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(54) Titre : PROCÉDE PERMETTANT DE DECOUPER DES PRODUITS ALIMENTAIRES EN TRANCHES
(54) Title: A METHOD FOR THE SLICING OF FOOD PRODUCTS

(57) **Abrégé/Abstract:**

The invention relates to a method for classifying portions in which the cut surfaces of the slices to be removed from a product are detected by an optoelectronic unit, and the images of cut surfaces are evaluated with regard to the inner structure of the product. Slices of the product which have identical inner structures within predeterminable tolerance limits are combined to form portions of a defined grade.





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(54) Title: METHOD FOR SLICING FOODSTUFF PRODUCTS (54) Bezeichnung: VERFAHREN ZUM AUFSCHNEIDEN VON LEBENSMITTELPRODUKTEN (57) Abstract The invention relates to a method for classifying portions in which the cut surfaces of the slices to be removed from a product are detected by an optoelectronic unit, and the images of cut surfaces are evaluated with regard to the inner structure of the product. Slices of the product which have identical inner structures within predeterminable tolerance limits are combined to form portions of a defined grade. (57) Zusammenfassung Es wird ein Verfahren zur Portionsklassifizierung beschrieben, bei dem die Schnittflächen der jeweils von einem Produkt abzutrennenden Scheiben mittels einer optoelektronischen Einheit erfasst werden und eine Auswertung der Schnittflächenbilder hinsichtlich der Produkt-Innenstruktur erfolgt, wobei Produktscheiben mit innerhalb vorgegebbarer Toleranzgrenzen gleicher Innenstruktur zu Portionen einer bestimmten Klasse zusammengefasst werden.		

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A method for the slicing of food products

The invention relates to a method for the slicing of food products having a non-uniform inner structure in accordance with the preamble of claim 1.

When slicing food products, it is not only important to achieve portions which are of as constant a weight as possible and which consist of shingled or stacked slices, but it is frequently also desired to ensure that the inner structure of the product slices within the individual portions, for example the fat portion and the lean portion in sausage slices or ham slices, is as equal as possible. Portions with an inner structure of the same kind do not just produce an optimum appearance, but also result in defined values, that is, classifications are possible which also allow different pricings and enable a differentiation between portions of a higher value and portions of a lower value.

This so-called grading of portions has previously been carried out by a manual sorting of portions produced in the slicing of products, with this grading or classification only being able to be carried out very roughly by persons due to the speed of the portion formation and due to the fact that, in a finished stacked portion, only the topmost slice is visible and, with a shingled portion, only regions of the slices are visible. The required labor effort is moreover unwanted and uneconomical.

A method having the features of the preamble of claim 1 is known from EP-A-0 449 512.

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It is the object of the invention to provide a method for the slicing of food products in a manner such that an automatic classification or an automatic grading can be achieved and with it being ensured, even at high cutting speeds, that the deviations in the inner structure of the individual slices of a portion always lie in a defined, pre-settable tolerance range and that thus a very differentiated classification can be ensured.

This object is satisfied in accordance with the invention by the features set forth in the characterizing part of claim 1.

The respective portions of different components relating to the surface are preferably detected with respect to the product inner structure, with the meat portions or the lean portions and the fat portions, for example, being able to be selected as the components.

Since the proportions of different components can also have different effects on the quality or value of the respective product, different tolerance limits are also preferably pre-set for different components in accordance with the.

The respective slice thickness can also be taken into the weighting factors since the slice thickness is changed within a portion in a number of slicing procedures with respect to the achievement of portions of constant weight.

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If the individually formed portions are associated with specific grades, then these graded portions formed successively, optionally in an irregular order, can be electronically marked such that the corresponding marking or characterizing can take place in a simple manner in the packaging of the respective portions.

As a rule, portions of at least one specific grade are formed from a certain product and product slices outside the pre-set tolerance range, or the pre-set tolerance ranges, are sorted out or led away, which can be done by a corresponding control of the conveying means associated with the product formation region or can, for example, take place by pivoting a conveying unit into the stream of formed slices.

When a minimum size of the surface of the respective product slice is not reached, this can also be used as a further sorting criterion for the formed slices.

A conveyor system is preferably associated with the portion forming region provided at the cutting station by means of which its product slices belonging to a specific grade, or part portions formed from these product slices, can alternately be moved between the product forming region and individual parking positions and can be transported away after completion of the respective portion. Appropriate blank cuts can be carried out in order to have sufficient time available for the moving operations in each case, also with fast-running slicing procedures.

Patentansprüche

1. Verfahren zum Aufschneiden von Lebensmittelprodukten mit ungleichmäßiger Innenstruktur, wie z.B. Wurst, Schinken u. dgl., bei dem die Produkte in Scheiben geschnitten und geschindelte Portionen oder Stapelportionen gebildet und mittels eines Fördersystems aus dem Aufschneidebereich abtransportiert werden,
dadurch **g e k e n n z e i c h n e t** ,
daß die Schnittflächen der jeweils vom Produkt abzutrennenden Scheiben mittels einer optoelektronischen Einheit erfaßt werden und eine Auswertung der Schnittflächen bzw. der die Schnittflächen repräsentierenden Signale hinsichtlich der Produkt-Innenstruktur erfolgt, wobei Produktscheiben mit innerhalb vorgegebbarer Toleranzgrenzen gleicher Innenstruktur zu Portionen einer bestimmten Klasse zusammengefaßt werden.
2. Verfahren nach Anspruch 1,
dadurch **g e k e n n z e i c h n e t** ,
daß hinsichtlich der Produkt-Innenstruktur die auf die Fläche bezogenen jeweiligen Anteile von unterschiedlichen Bestandteilen erfaßt und bewertet werden.
3. Verfahren nach Anspruch 2,
dadurch **g e k e n n z e i c h n e t** ,
daß als unterschiedliche Bestandteile Fleisch- bzw. Mageranteile und Fettanteile erfaßt werden.

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4. A method in accordance with claim 2, characterized in that color distributions are detected with respect to the product inner structure.
5. A method in accordance with any one of the preceding claims, characterized in that different tolerance limits are pre-set for different components.
6. A method in accordance with any one of the preceding claims, characterized in that weighting factors are provided in dependence on the respective slice thickness.
7. A method in accordance with any one of the preceding claims, characterized in that the portions associated with specific grades are electronically marked portion-wise.
8. A method in accordance with any one of the preceding claims, characterized in that conveyor means are associated with the portion forming region provided at the cutting station by means of which product slices belonging to a specific grade, or part portions formed from these product slices, can alternately be moved between the product forming region and parking positions and can be transported away after completion of the respective portion.

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9. A method in accordance with any one of the preceding claims, characterized in that portions of at least one specific grade are formed from a product and product slices outside the pre-set tolerance range, or the pre-set tolerance ranges, are sorted out and led away.
10. A method in accordance with claim 9, characterized in that when a minimum size of the surface of the respective product slice is not reached, this is used as a further sorting criterion.