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(54) **Refining process for semiraw rice**

Raffinationsverfahren für halbrohen Reis

Procédé de raffinage pour riz semi-cru

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Description

The present invention relates to a refining process for semiraw rice.

It is known that at the present time the refining process for semiraw or hulled rice (that is rice reduced to grains but still covered with the so-called husk), is generally performed by submitting rice to several, usually four, passages through appropriate machines commonly referred to as taper polishing machines.

Each of such machines is substantially formed of a metal member of inverted truncated conical form which is externally coated with a layer of abrasive material and rotates at high speed within a fixed casing of truncated conical form too. The fixed casing is generally made of a metal sheet and exhibits a plurality of holes of small diameter, that is capable of enabling passage of the husks and not of the individual rice grains.

The already hulled rice is introduced into the machine from the upper part thereof so that, while passing through the gap of adjustable width formed by the facing surfaces of said two members, it undergoes polishing, due above all to rubbing of the grains against the abrasive surface of the rotating frustoconical member. A vacuum system active externally of the fixed casing, carries out sucking of husks and powder through the holes provided in the fixed casing. Therefore as soon as the outer cortical layers are detached from the grains due to the rubbing action, they are also immediately separated from said grains. A refining action of the same typology can be achieved by inverted-taper polishing machines or horizontal-cylinder polishing machines having one or more sectors.

However the polishing process above described in short has some drawbacks.

In fact, above all when the stocks of semiraw rice to be refined do not have grains homogeneously sized, a differentiated process takes place from one grain to the other, that is to say that in some grains for example, there are removals that may concern not only the grain tip but also more internal portions thereof, and a fracture or uneven thinning of the typical tooth-like appendices may occur.

Consequently, during cooking, water penetrates into the grains at different speed from one grain to the other. More particularly, grains showing surface removals, thinnings and more marked fractures cook more quickly and are subjected to pulping more easily.

In addition, for the above reasons, that is due to its lack of homogeneity, it is even difficult to establish how long rice must cook.

It should be also noted that husks are rich in nutritive substances, flavours and good smells. By separating husks as soon as they are detached from the rice grain, said nutritive substances, flavours and good smells are completely lost.

In earlier times, when taper polishing machines were not used, rice polishing was carried out by spiral machines, each comprising a helix or screw rotating within a vessel of substantially ovoidal shape. Rice entrained towards the pot or vessel bottom by the screw coils reached the vessel periphery and climbed up along the circular wall. Thus, two opposite currents were formed in the product mass: a central current tending to the bottom and a peripheral current tending to the top of the vessel; the peripheral current after going past the maximum vessel circumference, dropped to the centre and resumed its cyclical motion.

The rice mass, kept in continuous motion, produced a substantially uniform rubbing of the grains with respect to one another thereby giving rise to a consequent uniform processing of the grains, irrespective of their size, so as to avoid irregular surface removals and fractures.

In addition, husks were not separated from rice during the whole process, thereby transferring part of their flavour, good smell and nutritive properties to the grains.

In spite of such advantages, since three or four passages through as many spiral-shaped vessels were necessary and since time required for each passage was in the range of 15 to 20 minutes, the production capacities of these machines were limited and not adapted for large-scale rice processing.

In addition, due to the difficulties in achieving continuous cycles with machines in which loading and unloading of the vessels was required at each working, these machines have been gradually abandoned in favour of the more up-to-date taper polishing machines.

It is known from doc. US-A-3485280 a grinding and friction type rice polishing machine comprising a grinding roll, peripherally provided with an annular wire mesh rice-bran discharge member, and a small diameter friction polishing roll, connected to said grinding roll and provided with a corresponding annular wire mesh rice-bran discharge member.

Under this situation, the technical task underlying the present invention is to devise a process capable of substantially overcoming limits and drawbacks of the refining processes of known type.

Within the scope of this technical task it is an important object of the invention to devise a refining process enabling refined rice to be obtained through a substantially reduced processing time and as a result of which process the rice grains afford greater nutritive and organoleptic properties together with a homogeneous and uniform cooking, thereby also offering an easy identification of the cooking degree reached by all the rice grains.

The technical task mentioned and the object specified are substantially achieved by a refining process for semiraw rice according to claim 1.

The description of a preferred embodiment of a refining process for semi raw rice in accordance with the invention is given hereinafter, by way of non-limiting example, with reference to the accompanying drawings, in which:

- Fig. 1 is a block diagram showing the process

steps:

- Figs. 2 and 3 are longitudinal sectional views showing a taper type polishing machine and a spiral type polishing machine respectively, used in the process of the invention.

Referring to the drawings, the process of the invention consists in previously using a taper polishing machine 1. In this machine the first step A of the inventive process in which grains are surface-cut is carried out. In fact, hulled rice to be refined is introduced into this machine and more particularly in the gap formed between a rotating member 2 coated with an abrasive material and a fixed casing 3 made of a metal sheet and disposed eternally of the rotating member 2.

In an original manner, in accordance with the present process the machine 1 is used over a single passage and said machine is such adjusted that it does not produce a strong rubbing on the rice grains which might cause the grain fracture. On the contrary, the machine adjustment allows a non-violent rubbing to be produced which is only capable of forming surface cuts in the grains, thereby greatly increasing their abrasion capability and making their separation from the husks easier.

Subsequently, rice processed in the taper type polishing machine 1 is transferred to a spiral type polishing machine 4, that is a machine comprising a helix or screw 5 rotating within a vessel or pot 6 substantially of ovoidal or semispherical form.

In this machine the second step B involving removal of the cortical layer from the grains takes place. That is, the rice grains previously surface-cut in the taper type machine 1, and therefore provided with a rough surface, cyclically rub against one another as provided in conventional spiral machines such as the polishing machine 4, thereby producing an easy removal of husks and powders.

Due to the presence of the surface cuts, rice stays in the spiral type polishing machine 4 for a greatly reduced time, because each cut represents an abrasive element active on the surface of all rice grains being processed.

The abrasive action, even if much more stronger than in the spiral machines used in traditional and known operation modalities, is gradual and homogeneously distributed on all grains, so that the product appears uniform, well polished, and does not include scratched or blunt grains, irrespective of the grain sizes.

It is also pointed out that the grains, while being refined, are still surface-permeated although to a reduced extent with husk particles that improve the rice flavour and nutritive properties.

In addition, being the grains refined homogeneously and in a very delicate manner, the produced rice acquires a greater homogeneity even when subsequently submitted to cooking.

The possibility of using two or more spiral type machines may also be envisaged in order to improve the process efficiency to a greater extent.

Finally, rice is submitted to a sieving step C using a sieve of a conventional type not shown in the drawings and intended for separating the residual husks from the refined rice.

The invention achieves important advantages.

It will be recognized in particular that the process of the invention carries out a new methodology for the use of already known and widely spread machines, which machines are therefore very reliable. As a result, the process itself is also very reliable and can be put into practice very easily and quickly since the required knowledge and training are substantially already present in rice mills.

Claims

1. A refining process for semiraw rice, comprising the following steps:

   - making surface cuts in the semiraw rice grains by rubbing said grains against an abrasive surface,
   - submitting the surface-cut grains to mutual rubbing so as to remove the cortical layers therefrom, characterized in that it comprises a final step of:
   - separating said cortical layers from the rice by sieving.

2. A process according to claim 1, characterized in that said rubbing of the grains against an abrasive surface is put into practice by a first polishing machine (1) comprising a rotating member (2) coated with an abrasive material and a fixed casing (3) disposed externally of said rotating member (2), said fixed casing (3) and rotating member (2) defining a gap between them for passage of the semiraw rice, and in that said rubbing of the grains against one another is carried out by a second polishing machine (4) of the type comprising at least one helix (5) having a vertical axis and a substantially ovoidal vessel (6) adapted to hold the rice, said helix (5) rotating within said ovoidal vessel (6).

3. A process according to claim 1, characterized in that said step in which the surface-cut grains are submitted to mutual rubbing is achieved by means of at least two distinct half-steps carried out in respective spiral polishing machines (4).

4. A process according to claim 3, characterized in that in the first half-step a helix (5) is used that has greater surface roughness that the helix (5) used in the second half-step.

Patentansprüche

1. Verfahren zur Raffination von halbrohem Reis,

umfassend die folgenden Arbeitsschritte:

- Ausführung von Ritzen an der Oberfläche durch Reibung der Reiskörner gegen eine Reibfläche,
- Unterziehen der an der Oberfläche eingeritzten Reiskörner einer gegenseitigen Reibung zur Abtragung der Rindschichten,
  dadurch gekennzeichnet, daß es den Endarbeitsschritt des:
- Trennens durch Absieben der Rindschichten vom Reis umfaßt.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß die Reibung der Reiskörner gegen die Reibfläche durch eine erste Bleichvorrichtung (1) ausgeführt wird, die ein Drehorgan (2), das mit Reibmaterial verkleidet ist, und ein feststehendes Gehäuse (3) umfaßt, das außerhalb des Drehorgans (2) angeordnet ist, wobei das feststehende Gehäuse (3) und das Drehorgan (2) zwischen sich einen Zwischenraum für den Durchgang des halbrohen Reises festlegen, und dadurch gekennzeichnet, daß die gegenseitige Reibung der Reiskörner durch eine zweite Bleichvorrichtung (4) durchgeführt wird, die mindestens eine Schraube (5) mit vertikaler Achse und ein im wesentlichen eiförmiges, den Reis enthaltendes Gefäß (6) umfaßt, wobei die Schraube (5) innerhalb des eiförmigen Gefäßes (6) umläuft.

3. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß der Arbeitsschritt, bei dem die an der Oberfläche eingeritzten Reiskörner der gegenseitigen Reibung ausgesetzt sind, durch mindestens zwei unterschiedliche Halbarbeitsschritten erhalten wird, die in jeweiligen Schraubenbleichvorrichtungen (4) erfolgen.

4. Verfahren nach Anspruch 3, dadurch gekennzeichnet, daß beim ersten Halbarbeitsschritt eine Schraube (5) verwendet wird, die eine größere Oberflächenrauhheit aufweist, als die beim zweiten Halbarbeitsschritt verwendete Schraube (5).

Revendications

1. Procédé de raffinage pour riz semi-cru, comprenant les étapes suivantes:

- effectuer des entailles ou incisions superficielles sur les grains de riz semi-cru par frottement contre une surface abrasive,
- soumettre les grains pourvus des incisions superficielles à un frottement réciproque destine a enlever les couches corticales,
  caractérise en ce qu'il comporte une étape finale de:
- séparer par tamisage lesdites couches corticales du riz.

2. Procédé selon la revendication 1, caractérisé en ce que ledit frottement des grains contre une surface abrasive est réalise par une première machine de blanchissage (1) comprenant un organe rotatif (2) revêtu d'une matière abrasive et une enveloppe fixe (3) disposée a l'extérieur dudit organe rotatif (2), ladite enveloppe fixe (3) et ledit organe rotatif (2) définissant entre eux un espace vide pour le passage du riz semi-cru, et en ce que ledit frottement réciproque des grains est effectué par une deuxième machine de blanchissage (4) du type comprenant au moins une hélice (5) à axe vertical et un récipient sensiblement ovoïdal (6) adapté a contenir le riz, ladite hélice (5) tournant à l'intérieur dudit récipient ovoïdal (6).

3. Procédé selon la revendication 1, caractérisé en ce que ladite étape dans laquelle les grains pouvus d'incisions superficielles sont soumis à frottement réciproque est obtenue par au moins deux demi-étapes distinctes réalisées dans des machines respectives de blanchissage du type à hélice (4).

4. Procédé selon la revendication 3, caractérisé en ce que dans la première demi-étape on utilise une hélice (5) ayant une rugosité de surface plus marquée que celle de l'hélice (5) employée dans la seconde demi-étape.

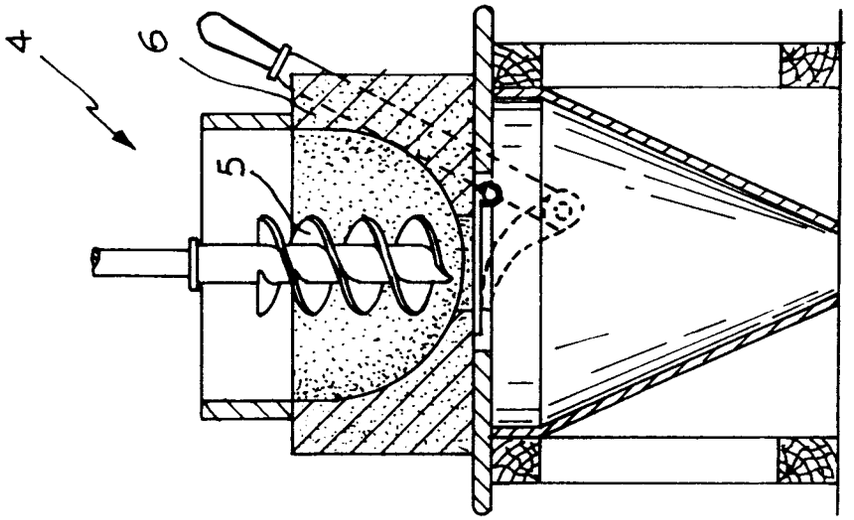

FIG 3

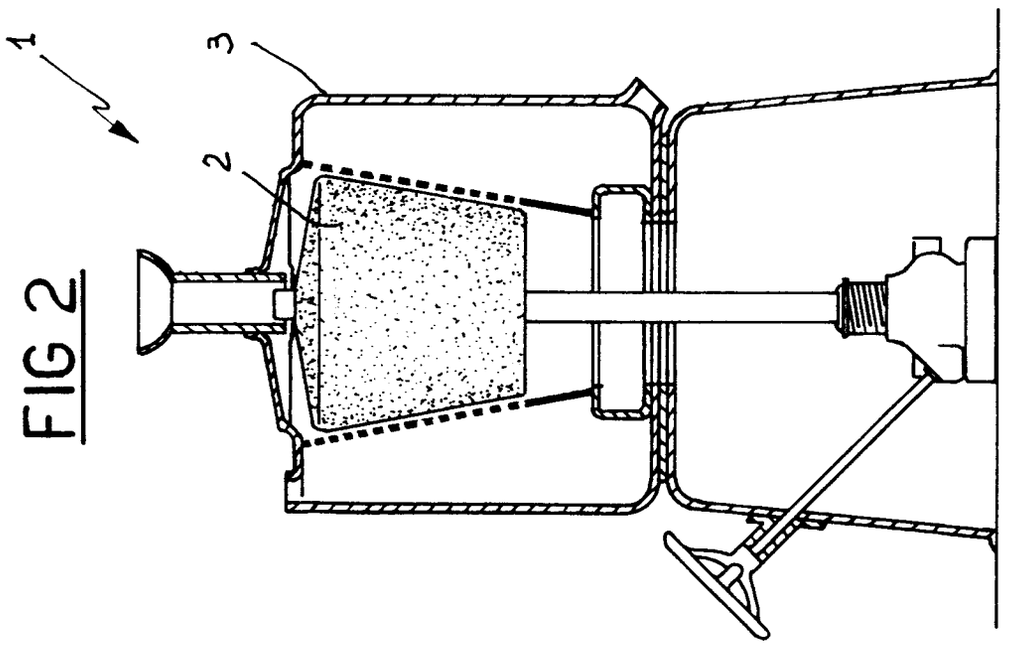

FIG 2

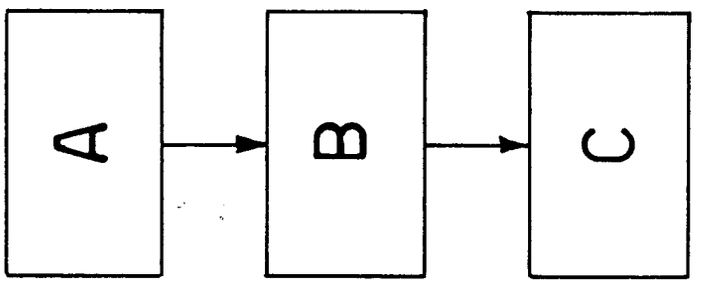

FIG 1