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Low Cost Semi-Automatic Chapatti Making Machine

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Abstract: In this modern era, we strive to make things simple, easy and tiny in size. In many of the hotels, dhabas and marriage halls as a common food, chapatti is made. While making a large quantity of chapatti, we are in need of a large machine to avoid manual effort and consumption of time. A project is made with which, time and manual effort can be reduced in chapatti making at a lower cost and with ease of operation. Since the size is smaller, it can be easily used and saves a lot of time in bulk cooking of chappaties.

Keywords : Chapatti, Ease of operation, Lower cost, Manual effort, Time

I. INTRODUCTION:

Normally, people felt it difficult to knead the wheat flour for bulk food cooking. It consumes more time during the process of manual kneading and also requires more effort. It is difficult to cut the dough into small pieces as also to make it round in large quantities. These processes are consuming more time while making the chapatti. In order to overcome the above difficulties, we introduce a new setup to cut the dough into small pieces. After that, the dough ball is compressed to get a flat shape. The main objective is to build a fast chapatti making machine which will satisfy the requirements of hotels, restaurants and canteens as well.

II. LITERATURE REVIEW

Wheat flour is the major ingredient in chapatti making, amounting to 80-95% of the dry matter. It's characteristics determine the chapatti quality. Better quality chapattis are prepared from hard wheat flour with intermediate protein content **(Waniskaet al 2004)[1,8].** Chapattis are usually consumed even after making and storing. However, consumers expect chapattis to maintain their shelf stability (flexibility) and shelf life (microbial) for weeks **(Waniska et al 2004)[1,9].**

Wheat flour chapattis are unfermented flat breads. Chapattis are traditionally homemade and widely consumed in northern Mexico over centuries; their popularity is increasing in the United States **(Guo et al 2003)[2].** Chapattis are produced by hot-press, die-moisture absorption from the fillings. They are smoother, more elastic, and resistant to tearing and cracking. Die cut chapattis have lower moisture content, less cut or hand-stretch procedures.

Due to this unique characteristic, wheat flour can be processed into a variety of food products such as bread, biscuit, chapattis and pasta, among others. Investigations on flour and dough characteristics have been conducted using analytical physico-chemical methods and also flour performance tests including Farinograph, Mixograph, Extensigaph and Alveograph tests **(Atwell, 2001)[3,6].**

The rheology of dough is affected by the interactions of gluten proteins and other flour components. This visco elastic behavior emerges only after the proteins interact with other components in the dough. Flour-water interactions are the most important reaction within a dough system. If an insufficient amount of water is added to meet the hydration needs of all dough components, the gluten does not become fully hydrated and the elastic behavior of the dough is not fully developed. On the other hand, if water is added in excess, the viscous component in the dough is dominant, and the dough shows decreased resistance to extension, increased extensibility and development of a sticky dough. The increase in water content weakens the elastic properties of gluten by decreasing the number of cross links (**Belitz et al 1986)[4,7].**

III. OBJECTIVES:

To reduce the manual labour.

To reduce human effort.

To satisfy the requirements of local dhabas, restaurants, hotels and canteens.

To reduce the dough kneading time.

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IV. EQUIPMENTS USED

Dough mixer

Screw conveyor

Belt and pulley

Motor

V. WORKING

Initially, the wheat flour is dropped into the dough mixer chamber. After that the motor is switched on. Then the water is poured into the chamber according to the quantity of flour along salt and yeast. It takes some minutes to knead the dough. Then the dough is dropped into the screw conveyor chamber. The screw conveyor transfers the dough from one end to another end. At the end of the screw conveyor, the cylindrical shaper is fixed through which dough comes in a cylindrical shape. A dough cutter is placed to cut it into small pieces. After that, the dough ball is compressed into a required size and shape.

Ingredients	Percentage
Flour	100
Water	60
Yeast	2
Salt	2

Table 1 Composition of wheat dough

Diagram



VI. DESIGN SPECIFICATION

Length of the dough mixing chamber = 42 cm

Breadth of the dough mixing chamber = 52 cm

Height of the dough mixing chamber = 30 cm

Volume of the chamber = 42 x 52 x 30

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= 65520 cu.cm

Capacity of the dough mixer = 5 to 6 kg

Rpm of the motor at load = 55 rpm

Time taken to knead the flour = 4-5 min

Length of the screw conveyor chamber = 40 cm

Breadth of the screw conveyor chamber = 17 cm

Height of the screw conveyor chamber = 17 cm

Volume of the chamber = 40 x 17 x 17

= 11560 cu.cm

Capacity of the screw conveyor = 2.52 kg (or) 1047.16 cu.cm

Rpm of the screw conveyor = 45 rpm

Inlet diameter of the cylinder = 4 cm

Outlet diameter of the cylinder = 3 cm

Distance between outlet and cutter = 3 cm

Volume of each dough pieces = 3 x 3 x 3

= 27 cu.cm

Capacity of screw conveyor = 7.86 cu cm/s

Time taken to cut into small pieces = 1047.16/ 7.86

= 133 sec

No of dough pieces = Total capacity/ volume of each pieces

= **1047.16/ 27**

= 39 pieces apprx.

VII. RESULTS AND CONCLUSSION

This chapatti making device is more suitable for hotels and hostels and meets their requirement of chapattis. It reduces the human effort. It can make more chapattis in an hour, saving a lot of time and labour. The chapattis made by this machine are totally 100% hygienic. We can use normal wheat flour with this chapatti making machine for making soft and high quality chapattis. The chapattis made will remain fresh and soft even after hours. This Chapatti machine is specially designed to give the best performance where chapattis are needed in bulk for industrial canteens, schools, college and army mess, tiffin services and MNC canteens.

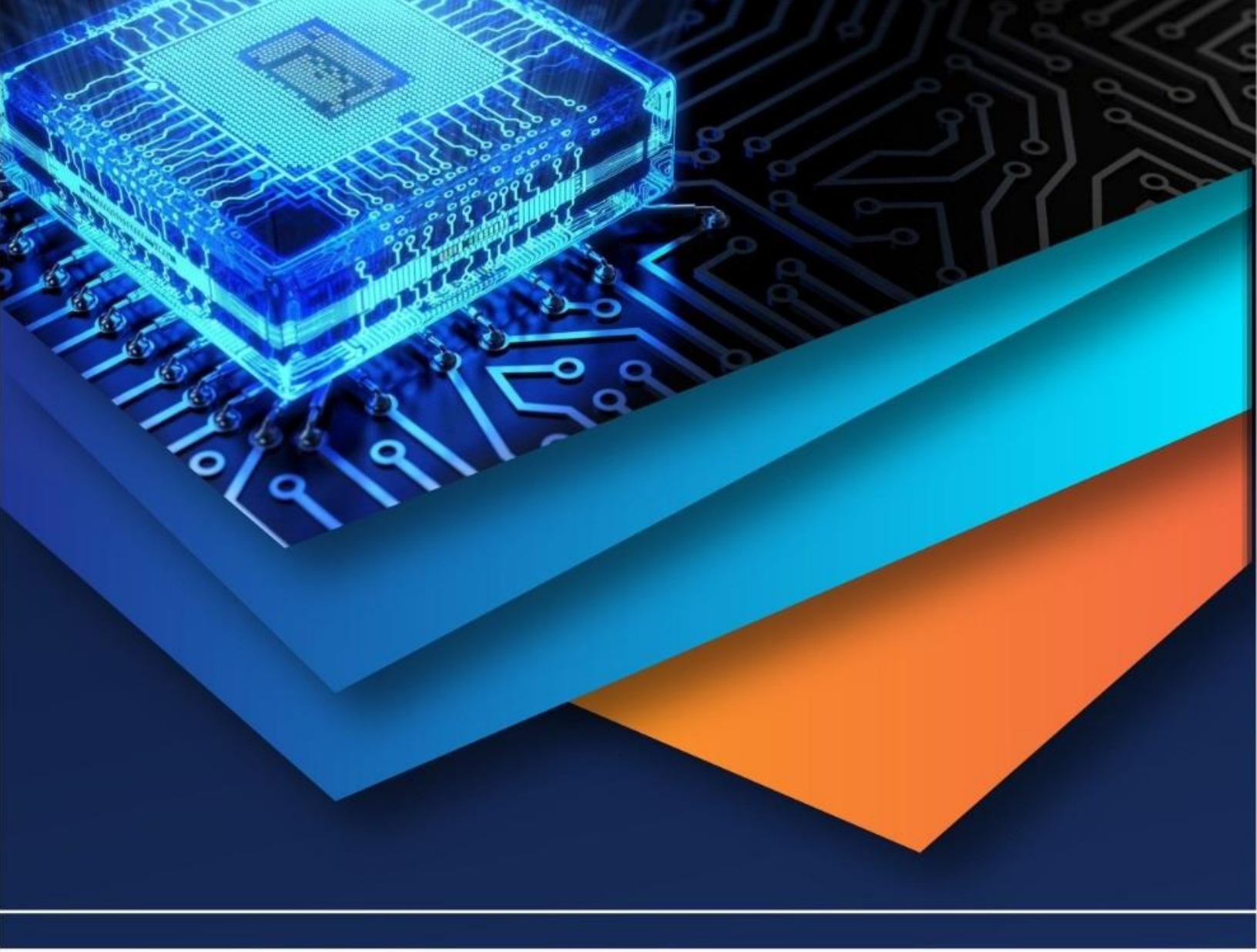
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