing mechanization of poultry farms. It has been shown by energetic analysis of poultry processing operations carried out, that in most mechanized plants, out of three plants that were taken into consideration required less energy consumption where there would be also corresponding increase in daily production beyond daily consumption by the poultry consumers to the extent that the system undoubtedly called for preservation by the use of refrigerator immediately after processing. Development of a constructions in poultry de-feathering machine is such an economical practice of a

mechanized poultry processing plants to replace the removal of poultry feathers by hand for meat preparation, so as to increase the numbers of poultry products processed per day.

#### **Futures studies**

A futures study is the systematic and interdisciplinary study of social and technological progress. It aims to quantitatively and qualitatively explore the range of plausible futures and to incorporate human values in the development of new technologies. More generally, futures researchers are interested in improving "the freedom and welfare of humankind". It relies on a thorough quantitative and qualitative analysis of past and present technological trends, and attempts to rigorously extrapolate them into the future. Science fiction is often used as a source of ideas. Futures research methodologies include survey research, modeling, statistical analysis, and computer simulations.

#### **Existential risk**

Existential risk researchers analyze risks that could lead to human extinction or civilizational collapse, and look for ways to build resilience against them. Relevant research centers include the Cambridge Center for the Study of Existential Risk, and the Stanford Existential Risk Initiative. Future technologies may contribute to the risks of artificial general intelligence, biological warfare, nuclear warfare, nanotechnology, anthropogenic climate change, global warming, or stable global totalitarianism, though technologies may also help us mitigate asteroid impacts and gamma-ray bursts.

#### **Emerging technologies**

Emerging technologies are novel technologies whose development or practical applications are still largely unrealized. They include nanotechnology, biotechnology, robotics, 3D printing, block chains, and artificial intelligence.

In 2005, futurist Ray Kurzweil claimed the next technological revolution would rest upon advances in genetics, nanotechnology, and robotics, with robotics being the most impactful of the three. Genetic engineering will allow far greater control over human biological nature through a process called directed evolution. Some thinkers believe that this may shatter our sense of self, and have urged for renewed public debate exploring the issue more thoroughly; others fear that directed evolution could lead to eugenics or extreme social inequality. Nanotechnology will grant us the ability to manipulate matter "at the molecular and atomic scale", which could allow us to reshape ourselves and our environment in fundamental ways. Nanobots could be used within the human body to destroy cancer cells or form new body parts, blurring the line between biology and technology. Autonomous robots have undergone rapid progress, and are expected to replace humans at many dangerous tasks, including search and rescue, bomb disposal, firefighting, and war.

Estimates on the advent of artificial general intelligence vary, but half of machine learning experts surveyed in 2018 believe that AI will "accomplish every task better and more cheaply" than humans by 2063, and automate all human jobs by 2140. This expected technological unemployment has led to calls for increased emphasis on computer science education and debates about UBI. Political science experts predict that this could lead to a rise in extremism, while others see it as an opportunity to usher in a post-scarcity economy.

#### **Statement of the Problem**

The progress made in information and communication technology (ICT) during the past two decades through the wide use of cellular phone software and application such as: Whatsapp, Facebook, Opera browser among others have made the research difficult because, this research project could not be easily found on so many pages of browser.

#### **Aim and Objectives**

The main aim of this research is to construct a Design Mounted Poultry De-Feathering machine that will perform effectively, gives a good appearance and quality to birds being de-feathered.

The objectives of this research includes: -

4. De-feather a bird at a low time frame so as to minimize the intensive labor, to meet up with consumer demand and to checkmate the spread of infections.
5. Calculate the probable efficiency of the machine.
6. Determine the time taken to de-feather the bird on the machine as opposed to manual plucking.

7. Determine the scalding temperature at which the feather will be adequately removed from the chicken without any scar.

#### **Types of innovation**

- Radical innovation: "establishes a new dominant design and hence, a new set of core design concepts embodied in components that are linked together in a new architecture."
- Incremental innovation: "refines and extends an established design. Improvement occurs in individual components, but the underlying core design concepts, and the links between them, remain the same."
- Architectural innovation: "innovation that changes only the relationships between them [the core design concepts]"
- Modular Innovation: "innovation that changes only the core design concepts of a technology."

#### **LITERATURE REVIEW**

According to Wikipedia, the term poultry is used collectively to designate those species of birds that have been domesticated to reproduce and grow in captivity so as to render the products of economic value. Chickens, turkeys, ducks, geese, some quail and pheasants, guineas and pigeons generally meet the above criteria. They provide meat, eggs, feathers, fertilizer, animal food and other by – products such as pharmaceuticals. They also serve as laboratory animals for scientific research. Birds kept only for companionship or beauty, are not considered poultry. One of the steps in poultry bird processing before it reaches the end product for cooking is de-feathering of the bird. De-feathering involves removing feathers from the slaughtered birds. ‘De-feathering’ is always used interchangeably with ‘plucking’ depicting the same meaning of removal of feathers from poultry birds. Therefore, development of a poultry de-feathering machine is planning and building of a mechanical structure that will remove feathers of poultry bird. Furthermore, the de-feathering machine is useful if compared to the removal of feathers manually (hand). These are some of its advantages: increasing the number of birds processed per day; human labour is greatly reduced; problem of boredom through manual removal of feathers is eliminated; avoiding the situation of touching hot water while removing the feathers that might have been soaked in hot water; and making the price of processed poultry products cheap.

#### **METHODOLOGY**

The design is to be done using a drawing software known as CorelDraw as per specifications. Typical construction of a design operations include constructions, iron bending, forming of the base, curing, cutting, folding, joining, welding, etc. Factors such as cost, flexibility, materials availability and durability are to be considered in the design.

#### **Components of the furnace**

The machine is made up of the following main parts:

Cement, Sand, Gravels, Reinforcement Bar ,Bending Wire, Shaft, Drum, Plucker (Fingers),Rotating plate,1hp Electric Motor, Angle Iron, Welding Machine, Measuring Tape, Paint , Curing, Form Work Labour, Transport, Bolt and Nut, Hacksaw, Cutting Stone, Drilling Machine, Drive Belt, Pulley.

#### **Description of working operation**

The machine consists of a frame made from iron angle which bears the load of the machine from the electric motor which is attached to the body of the machine to drive the shaft from the top of the machine. The machine also has an electric motor of 1HP, a drum which has rubber pluckers attached to it and rotating plate which is designed to de-feather one bird at a time.

The chicken to be de-feathered is soaked in hot water for some minutes, and then introduced into the drum through an opening on the drum. The engine is then switched on, as the disc rotates, the chicken rubs with the pluckers attached to the drum. This rubbing with the pluckers, causes the feather to peel off from the chicken within a short time. The feathers are thereby separated from the chicken. Different de-feathering machines have been designed and constructed with different materials for different species of

poultry. This is for the fact that the amount of energy required to remove the feathers vary from one species to another. For the purpose of this project, the de-feathering machine will be developed for both local and exotic chicken products. Also, to avoid complexity in design and construction, the machine has the capacity of de-feathering one chicken at a time.

## CONCLUSION

The efficiency of the machine is a function of time and the rate of feather removal. De-feathering machine operating at a low speed will have a lower efficiency than when the speed is relatively fast. The machine efficiency was found to be 89% while the machine is capable to de-feather a bird per 45 seconds. The construction of the de-feathering machine is a very important innovation for the small scale poultry industry because it reduces the stress encountered during manual de-feathering. The output per time is increased and hygiene can be guaranteed. Greater energy is consumed during manual de-feathering while the de-feathering machine consumes relatively low energy.

## RECOMMENDATION

- ❖ Positioning protein in economically possible form.
- ❖ It removes feathers of different types of poultry being slaughtered.
- ❖ Helps farmer/processor works faster.
- ❖ Its cost and time effective.
- ❖ It is flexible to use and maintain
- ❖ It promotes food hygiene.

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