



ISSN: 2350-0328

**International Journal of Advanced Research in Science,
Engineering and Technology**

Vol. 8, Issue 3, March 2021

Justification of the Process of Operation of the Device for Splitting and Extracting Kernels from Fruit Seeds for Material Support Units

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ABSTRACT: It is known cultivated including fruits, walnuts, apricots, peaches, cherries, plums and other fruits that every year across the republic Uzbekistan. The cornels of fruits such ass: walnuts, apricots, peaches cherries, plums and other contain 60 % oil which is used widely in pharmaceutical industries, perfumery and foot industries. About operating the cornels from fruit pits by industrial methods is not given any information in scientific technical literature. Now days this process is done manually. At the same time a number of process mechanization devices of fared, but they are not yet in production because of certain shortcomings in their structures. The task of this development is to develop a device design that allows you to preserve the integrity of crushed kernels and increase labor productivity, the shell of which can be used in industrial and home conditions for grinding seeds and almonds that have different shapes and physical and mechanical properties.

KEYWORDS: apricot seeds, device, sorted, split, cogwheel, implementation.

I. INTRODUCTION

Based on the results of work on the extraction of kernels from fruit seeds and walnuts, a description of the design of a device that can be used in industrial and home conditions for almond seeds and shells, which allows you to preserve the integrity of the kernel and increase its productivity.

It is known that the kernels of walnuts and fruits, including apricots, peaches, cherries, plums, etc. contain up to 60% oil and are widely used in the food, perfume and pharmaceutical industries. In the scientific and technical literature, there is no data on the industrial separation of kernels from seeds, that is, at present this process is mainly performed manually. 100 grams of apricot kernel contains 0.45-0.65 milligrams of vitamin B1, 0.16-0.30 milligrams of B2, 1.40-2.30 PP., 0.03-0.05 carotene and 2.25-3 grams of vitamin C.

II. LITERATURE REVIEW.

Parameters of apricot seeds: average length 25 mm, width 15 mm, average thickness 18 mm. A force of 0.5-0.8 N is required for splitting the seeds. at the same time, a number of devices for mechanizing the process were proposed [1, 2, 3], but they were not introduced into production due to some design flaws.

Based on research, grains in apricot or walnut shells that have so far been offered for production are transferred from the container to the cutting unit using a conveyor with a belt, with which the shafts in the sections are

removed by a stream of air. Such devices can be used to split nuts (such as pine nuts) with little or no bond strength between the core and the shell. To isolate the volume air from nuts and grains with higher adhesion strength, a higher flow rate is required, which increases the device's power consumption [1, 2].

III. FORMULATION OF THE PROBLEM

In another device for splitting apricot or walnut, it is proposed to use the impact force of a high-speed ejection air flow installed on a high-speed fixed horizontal platform [3].

The disadvantages of this device are the following. Firstly, high-speed air flow requires significant energy consumption. Secondly, the impact caused by the air flow can cause small crusts of strong and strong shells to be heated, and the rest can be completely returned to the platform. The goal of this development is to develop an energy-efficient device that can be used in industrial and home settings for splitting almond bark with various shapes and physical and mechanical properties that can maintain the integrity of the crushed core and increase productivity.

To solve the above problem, the author suggests the device design shown in Figure 1. The Unit includes four-wheel drive hoppers and gears, respectively, and an electric motor. The cogwheels are cylindrical in shape and consist of a set of teeth and cylindrical shafts. The spring is installed on the tuner hopper using a clip. The oval roller vibrator is installed in such a way that the installed parts of the specified size do not stop. The thumbs from the cogwheels enter the reservoir through the rod.

IV. METHODOLOGY

The device works as follows. By studying the physical and mechanical properties of fruit seeds, the device has the ability to split apricots, almonds and peaches and extract the kernels.

Before starting the device, the apricot seeds are sorted to the same size, and the distance between the cogwheel and the cylinder shaft is selected according to the resulting size. After studying the market economy, apricot seeds were chosen as the most popular grain product.

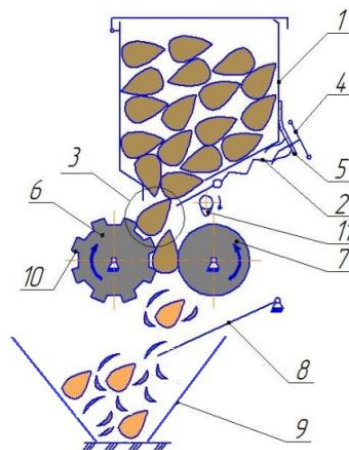


Fig. 1. Device for splitting seeds.

- 1.9 – capacity for storing seeds, 2 – return spring, 3 – apricot seeds,
4 – control lever, 5 – fastener, 6 – cogwheels, 7 – cylindrical shaft,
8 – gutter , 10 – toothed slots, 11 – roller motor.

From the container shown in the first picture, apricot seeds fall successively on the cogwheel and cylindrical shafts, and the shafts rotate in opposite directions. The seeds successively fall between the cogwheel and the cylinder of



ISSN: 2350-0328

International Journal of Advanced Research in Science, Engineering and Technology

Vol. 8, Issue 3, March 2021

the shaft rotating in opposite directions, split at a certain force, fall through the gutter and accumulate in the container, where they are separated by a separate eccentric separator device or sieve. [4]

The force applied to the finished product is determined by calculating the size of the coils in accordance with its physical and mechanical properties, including the strength and stiffness of the shell. The size of the product by the cross – section of the impact is taken into account by measuring the size of the seeds and the size of the grain core and its crust by determining the distance between the turns.

V. METEOROLOGICAL AND LOAD CALCULATIONS

Efficiency of the solution. The device operates in two systems according to the order of operation: first, the total capacity of grain on rollers rotating in opposite directions is 27 kg, which saves 85-90% of its contents. The second system of the device acts as a force of influence on the product and changes it depending on the shape, size and physical and mechanical properties of the product. Both systems are structurally connected to a single drive, which ensures balanced and precise movement of all parts of the device, which allows you to achieve high performance and reliability, as well as maintain the integrity of the separation core. The process of separating the seeds has not yet entered the competence of the state. This process is carried out by private entrepreneurs, that is, there is no technical electrified or mechanized device for its implementation.

VI. RESULTS AND DISCUSSION

Conclusions and recommendations: Apricot juice is enjoyed by the population of the Republic. This raises the question of separating the apricot kernel and putting it on the people's table. The process of splitting the seeds of fruit trees is carried out by private entrepreneurs, that is, there is no technical electrified or mechanized device for its implementation. So, the recommended machine for splitting the seeds of fruit trees is one of the most profitable backup sources for private entrepreneurs.

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