What's in a Cashew? Processing of Different Cashew By-Products / Librada Fuertes, DA-PAES

1. Cashew these super nuts belong to the family of Anacardiaceae, which also includes mangoes and pistachios. They are kidney-shaped seeds and are widely cultivated in places that have tropical climates.

2. Cashew (Anacardium occidentale L.) is native to North-Eastern Brazil. Introduced to the west coast of India & East Africa in the 16th century shortly after its discovery in 1578 by the Portuguese travelers mainly for checking soil erosion in the coastal areas. Now planted in many tropical countries particularly in the coastal areas of East Africa, Tanzania, Kenya, Phils. Mozambique, Uganda, Ivory coast, Nigeria, Angola, etc. Dispersal of the species to South East Asia appears to have been carried out by birds, bats, monkeys and human agents. Introduced in El Nido, Palawan by Mr. Restituto Acosta in 1940’s

3. Common Name: Cashew Scientific Name: Anacardium occidentale L. Local Name: (s) Tagalog- Kasoy

4. Cashew is the leading nut crop after after almond in the world and with a high market export potential. It is a drought resistant crop, can grow successfully in areas with distinct wet and dry season. Asexually propagated cashew stars to bear fruits 2-3 years after transplanting and full bearing starts on the 7th year with productive years of 50 years or even higher when applied with proper cultural management practices. It is known for various nutritional, medicinal and industrial uses

5. THE CASHEW THREE

6. PARTS OF CASHEW FRUIT The fleshy soft portion of the fruit (Pseudocarp) The outer covering of the Raw cashew nut Edible Portion of the RCN Thin layer that cover the kernel

8. Medicinal Uses: X Juice – cure stomach disorder, vomiting and gargles for sore throat, toothache, fever, muscular pain, irregular bowel movement, blood pressure and insomnia X Kernel – rich source of fat(46%), protein (18%) & good source of calcium, phosphorus & iron, zinc and selenium. Contain significant amounts of phytochemicals with antioxidant properties. Researches shown that chemicals in the nuts kill gram + bacteria that causes tooth decay, acne and tuberculosis. X CNSL – used to remove warts, corm, and can cure cracks in the soles of the feet.

9. Young leaves – can cure diarrhea, dysentery and hemorrhoids X Matured leaves – when crushed are used as poultices for burns and skin ailments, X Roots – contains deworming properties X Bark – chewed to cure sore gums and toothache X Apple – contain high ascorbic acid content at (262mg/100ml), 5 times higher than citrus, can cure rheumatism & neurological pain, scurvy, source of energy

10. CASHEW VARIETIES Genebank collection of 221 cultivars started since 1977 at DA ROS – PAES Puerto Princesa City in Palawan Selected 21 cultivars in 1988 out of 221 and, Selected 6 promising cultivars in 1994 such as MITRA (NSIC Approved), FERNANDEZ, RECTO, GONZALES, CALIWAG and ELEAZAR

11. CHARACTERISTICS Apple Weight - 146.39 g Nut Weight - 13.43 g Kernel Weight - 3.72 g Kernel Recovery - 27.84% TSS - 13.08% Ave. Nut Production/tree (7 year-old) - 9.67 kgs. Color of Apple - Orange MITRA VARIETY CHARACTERISTICS Apple Weight - 129.0 g Nut Weight - 12.78 g Kernel Weight - 3.55 g Kernel Recovery - 27.77% TSS - 15.84% Ave. Nut Production/Tree (7-year Old) - 7.38 kgs. Color of apple - Orange RECTO VARIETY

12. FERNANDEZ VARIETY CALIWAG VARIETY CHARACTERISTICS Apple Weight - 129.0 g Nut Weight - 12.78 g Kernel Weight - 3.55 g Kernel Recovery - 27.77% TSS - 15.84% Ave. Nut Production/Tree (7-year old) - 6.90 kgs. Color of Apple - Orange CHARACTERISTICS Apple Weight - 79.48 g Nut Weight - 11.71 g Kernel Weight - 3.10 g Kernel Recovery - 26.47% TSS - 13.88% Ave. Nut Production/Tree (7-year old) - 7.02 kgs. Color of apple - Yellow Orange

13. GONZALES VARIETY ELEAZAR VARIETY CHARACTERISTICS Apple Weight - 70.22 g Nut Weight - 13.43 g Kernel Weight - 2.96 g Kernel Recovery - 29.22% TSS - 12.36% Ave. Nut Production/Tree (7-year old) - 7.93 kgs. Color of Apple - Red Orange CHARACTERISTICS Apple Weight - 81.77 g Nut Weight - 10.05 g Kernel Weight - 2.55 g Kernel Recovery - 25.37% TSS - 14.06% Ave. Nut Production/Tree (7-year old) - 6.98 kgs. Color of apple - Orange

14. Cultivar Apple Weight (g) Nut Weight (g) Kernel Weight (g) Ave. nut prod’n/tree (kg) Mitra 146.39 13.43 3.74 9.67 Recto 129.00 12.70 3.55 7.38 Fernandez 117.48 11.93 2.94 6.90 Gonzales 70.22 13.43 2.96 7.93 Eleazar 81.77 10.05 2.55 6.98 Caliwag 79.48 11.71 2.55 7.02 SIX PROMISING CASHEW CULTIVARS

15. PROVINCE PLANTING HARVESTING Palawan May- October January- June Occidental Mindoro May - October March – May PLANTING AND HARVESTING SCHEDULES

17. REGIONAL PRODUCTION, AREA AND YIELD, 2011 REGION AREA Harvested (HA) VOLUME OF PRODUCTION (MT) YIELD (MT/HA) MIMAROPA 25,335 125,080.1 4.9 Central Luzon 1,522 6,821.12 4.5 Ilocos Region 472.2 683.74 1.4 Western Visayas 434 562.77 1.3 Davao Region 220 49.46 .2 Central Visayas 20 47.31 2.3 Cagayan Valley 29 45.2 1.6 CALABARZON 32 43.51 1.4 Northern Mindanao 54 28.19 .5 SOCCSKARGEN 11 10.9 .9 Source: Bureau of Agricultural Statistics (BAS)

18. Percentage share of MIMAROPA in the National Volume of Production of cashew, 2011 Source: Bureau of Agricultural Statistics (BAS)

19. Source: Palawan Local Traders RETAILER-AGENTS Raw nut – Php35-50/kg* 60-70/kg** LOCAL PROCESSORS Split-Php 120-200/kg* 220-300/kg** ANTIPOL CITY PROCESSORS Raw nut-Php 40-55/kg* Split- 140-245/kg** WHOLESALERS EXPORT FARMER Raw nut-Php 15-35/kg* 35-50/kg** CONSUMER Split – Php 280-300/kg* 350-500/kg** Whole nut-350-600/kg* 480-650/kg ** Raw nut, fresh & dried Php 57.50/kg or US $ 1.15/kg Processed/Preserve Php 209.50/kg or US $ 4.19/kg Supply chain for cashew nut (raw and processed) Yr. 2011 Note: *Peak season (Apr - Jun) **Lean season (Jul – Dec)


21. SWOT ANALYSIS STRENGTHS WEAKNESSES OPPORTUNITIES THREATS

Leading nut crop in the Phils. with high export potential Occurrence of pests and diseases due to heavy rains during flowering and fruiting stage Increasing demand for cashew products due to increasing influx of tourists especially in Palawan Political instability Adapted in different soil types even on marginal soils Inadequate postharvest facilities; low quality of labeling and packaging materials used Nutritional, medicinal and industrial benefits of cashew Unstable price Abundance of unproductive old trees Market potential (local and foreign) Production and post production technologies Inclusion of Palawan in BIMP EAGA Cooperation Available expansion areas for production in Palawan, Occ. Mindoro and Romblon Unorganized and weak organization of cashew growers and processors Potential processing of cashew by products (CNSL)

22. • Cashew growers and processors • RFU • LGUs • NGOs • Land Bank of the Philippines • QUEDANCOR • Academe – WPU, UPLB, PSU • DOST (FRDI) • DENR • PHILMECH • CDA • Traders-wholesalers and retailers • DTI • DOLE • BAR • PCARRD •Investors KEY PLAYERS

23. Uses of Leaves 1. Maybe eaten raw or tossed into salads
24. Medicinal cure for burns, skin ailments and stomach disorders,
25. Uses of Cashew Shell The shell contains Cashew Nut Shell Liquid or (CNSL) with many industrial uses. Collected CNSL in plastic canisters
26. Other uses of Shell: a. It has anti – fungal property – use for warts removal b. Novelty item (key chain, curtain, lampshade c. Can be used as indigenous decor
28. Other uses of Cashew kernel - May be used as ingredient in many food preparations Beef curry with cashew nuts Baked lasagna with cashew nuts as toppings Thai Soup Cashew Nuts con chili
29. **Why do we need to process cashew?**
   1. To maximize the utilization of the fruit
   2. To increase income of cashew farmers through value adding
   3. For new enterprise development
   4. To contribute to food supply
   5. To encourage farmers to produce more cashew plants.

30. **What is food processing?**
   - Is the transformation of raw ingredients into food, or into other forms/products and uses these to produce attractive, marketable and often long shelf-life food products.

31. **It ensures the availability of food throughout the year.** It ensures the availability of food even at distant or remote places. It makes the food more palatable. Modern supermarkets would not exist without modern food processing techniques, and long voyages would not be possible. “The primary aim of a food company is to make money and stay in business.”

32. **Uses of Cashew Apple**
   - Flow Chart for Standard Apple Processing:
     - Picking (pick only the fully – riped ones)
     - Washing (free flowing water)
     - Sorting (remove the damaged ones)
     - Slicing (2-3 slices depending on the size)
     - Soaking (in sugar, at least 2 soakings)

33. **Value Adding through processing:**
   - Assumptions:
     a. Production of Cashew tree/ha. = 9 kgs. Nuts/tree x 156 trees/ha = 1,404 kgs nuts X P25/kg. = P35,100.00 (gross profit x ha. From RCN)
     b. If processing will be done: RCN with apple = 1,404 kgs nuts + 12,636 kgs apple = 14,040 kgs x 10 = P140,400.00

34. **Cost and return analysis for cashew wine**
   - Quantity Unit Item Description Unit cost Total amount 100 Kls. Cashew Apple 10 P1,000.00 10 Kls. White sugar 50 500.00 350 grams Yeast 64 64.00 6 Pcs. Egg 6 36.00 80 Bottle Wine bottle 375 ml 26 2,080.00 40 Pcs. Seal and cap 18 720.00 1 Pack Cotton 10 10.00 ½ Kilo Lpg 41 41.00 TOTAL P4,451.00
   - Material cost P4,451.00 Labor cost 600 Total production cost P5,051.00 Total production yield 80 bottle (375ml) Production cost per bottle P63.13 Selling price per bottle 120 Gross sale 9,600 Net Profit 4,549.00 Return on investment 90.06% / 61% (sexy bottle)

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37. **Additional material cost**
   - Quantity Unit Item Description Unit cost Total amount 115 pcs CP#10 plastic container 4.25 488.75 2 kg LPG 81 162 116 pc Plastic seal 0.5 58 Production label 35 210 TOTAL 918.75
   - Material cost (P918.75+P307.57) P1,226.32 Labor cost (3 days) 600 Total production cost (TPC) 1,826.32 Total production yield 17.5 kg (115 pcs @ 150 grams per pack)
   - Production cost per container 15.88 (P1826.32/115 packs = P15.88 Selling price per container 30 Gross sale (GS) P 3,450 Net Income (GS - TPC) P3,450.00- 1,826.32 1,623.68 Return on investment 88.90%

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39. **Material cost P2,613.00 Labor cost P600.00 Total production cost (TPC) P3,213.00 Total yield 63 bottles (750ml) Production cost per bottle 80.32 Selling price per bottle 120.00 Gross sale (GS) 7,632.00 Net Profit (GS - TPC) P7,632.00- P3,213.00 P4,419.00 Return on investment 86.7%**

40. **COST AND RETURN FOR CASHEW NUT BUTTER**
   - Quantity Unit Item Description Unit cost Total amount 50 Kls. Nuts 240.00 12,000.00 20 Kls. White sugar 50.00 1,000.00 35 Bottle Oil 28.00 980.00 25 pack Butter Milk 52.00 1,300.00 330 Bottle Container with cap 9.46 3,121.80 330 Pcs. Seal
41. **Material Cost** 25,044.80  
**Labor Cost** 600.00  
**Total Production Cost (TPC)** 25,644.00  
**Total Yield** (330 bottles (250 g/bottle))  
**Production Cost per bottle** 77.71  
**Selling price per bottle** 125.00  
**Gross Sale (GS)** 41,250.00  
**Net Income (GS-TPC)** P41,250.00 - 25,644.00 = P15,606.00

42. **Cost and return for Cashew jelly**  
**Quantity**  
**Item Description**  
**Unit cost**  
**Total amount**  
100 Kg. Cashew Apple  
10 1000 48 Kg. white sugar  
50 2400 17 Gram citric acid  
10 170 54.4 Gram Potassium sorbate  
10 544 2 packs gelatine  
12 24 250 Bottles bottles/cap  
16.45 4112.5 250 pcs label  
2.5 625 250 pcs plastic seal  
1 250 1 Kg. lpg P81 per kg.  
81 81 TOTAL  
9,206.5

43. **Material cost** 9,206.50  
**Labor cost** 2 head (1 day) 600.00  
**Total production cost (TPC)** 9,806.50  
**Total production yield**  
**Production cost per container** (P9806.5/250 container = P39.22)  
39.22  
**Selling price per container** 100  
**Gross sale (GS)** 25,000.00  
**Gross profit (GS-TPC)** P3,450.00 - 1,826.32 = 15,193.50  
**Return on investment** 154.93%

44. **Material cost** 7,806.15  
**Labor cost** 2 head (1 day) 600.00  
**Total production cost (TPC)** 8,406.15  
**Total production yield**  
**Production cost per container** (P9806.5/305 container = P31.48)  
31.48  
**Selling price per container** 75.00  
**Gross sale (GS)** 22,875.00  
**Gross profit (GS-TPC)** P30,500.00 - 9,603.75 = 14,468.85  
**Return on investment** 172.12%

45. **SOAP MAKING**  
**Ingredients:** Caustic soda = 300 g  
Oil = 5 bots. (350 ml)  
Cashew juice = 750 ml  
Color and essence (optional)  
**Procedure:** Mix caustic soda and juice (slowly)  
Mix with oil for 1 hour until mixture becomes thick.  
Yields 25 soaps 83 grams each.

46. **MACHINERY & EQUIPMENTS**  
- 2 units “kawa” biggest  
- 2 units hose and regulator  
- 2 units LPG Stove (one burner)  
- 2 units filled LPG Tank  
- 1 unit casio calculator (5-30)  
- Oven  
- Refrigerators  
- Pet jars/carboys  
- Filtering machines

47. **Problems in Cashew Processing Industry**  
1. Inferior packaging materials  
2. No BFAD/Halal  
3. No nutrition facts  
4. Inferior quality since materials being used are not the standard ones  
5. Insufficient information on GMP or Good Manufacturing Practices.

48. **Efforts being done to support the processing industry:**  
1. Attendance to trade exhibits/trade fairs, for product promotion and marketing (National and International).  
2. Rehabilitation/Repair of Building for Toll packaging once with BFAD  
3. Upgrading of materials for wine making  
4. Training on Dry Wine Making  
5. Train potential entrepreneurs on Cashew Processing  
6. The Winning Booth: DA-RFU (MIMAROPA) 2nd Placer in Best Booth Competition during the DA-BAR 10th Anniversary Celebration, SM Megamall, Mandaluyong City – August 8-10, 2014
56. Continuous product improvement/development 2nd Placer – Most Innovative Product during the DA-BAR 27th Anniversary last August 08-10, 2014 With the evaluators… Awarding ceremony…

57. 2nd Place during the DA-BAR Booth Competition – August 7-9, 2015

58. Cashew Products on display at SM Megamall during the Product Exhibit

59. Training On Cake Decoration @Asturias Hotel, Palawan

60. Choco moist cake with Prunes and Fondant cake with Prunes

61. SUPPORT SERVICES NEEDED FROM THE GOVERNMENT Access to credit

Provision of quality planting materials

Provision of postharvest facilities such as Dryer, Oven and decorticator

Other processing equipments

Improve packaging and labelling technology

Market assistance

Farm to Market Road Research on CNSL Extraction and Utilization technology

Conduct of trainings on GAP, HACCP, GMP on Packaging and Labelling

Facilitate processors in BFAD Registration and FNRI Nutritional Analysis

Creation of National Cashew Research Center in Palawan


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