Supplementary Information

Table A. Emerging commercial applications of cashew apple

Cashew apple product	Industrial use	Reference
Cashew apple juice	General: Health drinks (especially as Vitamin C supplement), sports drink, juice, jams, candies, vinegar Alcoholic: Cajuina, Feni, wine Substrate for production of Lactic acid, mannitol and surfactant, production of esters and alcohol	[18,23,43,50-51]
Cashew apple powder	Supplement for biscuit-type cookies	[25]
Cashew apple bagasse	Source of sugars for ethanol production, tannase production	[30,52]
Cashew apple waste	Livestock feed, Vermin composting	[42]

Table B. Tannase produced from cashew apple bagasse with nutrient supplementation and compared with other substrates (Permission taken from CMU J. Nat. Sci, Prommajak et al., 2014 [53])

Raw material & Initial moisture (%)	Microorganism	Nutrient supplementation	Fermentation condition	Tannase activity (U/gds)	Reference
Cashew apple bagasse, 40.4	*Aspergillus oryzae* (10^7 spores/g)	2.5% tannic acid, 1% ammonium sulphate	30°C, 48 h	3.42	[52]
Cashew apple bagasse, 40.4	*Aspergillus oryzae* (10^7 spores/g)	2.5% tannic acid, 2.5% ammonium sulfate, 1% sucrose	30°C, 48 h	4.63	[15]
Palm kernel cake, 53.5	*Aspergillus niger* ATCC 16620 (11×10^9 spores/5g)	5% tannic acid	30°C, 96 h	13.03	[54]
Tamarind seed powder, 65.75	*Aspergillus niger* ATCC 16620 (33×10^9 spores/5g)	1% glycerol, 1% potassium nitrate	30°C, 120 h	6.44	[54]
Wheat bran, 80	*Aspergillus aculeatus* DBF9	5% tannic acid	30°C, 72 h	8.16	[55]
Jamun leaves, 1 g substrate: 2ml tap water pH (5.5)	*Aspergillus ruber*	Carbon and nitrogen source had no positive effect	30°C, 96 h	69	[56]

Table C. Processing conditions and final ethanol concentration of cashew apple wine and bioethanol (Permission taken from CMU J. Nat. Sci, Prommajak et al., 2014 [53])

Products	Microorganism	Yeast Added (%v/v)	Initial total soluble solid (%w/v)	Fermentation time & temperature (°C)	Final Total soluble solid (% w/v)	Final Ethanol Concentration (% w/v)	Reference
Dry and sweet wine	*S. cerevisiae* var. ellipsoideus	0.3	21 (dry), 23 (sweet)	3 weeks, 23°C	4.1-4.3 (dry), 9.3-9.5 (sweet)	11.59-11.69 (dry), 11.86-11.90 (sweet)	[10]
Wine from cashew apple juice and powder	Bakers' yeast (*S. cerevisiae*)	0.1	20% TSS	14 days, 28°C	9.2(juice) 7.0 (powder)	6.0 (fresh), 5.2 (powder)	[25]
Wine	Active *S. cerevisiae* var. ellipsoideus	5	20, 22, 24	15 days, 28-30°C	12.4, 12.8, 13.2	7.81, 8.25, 8.9	[28]
Bioethanol	*S. cerevisiae* var. ellipsoideus	5	15	Aeration 24h, static for two weeks, 28°C	3%	7.70	[57]
Bioethanol	*S. cerevisiae*	0.2	26.5	32 h, 32°C		6.5	[58]
Bioethanol	Bakers' yeast (*S. cerevisiae*)	1	8.77, 10.31	4h, 30°C 6h, 30°C		4.28, 4.44	[59]

Table D. Quality of aroma volatiles evaluated in the GC effluents of cashew apple water phase (Permission taken from John Wiley & Sons, Sampaio et al., 2011 [32])

Compound	Descriptor
Ester	
Ethyl propanoate	Fruity, sweet, cashew apple
Ethyl 2-methylpropanoate	Fruity, sweet, cashew apple
Methyl 3-methylbutanoate	Fruity, grass
Ethyl butanoate	Fruity, overripe cashew
Ethyl 2-methylbutanoate	Fruity, cashew, sweet
Ethyl 3-methylbutanoate	Cashew apple, sweet
Isoamyl acetate	Enamel, fruity, banana
Ethyl *trans*-2-butenoate	Fruity, cashew apple, flower
Ethyl 3-methylpentanoate	Fruity, grass, cashew apple
Methyl 2-ethylacrylate	Beetle, grass, sweet, flower
Ethyl *trans*-3-hexenoate	Fruity, flower, cashew apple
Ethyl *trans*-2-hexenoate	Fruity, sweet
Ethyl 3-hydroxy-3 methylbutanoate	Fruity, grass, grain, cashew
Ethyl octanoate	Grain, wet ground, butter
Methyl 2-hydroxy-3-methylpentanoate	Fruity, guava, citric, flower
Methyl 2-hydroxy-4-methylpentanoate	Fruity, grass, cashew
Ethyl 2-hydroxy-4-methylpentanoate	Fruity, lemon
Ethyl 2-hydroxyhexanoate	Cashew, 'pitanga'
Ethyl decanoate	Cashew, flower, grass
Ethyl 3-hydroxyhexanoate	Grass, fruity
Alcohol	
2-2-Methyl-3-buten-2-ol	Fruity, cooked pine apple
2-Methyl-1-propanol	Grass, grain
3-Methyl-1-butanol	Overripe cashew
Trans-2-Penten-1-ol	Grass, mould, fermented
4-Methyl-1-Pentanol	Grass, herb, green fruity
Hexanol	Grass, sweet, almond oil
Trans-3-Hexen-1-ol	Grass, fruity, perfume, floral
Cis-3-Hexen-1-ol	Grass, sweet, fruity
Heptanol	Cashew, fruity, grass
2-Ethyl-1-hexanol	Grass, herb, floral
1-Octanol	Floral, fruity, grass
Aldehyde	
Hexanal	Grass, herb
2-Methyl-4-Pentenal	Grass, fruity, sweet
Trans-2-Hexenal	Pentatomidae bug, grass

Furaldehyde	Wood, coconut, unpleasant
Ketone/lactone	
2,3-Butanedione	Fermented, cashew, sweet
2,3-Pentanedione	Fruity, cashew, fermented
3-Hydroxy-2-butanone	Fruity, herb
Acetophenone	Cheese, acid, sweet, wax
γ-Dodecalactone	Cashew, wine, herb
Acid	
Acetic acid	
3-Methylbutanoic acid + 2-Methylbutanoic acid	Cheese, foot odour
Hexanoic acid	Cashew, sweet grass
Nonanoic acid	Sweet, fruity
Decanoic acid	Floral, grass, citric
Phenylacetic acid	Woody, overripe, cashew