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DESIGN, CONSTRUCTION AND TESTING OF MANUAL AND MOTORIZED MEAT SLICING/DRYING MACHINE: A REVIEW

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ABSTRACT: *A manually and motorized meat slicing/drying machine would be in high demand in Africa as a single unit. This research review was done to improve the existing work on meat mincing machine. The slicing/dryng operation is based on the principle of shearing of meat tissues by the use of cutting zone of the machine. The device would be designed based on locally available raw materials, ease of operation and low cost. The fabricated parts comprise the following components: hopper, shaft, shaft housing, perforated plate, blade, ring screw, knife, bearing housing, receiver, stand and crank handle. From the analysis carried out on the study, it was discovered that many people are consuming unhygienic meat in Africa most especially Nigeria. Due to this, more research work most carried out to address the current method used by the meat sellers.*
KEYWORDS: mincer, motorized, manual, parameters.

INTRODUCTION

The preferred solution to meat processing in Africa is to introduce a mechanical and hygienic method of processing meat as it is done abroad. The technique of meat processing is a form of food processing whereby meat is converted to various forms by the use of mechanical devices and otherwise. When meat is processed, it provides a wide range of meat product for consumption, preservation, storage, packaging, ease of transportation etc. An invaluable way of processing meat for total consumption is to slice, mince and dry the meat by the use of a meat machine.A meat-mincing machine or meat grinder is a kitchen appliance for grinding, fine mincing or mixing raw or cooked meat. It involves the chopping or cutting of meat into small shreds with the aid of rotating blade mounted on an auger which is powered manually or electrically by using an electric motor. The auger is a screw conveyor which can be used to carry material horizontally or at an angle (Bello et al., 2011).

In this research review, design and construction of a single meat mincing machine with both manual and motorized operation shall be reviewed. It is a portable machine which can be used in both rural and urban areas. The motorized or electrical mode of operation is used for fast, efficient and mass production. The machine has an electric motor which transmits motion to the shaft through a belt drive. This helps to rotate the shaft which also pushes the meat through the grill in smaller pieces.

The manual mode of operation is used when there is electric power failure or for smaller production of minced meat. This operation is performed by using the crank of the machine to rotate the shaft. The applied force drives the meat to the cutters where it is being sheared against the grill (i.e. perforated plate). Smaller pieces of meat are extruded from the grill.The importance of this review work cannot be overemphasized. The use of manual and motorized meat slicing/drying machine can bring about entrepreneurship. This will contribute to the development of new market as well as the creation of employment. Meat processing companies can be established to use this type of machine. Such companies can process and market various kinds of meat product which can be delivered to customers.The manual and motorized meat slicing/drying machine has the solutions to the problems of consuming unhygienic meat in Africa most especially in Nigeria.

Components

Components

The components comprise of the following;

- Hopper
- Body/shaft chamber
- Perforated plate (i.e. grill)
- Fixing/ring screw
- Blade
- Shaft
- Knife/cutter
- Crank handle
- Bearing
- Receiver
- Belt
- Bearing house
- Stand

METHODOLOGY

Figure 1 below shows the method for the design and construction and testing of meat slicing/drying machine.

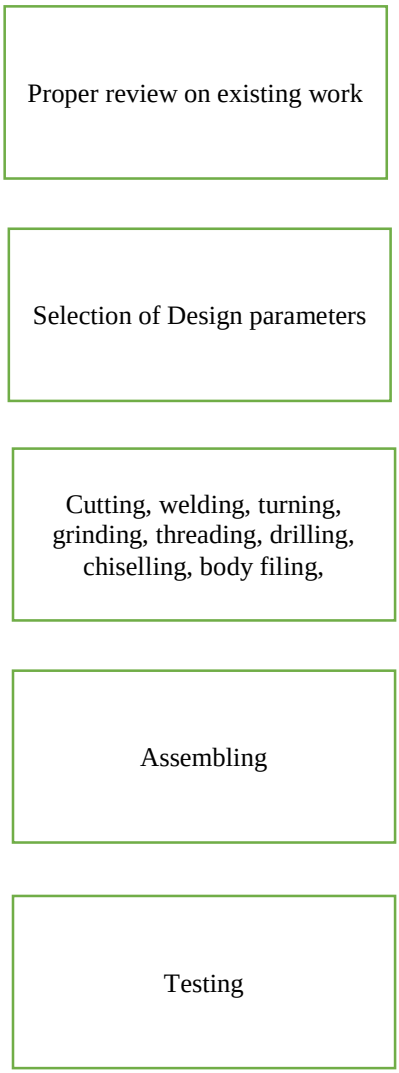

Figure 1: Block Diagram for Design and Construction.

Previous works

Various methods have been used in processing of meat for consumption. One of the earliest is grinding of meat which involves the rubbing of the meat against sharp punched holes on metal surfaces. This rubbing effect allows the meat to shear and the sheared meat is collected at the other end of the punched plate. (Olatunji, 2002). It was noted that the design of an efficient single meat grinding machines with both manual and motorized mode of operation can be used anywhere (i. e urban or rural) and at any time (Bako et al., 2015)

A manually operated double face meat mincer was design and constructed with locally available materials. The production rate of the machine is 021% kg min with the percentage discharge

mincemeat of 52% and undischarged of 19%. It was widely observed that the mincer had the potential of being widely use in location characterized with erratic conventional power supply (Oyeade et al., 2004).

The methods of producing minced meat over the years had transformed. This has brought about the creation of new machines which makes mincing operation easier, more efficient, save energy, operator safety and hygiene of the minced meat to be consumed.

CONCLUSION

The following conclusions are drawn from the results of the research review above

- To construct a machine with a simple design that can be operated both manually and electrically at a cheaper rate one has to use locally available raw materials that are less expensive.
- When the machine is well maintained its durability is guaranteed.
- All parts made of mild steel should be replaced with stainless steel to prevent corrosion.

Recommendation

It is recommended that screw conveyor shaft can made of a hollow rod so as to reduce the weight of the machine.

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