

(12) INNOVATION PATENT
(19) AUSTRALIAN PATENT OFFICE

(11) Application No. **AU 2021105260 A4**

(54) Title
**A SYSTEM AND METHOD FOR EXTRACTING COCONUT ENDOSPERM WITHOUT
BREAKING ITS SHELL**

(51) International Patent Classification(s)
B26D 1/00 (2006.01) **B26D 7/27** (2006.01)
A23N 5/03 (2006.01)

(21) Application No: **2021105260** (22) Date of Filing: **2021.08.10**

(45) Publication Date: **2021.12.02**

(45) Publication Journal Date: **2021.12.02**

(45) Granted Journal Date: **2021.12.02**

(71) Applicant(s)
Kiran Christopher

(72) Inventor(s)
Christopher, Kiran;A. Ritwik.;A R, Reghuraj

(74) Agent / Attorney
Kiran Christopher, 22 Glenroy road Glenroy, Victoria, VIC, 3046, AU

ABSTRACT

The present disclosure relates to a system and method for extracting coconut endosperm without breaking its shell. The coconut endosperm is extracted by drilling a hole of maximum 1.15 inch at the functional pore of the coconut shell. The specialized tool for extracting the coconut endosperm comprises: a blade casing; cutter blade and cutter teeth; a push rod; connecting links; connecting pins; a nut; and an outer cylinder. The removal of coconut endosperm is done without breaking the shell which promotes the business of handicrafts. A strength analysis of endocarp portion of the coconut is performed because every coconut endocarp has different dimension. A machine is designed for holding the coconut in its right position that makes the process of extraction more precise and accurate. The proposed process of extracting the coconut endosperm doesn't affect the quality of the endosperm.

A SYSTEM AND METHOD FOR EXTRACTING COCONUT ENDOSPERM WITHOUT BREAKING ITS SHELL

FILED OF THE INVENTION

The present disclosure relates to a system and method for extracting coconut endosperm without breaking its shell.

BACKGROUND OF THE INVENTION

The importance of the coconut can be evaluated from this that it is a major source of employment and income in the field of crops plantation. The usage and its adaptability to grow in different environments increase its demand to a really high extent. The coconut also have vital role in the production of many products and thus increasing the income of the people who make those products, wherein these products are commercially exploited for multiple purpose. The increasing demand of coconut also increases the demand of a method to extract the coconut endosperm efficiently and effectively.

In the conventional method, the endosperm is extracted by breaking the shell of the coconut due to which the shell of that coconut cannot be used further for any production of any product such as handicrafts, which are made from coconut shell. The process of extracting the coconut endosperm by human is very tedious and, also it's very time consuming and not recommended because it might damage the endocarp (shell). Another method is to cut the shell and extract the endosperm using chemicals. The problem is that the coconut endosperm is extracted by breaking the shell but the handicraft and artifacts industry need the shell without any kind of crack and the endosperm extracted using chemicals will damage it and therefore that endosperm cannot be used for further processing. Therefore there is a need for a system and method for extracting coconut endosperm without breaking its shell.

SUMMARY OF THE INVENTION

The present disclosure relates to a system and method for extracting coconut endosperm without breaking its shell. The aim of the present disclosure is to drill a hole in coconut for extracting the coconut endosperm, wherein the hole is of maximum 1.15 inches and at the functional pore of the coconut shell. A special tool is designed for extracting the coconut

endosperm for getting it without breaking the shell so that the shell can be used for making handicraft items. The removal of endosperm without breaking the shell also promotes the business of handicraft and food industry. Before extraction a strength analysis of endocarp portion of the coconut is performed because every coconut endocarp has different dimension and this result in a very high complexity. The proposed special tool for extracting the coconut endosperm provides a solution for the problem and the complete process is done without affecting the quality of endosperm.

The present disclosure seeks to provide a system for extracting coconut endosperm without breaking its shell. The system comprises: a blade casing along the longitudinal axis, wherein the blade casing is a cylindrical shaped part with slotted grooves; cutter blade and cutter teeth for extracting the coconut endosperm with the help of projected teeth of cutter; a push rod for forcing the connecting link to slide inside the slotted grooves of blade casing during the rotation, wherein the connecting link is used for joining the pushrod and cutter blades, wherein the connecting link and cutter blade are joint by using a connector pin; and a nut for locking the tool properly onto the machine so that a precise and accurate extraction can be done.

The method includes rotating the tool for extracting the coconut endosperm, wherein the cutter blades connected to the links expands and protrude due to centrifugal force; hence the protruding blades helps in scraping the endosperm.

Another objective of the present disclosure is to propose a special tool for extracting the coconut endosperm without affecting the quality of endosperm.

Another objective of the present disclosure is to promote the business of handicrafts by not breaking the shell of the coconut for the extraction.

Another objective of the present disclosure develop a machine for holding the coconut in its right position.

Yet, another objective of the present disclosure is to make the process of endosperm removal precise and accurate.

To further clarify advantages and features of the present disclosure, a more particular description of the invention will be rendered by reference to specific embodiments thereof,

which is illustrated in the appended drawings. It is appreciated that these drawings depict only typical embodiments of the invention and are therefore not to be considered limiting of its scope. The invention will be described and explained with additional specificity and detail with the accompanying drawings.

BRIEF DESCRIPTION OF FIGURES

These and other features, aspects, and advantages of the present disclosure will become better understood when the following detailed description is read with reference to the accompanying drawings in which like characters represent like parts throughout the drawings, wherein:

Figure 1 illustrates a block diagram of a system for extracting coconut endosperm without breaking its shell in accordance with an embodiment of the present disclosure;

Figure 2 illustrates a flow chart of a method for extracting coconut endosperm without breaking its shell in accordance with an embodiment of the present disclosure;

Figure 3 illustrates the developed special tool in accordance with an embodiment of the present disclosure;

Further, skilled artisans will appreciate that elements in the drawings are illustrated for simplicity and may not have been necessarily been drawn to scale. For example, the flow charts illustrate the method in terms of the most prominent steps involved to help to improve understanding of aspects of the present disclosure. Furthermore, in terms of the construction of the device, one or more components of the device may have been represented in the drawings by conventional symbols, and the drawings may show only those specific details that are pertinent to understanding the embodiments of the present disclosure so as not to obscure the drawings with details that will be readily apparent to those of ordinary skill in the art having benefit of the description herein.

DETAILED DESCRIPTION

For the purpose of promoting an understanding of the principles of the invention, reference will now be made to the embodiment illustrated in the drawings and specific language

will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications in the illustrated system, and such further applications of the principles of the invention as illustrated therein being contemplated as would normally occur to one skilled in the art to which the invention relates.

It will be understood by those skilled in the art that the foregoing general description and the following detailed description are exemplary and explanatory of the invention and are not intended to be restrictive thereof.

Reference throughout this specification to “an aspect”, “another aspect” or similar language means that a particular feature, structure, or characteristic described in connection with the embodiment is included in at least one embodiment of the present disclosure. Thus, appearances of the phrase “in an embodiment”, “in another embodiment” and similar language throughout this specification may, but do not necessarily, all refer to the same embodiment.

The terms "comprises", "comprising", or any other variations thereof, are intended to cover a non-exclusive inclusion, such that a process or method that comprises a list of steps does not include only those steps but may include other steps not expressly listed or inherent to such process or method. Similarly, one or more devices or sub-systems or elements or structures or components preceded by "comprises...a" does not, without more constraints, preclude the existence of other devices or other sub-systems or other elements or other structures or other components or additional devices or additional sub-systems or additional elements or additional structures or additional components.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. The system, methods, and examples provided herein are illustrative only and not intended to be limiting.

Embodiments of the present disclosure will be described below in detail with reference to the accompanying drawings.

Figure 1 illustrates a block diagram of a system for extracting coconut endosperm without breaking its shell in accordance with an embodiment of the present disclosure. The system 100 includes a blade casing 102 along the longitudinal axis, wherein the blade casing is a cylindrical shaped part with slotted grooves.

In an embodiment, cutter blade and cutter teeth 104 are used for extracting the coconut endosperm with the help of projected teeth of cutter.

In an embodiment, a push rod 106 is used for forcing the connecting link to slide inside the slotted grooves of blade casing during the rotation, wherein the connecting link is used for joining the pushrod and cutter blades, wherein the connecting link and cutter blade are joined by using a connector pin.

In an embodiment, a nut 108 is used for locking the tool properly onto the machine so that a precise and accurate extraction can be done.

In an embodiment, an outer cylinder acts as an outer casing for the tool.

In an embodiment, the coconut endosperm is extracted through a narrow hole of about 1.15 inch size.

In an embodiment, a machine is designed for holding the coconut in its right position for the extraction of endosperm with high degree of precision and accuracy.

In an embodiment, a strength analysis of endocarp portion of coconut is performed before extracting the coconut endosperm because every coconut endocarp has different dimensions and this result in high complexity.

In an embodiment, a specific mechanism and tool geometry is designed in the solid work platform.

Figure 2 illustrates a flow chart of a method for extracting coconut endosperm without breaking its shell in accordance with an embodiment of the present disclosure. At step 202 the method 200 includes, rotating the tool for extracting the coconut endosperm, wherein the cutter blades connected to the links expands due to centrifugal force.

At step 204 the method 200 includes, drilling the coconut with cutter blade and cutter teeth and scraping the coconut endosperm through rotation of blade and teeth inside the coconut.

Figure 3 illustrates the developed special tool in accordance with an embodiment of the present disclosure. The specialized tool is proposed for extracting the coconut endosperm through a narrow hole of 1.15 inches without breaking the shell of the coconut and doing extraction with precision and accuracy. Before extracting, strength analysis of endocarp portion of the coconut is performed. The tool comprises: a blade casing that is a cylindrical shaped part with slotted grooves along the longitudinal axis; cutter blade and cutter teeth that is mainly used for the endosperm extraction through the projected teeth; a push rod forces the connecting link to slide inside the slotted grooved while rotation; a connecting link that acts as a joint between the pushrod and blades; a nut for locking the tool onto the machine properly; a connector pin for joining the connecting link and blades; and an outer cylinder acts as an outer casing for the developed tool. During the rotation the cutter blades that are connected to the links expand with the help of centrifugal force. The blades make their way inside the coconut and start rotating inside the coconut shell which enables blades for scraping the coconut endosperm and this way the coconut endosperm is obtained without breaking the coconut shell.

The drawings and the foregoing description give examples of embodiments. Those skilled in the art will appreciate that one or more of the described elements may well be combined into a single functional element. Alternatively, certain elements may be split into multiple functional elements. Elements from one embodiment may be added to another embodiment. For example, orders of processes described herein may be changed and are not limited to the manner described herein. Moreover, the actions of any flow diagram need not be implemented in the order shown; nor do all of the acts necessarily need to be performed. Also, those acts that are not dependent on other acts may be performed in parallel with the other acts. The scope of embodiments is by no means limited by these specific examples. Numerous variations, whether explicitly given in the specification or not, such as differences in structure, dimension, and use of material, are possible. The scope of embodiments is at least as broad as given by the following claims.

Benefits, other advantages, and solutions to problems have been described above with regard to specific embodiments. However, the benefits, advantages, solutions to problems, and

any component(s) that may cause any benefit, advantage, or solution to occur or become more pronounced are not to be construed as a critical, required, or essential feature or component of any or all the claims.

WE CLAIM

1. A system for extracting coconut endosperm without breaking its shell, the system comprises:
 - a blade casing along the longitudinal axis, wherein the blade casing is a cylindrical shaped part with slotted grooves;
 - cutter blade and cutter teeth for extracting the coconut endosperm with the help of projected teeth of cutter;
 - a push rod for forcing the connecting link to slide inside the slotted grooves of blade casing during the rotation, wherein the connecting link is used for joining the pushrod and cutter blades, wherein the connecting link and cutter blade are joined by using a connector pin; and
 - a nut for locking the tool properly onto the machine so that a precise and accurate extraction can be done.
2. The system as claimed in claim 1, wherein the system further comprises an outer cylinder that acts as a outer casing for the tool.
3. The system as claimed in claim 1, wherein the coconut endosperm is extracted through a narrow hole of about 1.15 inch size.
4. The system as claimed in claim 1, wherein a strength analysis of endocarp portion of coconut is performed before extracting the coconut endosperm because every coconut endocarp has different dimensions and this result in high complexity.
5. The system as claimed in claim 1, wherein a specific mechanism and tool geometry is designed in the solid work platform.
6. A method for extracting coconut endosperm without breaking its shell, the method comprises:

rotating the tool for extracting the coconut endosperm, wherein the cutter blades connected to the links expands due to centrifugal force.

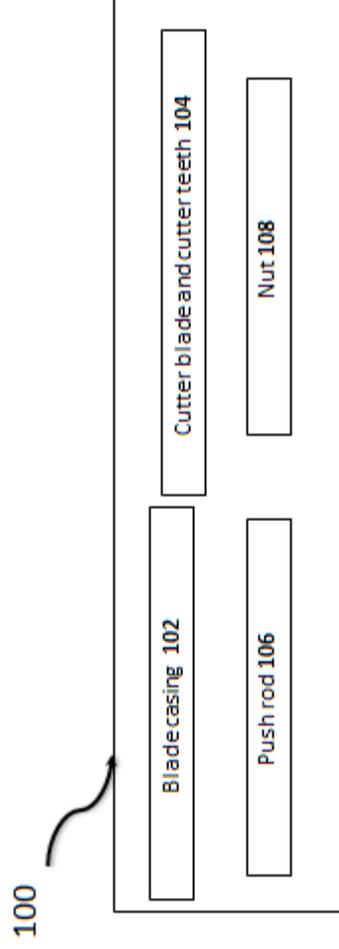


Figure 1

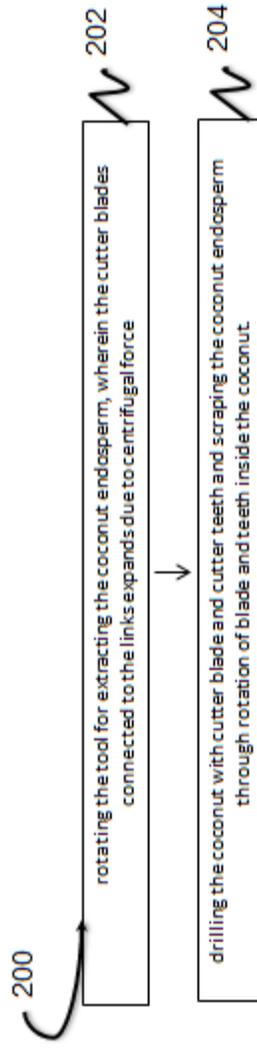


Figure 2

