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ROASTING EXPERIMENT OF CASHEW NUT IN TRADITIONAL INDUSTRY

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Abstract

Processing of cashew nut in Indonesia is worked by small industries, that need relative small energy input. The stages of traditional process of cashew nut comprise: drying of cashew, shelling of pericarp, frying without oil, shelling of epidermis, drying and grading.

In this research a roasting experiment of cashew nut were carried out as pre-treatment before shelling activity. This pre-treatment intended to extract the Cashew Nut Shell Liquid (CNSL) content in shell. By this treatment the shell will be brittle and the shelling capacity in traditional process is also increased. This pre-treatment is also increased the whole kernel as indicator of the quality of cashew nut product.

The effect of roasting as pre-treatment on shelling capacity shows that the roasting can increase the shelling capacity. The average of shelling capacity increases more than100 % i.e. from 4,5 kg/hour to 9,5 kg/hour. This treatment is also increase the whole kernel. By the usual shelling the average whole kernel is 62,17 % and by the treatment it found 82,9 % or increased 33,5 %. The colour of the nut product visually is not different by the usual shelling and the treatment.

Technically the roasting activity enables to be applied in traditional processing of cashew nut especially for the small industries.

LITERATURE REVIEW

Cashew nut is the fruit of the cashew tree (*Anacardium occidentale*). The kernel of the nut can be consumed when it has been extracted from the nut. The processing of cashew nut is known broadly from small/traditional industry to highly organized factory.

Generally the processing of cashew nut in Indonesia practiced in traditional scale. This process undergo with small energy input except for the process of drying and shelling.

The cashew nut consist of an outer shell (Epicarp), honey combed structure (Mesocarp), inner shell (Endocarp), Testa and Kernel. The Epicarp is greenish to pinkish brown depending on the degree of dryness. The mesocarp content a natural resin, known commercially as a Cashew Nut Shell Liquid (CNSL). The CNSL is viscous and blister the human skin. The endocarp is hard but brittle. It is protect the kernel from the Natural Resin. The epicarp, mesocarp and endocarp are known as pericarp (Russell, 1969).

The CNSL, which is contented the shell make the process of shelling difficult. The shell is elastic and strong. While the CNSL is irritates to human skin, it's also problematic when the shelling process worked manually.

Within pericarp there is a kernel, which is covered by a thin membrane as known as testa or peel. The colour of testa is pink and has a function to protect the kernel. Kernel is the main product of cashew nut industry. The art of the cashew nut processing is how to extract the kernel from the cashew nut without damage the kernel.

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The step of the traditional cashew nut processes in Indonesia is shown in Figure 2. The shelling is the bottleneck of the whole process. This operation secures the whole productivity and the quality of the kernel. The irregular shape and size is also the constraint of shelling cashew nut. Only the trained operator can shell cashew nut perfectly.

1. Roasting The Cashew Nut

Roasting of cashew nut is one of the unit operations in processing of cashew nut. The process involves heat treatment to extract CNSL from the mesocarp and applied in industrial scale before shelling pericarp.

The extraction of CNSL caused the pericarp brittle and make easy to be broken. Besides of making brittle, it is advantage in exploiting the beneficial CNSL, which can be use as a component of hard board (Abdullah, 1985).

Roasting is conducted by immersing the cashew nut in the hot CNSL. Russel (1969) suggested that the ratio of cashew nut and the CNSL is between 1 : 30 to 1 : 32. Principally, roasting can be conducted by immersed in the heat frying oil, but usually this process more expensive. During roasting process, the CNSL on the roaster will be increase.

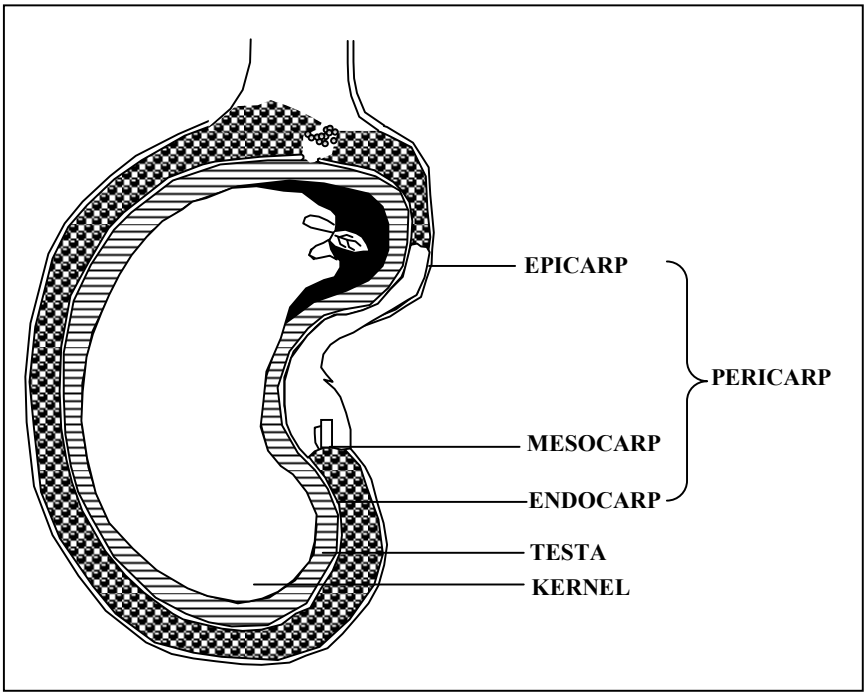

Figure 1. Section of cashew nut (Russel, 1969)

2. The Quality of Kernel

The classification of the kernel quality is based on the percentage of whole kernel, colour and number of kernel per unit

weight. Those three parameters are developed furthermore based on shaped, dryness, etc. Russel (1969) classified the kernel in 24 kinds of grade.

The member per unit of weight is not affected by the process, but affected by the size of cashew nut. The process has effect on unimpaired and the colour of the kernel. If the roasting took place to long, the colour of the kernel would be dark.

3. The Traditional Shelling of Cashew Nut

The shelling process of cashew nut is carried out with a tool named "Kacip". This tool is constructed from wood as under layer and frame, concave knife, and lever. The cashew nut is laid between concave knifes, and raked up at horizontal sign, then the kernel is brought out with big needle.

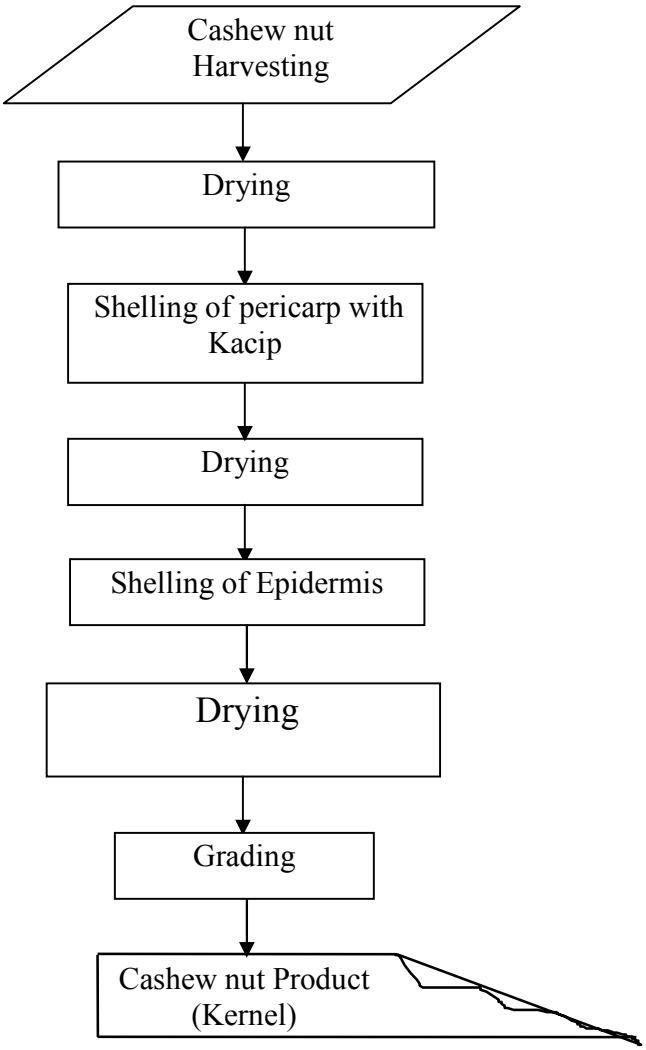

Figure 2. The traditional cashew nut processes (Rakhmadiono, 1991)

OBJECTIVE

The experiment of roasting is carried out to know the effect of roasting of cashew nut as pre treatment on the capacity of traditional shelling process and on the quality of kernel.

METODOLOGY

The experiment is carried out on The Agricultural Product Processing Laboratory, Agricultural Engineering Department, Brawijaya University. The treatment experiment of roasting is to know the effect of roasting to the capacity of traditional shelling and the number of whole nut as indicator of the quality.

The shelling is done by a worker, which works on the traditional cashew nut industry. The worker came from Wonosari, Ngoro, Mojokerto. The shelling is done use the kacip.

In this experiment, the cashew nut is graded in three categories. The big size has length more than 22 mm, the medium size has a length between 18 to 22 mm, and the small size has a length less than 18 mm. The experiment is conducted in 3 treatment; 85 second on 185°C, 95 second on 180°C and 110 second on 170°C. Each treatment is repeated 3 times.

After roasting the cashew nut is drained with hull of rice to separate the CNSL that stick on the surface of cashew nut shell. Next the roasted cashew is shelling by the traditional worker. The capacity of shelling and the percentage of whole nut are observed.

RESULT AND DISCUSSION

The effect of roasting on the traditional shelling capacity is shown in Figure 3. The roasting treatment of the cashew nut shell for all size (big, medium and small), shown significant increases. The shelling capacity with roasting treatment rouse until about 100% from the traditional process capacity (4.5 kg/hour) to 9.5 kg/hour.

The heating of cashew nut until 180°C causes the water in shell changes to steam phase rapidly, and next come out from the cell. The specific volume of water expands and the pressure rises, facilitating the extraction of the CNSL. Furthermore the content of CNSL in the cell decrease rapidly and causes the epicarp brittle. The phenomena cause the shelling of cashew nut faster than usual shelling.

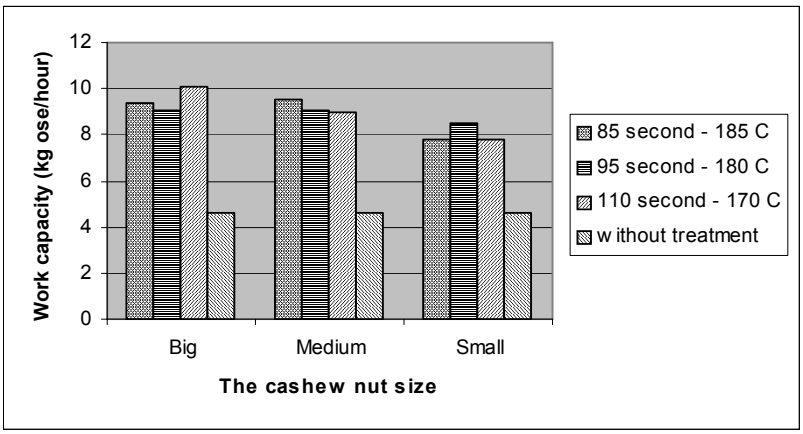

Figure 3. Roasting effect on the cashew nut shell capacity

The effect of temperature and roasting time on the shelling capacity have no significant difference, but the size of cashew nut shows the significant differences. The big size seems easier to be shelled. Russel (1969) suggest that the roasting of cashew nut conducted by the ratio of CNSL and cashew nut 30 : 1 to 50 : 1 with roasting temperature is 180°C and roasting time is 90 minutes. Russel suggests this condition based on observation in cashew nut industries. This recommendation is not different with the experiment.

The shelling capacity of small size is relative low. This case has no relationship with the roasting process. The member of cashew nut per unit mass is greater for the small size, that it need higher frequency to gain the same quantity. Then the shelling capacity decreased following the size of cashew nut. The smaller the cashew nut size, the smaller the shelling capacity.

The effect of roasting on the whole kernel is shown in Figure 4. The roasting treatment is increases the amount of whole ose 31% to 35%. Especially for the roasting with 185°C in 85 second and 180°C in 95 second, can be recommended as treatment for all size. Roasting with 110 second on 170°C is not suitable especially for the smaller size of the cashew nut, because the increasing of the whole only 4% higher than without treatment.

Even though, the colour of kernel in this research can not be shown quantitatively, but as visually the colour of the kernel is not different. The result of the ose that was treated has colour as the control. It shows, that the roasting can increase the quality of the kernel.

Because roasting of the cashew nut can increase the traditional shelling capacity and the quality, this treatment enable to be applied in traditional industries. Technically the CNSL can be found with simple technology i.e. extracting from cashew shell by heat treatment.

The cashew shell is usually used as fuel for the household. The burning of depleted cashew shell results bad smell caused of CNSL oxidation. If the content of the CNSL is decreased, it is burning would smell better and enable to be used in household. It is problematic, that changing their habit is not easy, so to add one unit operation like roasting in traditional scale needs intensive socialization.

On the other hand, the application of roasting in traditional scale, need extra energy input to keep temperature constantly of the CNSL 170-180°C. It needs extra cost; besides that the roasting activity can increase the capacity, quality and comfort ability.

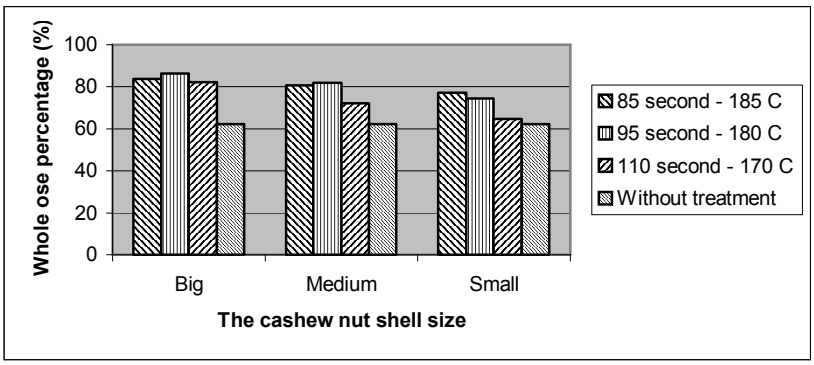

Figure 4. Roasting effect on the whole kernel percentage

CONCLUSION AND SUGGESTION

The main product of the traditional cashew nut processes is cashew kernel, with minimum standard quality based on whole of cashew nut per unit of weight, whole ose percentage, and colour.

The roasting treatment before shelling increases the cashew nut kernel quality and the traditional shelling capacity. The increasing of the cashew nut shelling with roasting treatment on the traditional processes more than 100% from 4.5 kg/hour to 9.5 kg/hour. The whole kernel of cashew nut percentage with roasting treatment increases 33.5%. The colour of the roasting nut product is visually not different. Technically the roasting activity enables to be applied in traditional processing of cashew nut especially for the small industries.

The next experiment can be continued with constructing of roasting machine that appropriate with home industry scale with emphasizing of ergonomic aspect.

REFERENCE

Abdullah, A. 1985. *Jambu mente sebagai sebagai komoditi ekspor yang mempunyai harapan*. Jurnal Penelitian dan Pengembangan Pertanian. Vol. IV. No. 1 : 17-22.

Rakhmadiono,S. 1991. *Laporan kunjungan ke Prosesor mete di Desa Wonosari, Kec. Ngoro, Kab. Mojokerto*. Makalah tidak dipublikasikan. PS. Mekanisasai Pertanian, Universitas Brawijaya

Rakhmadiono,S. 1991. *Perbaikan Pengolahan Mete Rakyat dengan Cara Roasting*. Universitas Brawijaya Malang.

Rakhmadiono,S. 1992. *Prosesing Kacang Mete dan Prosesing Buah Jambu Mete Menjadi beberapa Produk Minuman*. Universitas Brawijaya Malang.

Russel, D.C. 1969. *Cashew Nut Processing*. Food and agriculture Organisation of the United Nation. Rome.

Susilo, B. dan Rakhmadiono, S. 1997. *Roasting untuk memperbaiki proses pengolahan kacang mete tradisional*. Makalah Seminar Pusat Kajian Makanan Tradisional, Lembaga Penelitian Universitas Brawijaya Malang.

Susilo, B. 2000. *Penerapan mesin roasting untuk memperbaiki pengolahan kacang mete tradisional : upaya untuk peningkatan pendapatan pengrajin kacang mete di Desa Mojosari Kabupaten Mojokerto*. Program Penerapan IPTEK, Dirjen Dikti. Jakarta.