Product Characteristics of West African cashew nut kernels

Cashew nut kernels are produced by shelling raw cashew nuts (RCN), which grow at the end of cashew apples. Cashew nut kernels are primarily judged on their size, colour and moisture content. Whole cashew nut kernels are the standard, as broken kernels are seen as a quality deterioration. These characteristics form the basis of cashew nut kernel grades. Whole kernels of an ivory colour represent the highest quality grade and the larger the kernels, the higher the price.

Product description

The cashew tree (Anacardium occidentale) is the source of the cashew nut and apple. It is a tropical, drought-resistant evergreen tree, which grows up to 12-14 metres.

Cashew trees start producing cashew apples in the third or fourth year. At favourable conditions, they reach their mature yield by the seventh year. Average yield of a mature tree is between 7-11 kg of nuts per year, with most trees producing nuts for 15-20 years. However, according to industry sources, yields in West Africa are much lower.

The trees produce fruits, called cashew apples, of which the fruit pulp can be used to produce (fruit) drinks or liqueur. At the end of the fruit grows a kidney-shaped ovary. This is the raw cashew nut, which has a hard double shell that is difficult to crack. In West Africa, cashew nuts are cooked in steam to soften the shell, after which the shells are separated from the nut kernel inside. These kernels are graded and sold as ‘cashew nuts’ on international markets. The focus of this Tailored Intelligence study is on shelled kernels, referred to as cashew nut kernels. In-shell cashew nut kernels are referred to as raw cashew nuts (RCN).

The outturn of cashew nut kernels is equal to the amount of usable kernels after shelling the cashew nuts. Kernel outturn ratio (KOR) is measured as the weight of kernels in lbs per bag of cashew nuts (80 kg or 176 lbs). For example, a KOR of 48 means that there are 48 lbs (2.8 kg) of useable cashew nut kernels in a bag of 176 lbs (80 kg). Generally, outturn ranges between 20 and 24% (Red River Foods, 2011), but can be much higher as well.

Classification codes for cashew nut kernels

- Harmonised System (HS) codes: within the EU / EFTA, the following HS codes for cashews exist:
  - 0801.31: Fresh or dried cashew nuts, in shell (RCN)
  - 0801.32: Fresh or dried cashew nuts, shelled (cashew nut kernel)
Quality characteristics

Raw cashew nuts
Quality of raw cashew nuts is determined by processing outturn, size of the nut, incidence of insect or fungal damage and moisture levels. Additionally, the ease with which cashew nuts can be shelled contributes to quality as well, difficult to shell cashew nuts lead to a higher level of nut kernel breakage. According to industry sources, cashew nuts from Benin are easier to shell than cashew nuts from Nigeria.

Cashew nut kernels
Quality of cashew nut kernels is determined by taste, moisture content and specific quality grades, which are influenced by size and colour. It is also crucial that the maximum levels of mycotoxins (e.g. aflatoxins) are not surpassed, which can be a cause for border rejections (see module ‘Compliance with European buyer requirements’). Moisture content in cashew nut kernels needs to be between 4 and 5%. Cashew nut kernels with a lower moisture content often causes breakage.

Cashew nut kernels are graded according to their quality and allowable quality defects. Please note that broken or scorched kernels are not necessarily seen as a quality defect if they conform to a recognised grade. Below, international grading systems for cashew nut kernels are described, followed by the classifications on form, colour, sizing and quality defects.

International grading standards
Various grading standards exist for classifying cashew nut kernels. Additionally, buyers have their own specifications. International grading standards include:
- Association of Food Industries (AFI)
- United Nations Economic Commission for Europe (UNECE)
- Cashew Export Promotion Council of India (CEPC)

Of these grading standards, the AFI system is the most widely accepted. Differences exist between these grading systems, but these are limited (a comparison between different standards can be found on the website of Cashewinfo.com). The main difference for the UNECE standard is that cashew nut kernels are categorised into three classes: ‘Extra’ Class, Class I and Class II, instead of those listed in Table 1. This corresponds with classifications of other food products, such as fresh fruits. The ‘Extra’ Class corresponds to First Quality Fancy, Class I to Second Quality Scorched, with the other grades mentioned in Table 1 falling under Class II. Cashew nut kernels in all classes need to follow similar minimum requirements as in the AFI grading system when it concerns serious damages.

Refer to African Cashew Alliance (ACA) Cashew Grades document for more details and photos of the various cashew nut kernel grades.

Grading
Cashew nut kernels are classified according to their size, form and colour as discussed in the sections above. Various international grading systems exist, based on similarities of the following:

Table 1  Cashew kernel grades

<table>
<thead>
<tr>
<th>Name</th>
<th>Whole / Broken</th>
<th>Colour</th>
<th>Allowed defects</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Quality Fancy</td>
<td>Whole</td>
<td>Uniform; white, light yellow or pale ivory</td>
<td>N/A</td>
</tr>
<tr>
<td>Second Quality Scorched</td>
<td>Whole</td>
<td>Scorched (yellow, light brown/ivory/ash-grey, deep ivory)</td>
<td>Slightly scorched</td>
</tr>
</tbody>
</table>

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Whole or broken

Regarding the form of cashew nut kernels, these can be whole or broken. The main classifications of kernel forms are:

- **Whole (W):** cashew nut kernels that have the characteristic shape of a cashew kernel and not more than 1/8 of the kernel is broken off.
- **Butts (B):** cashew nut kernels that have been broken crosswise and are between 3/8 and 7/8 of a whole kernel. The cotyledons, the tips of the cashew nut kernels, are still naturally attached.
- **Splits (S):** half cashew nut kernels that have been split lengthwise, with no more than 1/8 of the cotyledon broken off.
- **Pieces (P):** cashew nut kernels that are broken in pieces smaller than 3/8 of a whole kernel. Pieces are further categorised on their size into mixed and small pieces and granules.

Colour

In terms of colour, four categories of cashew nut kernels are specified: white, lightly blemished, scorched and deeply scorched. White cashew nut kernels range from white to pale ivory or light ash grey. They need to be free from black or brown spots. Lightly blemished cashew nut kernels have a light brown, ivory or ash-grey colour or are deep ivory. They may have some light brown speckles or blemishes on the surface. Scorched cashew nut kernels are darker or discoloured, which can be a result of overheating in the drying process. Deeply scorched cashew nut kernels are of a deep-brown colour and may have black speckles and blemishes on the surface.

The degree of discolouring is important in the grading of cashew nut kernels, as a higher degree of discoloration decreases the quality and thus value of the kernel. Consequently, white kernels have the highest quality and commercial value on the European market. Moreover, the European cashew market is almost exclusively a market for white or pale ivory coloured cashew nut kernels.

Sizing for cashew nut kernels

Along with their form and colour, sizes of cashew nut kernels are an important characteristic of quality and value. The benchmark grade is WW320; ivory, whole cashew nut kernels that count 300-320 kernels per pound (Table 2). Cashew nut kernels of this size have the highest yield in processing and are most suitable for use in snack foods, still the main application in Europe.

According to the grading system by the Association of Food Industries (AFI), which is most widely accepted in the industry, sizing of cashew nut kernels is compulsory in first quality cashews, but optional for other whole grades. However, in reality most scorched cashew nut kernels are graded as well. In sizing the whole cashew nut kernels, the following size tolerances are used:
• In whole kernels, those of a lower size grade do not exceed 10% of the total by weight.
• In whole kernels, broken kernels or pieces do not exceed 10% of the total by weight.
• In butts and splits, pieces do not exceed 10% of the total by weight.
• In pieces, quantity of the next lower size grade does not exceed 5% of the total by weight.

Table 2  Cashew kernel sizes and count per kg/pound

<table>
<thead>
<tr>
<th>Size Designation</th>
<th>Count per kg</th>
<th>Count per pound (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>265-395</td>
<td>120-180</td>
</tr>
<tr>
<td>210</td>
<td>395-465</td>
<td>200-210</td>
</tr>
<tr>
<td>240</td>
<td>485-530</td>
<td>220-240</td>
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<tr>
<td>280</td>
<td>575-620</td>
<td>260-280</td>
</tr>
<tr>
<td>320</td>
<td>660-705</td>
<td>300-320</td>
</tr>
<tr>
<td>400</td>
<td>770-880</td>
<td>350-400</td>
</tr>
<tr>
<td>450</td>
<td>880-990</td>
<td>400-450</td>
</tr>
<tr>
<td>500</td>
<td>990-1100</td>
<td>450-500</td>
</tr>
</tbody>
</table>

Quality defects

Aside from broken and small-sized kernels, damage to the kernels decreases their quality and commercial value as well. Quality defects can be divided into serious damages and defects that influence the appearance of the kernels. For both whole kernels and pieces, maximum tolerances of serious damage and defects are set, which depend on the overall quality grade of the kernel.

Serious damage to cashew nut kernels includes too high levels of insect damage, mould, rancidity, decay and adhering or foreign matter. Other defects include superficial and intrinsic damage to the kernel, which affect the appearance of the lot. Examples include scorching, blemishes, discolouration, immature or shrivelled kernels, pitted or black spots on kernels, adhering testa, scrapes, flux marks and speckles. Additionally, if you have kernels of a lower grade among your higher-grade kernels, this is seen as a defect as well.

This survey was compiled for CBI by ProFound – Advisers In Development, in collaboration with CBI sector expert James Fitzpatrick.

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