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Diagnosis on the Production of Algarrobina for the European Union Market: Caserío de Sáncor Chulucanas District – Morropón 2017

Adrián Colomer Winter, Alfredo Lázaro Ludeña Gutierrez and Ibai Aldebaran de Villasante Llaquet*

VIU, San Pedro University, Perú, Spain.

*Correspondence:
Ibai Aldebaran de Villasante Llaquet, VIU, San Pedro University, Perú, Spain, Tel: +51 927390703; E-mail: ibaius2000@gmail.com.

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Keywords

Carob syrup, Fair Trade, Novel Foods, Productive chain value, Acrylamide, Carcinogenic substance.

The present researching Project has the following title: Diagnostic of the Carob Syrup Production to the European Union Market," Sancor Village District Chulucanas 2017. This report had been made considering the high consume demand of organic food on the European Union Market correlatively with the gradual productive quality standardization and increasement of Carob Syrup on the national and international market. Considering that this product has a lot of nutritional properties, it represents a great opportunity to export this as a natural restorative which slows down European physical aging.

In order to achieve this goal, the present product needs to be produce under optimal conditions which comprehend the innocuity principles, productive standardization, the high technology equipment, consumer trends, Key Performance Indicator System for each productive step and the adaptation of the Peruvian Technic Norm to the European alimentary regulations.

The results report that the Carob Syrup production of Sancor Village is done under unhealthy conditions with antiquate equipment, slow efficiency.

The presence of high levels of acrylamide (carcinogenic substance with genotoxic potential) that, it prevents it from being constituted as a product of export quality. Likewise the study showed that the Peruvian technical standard establishes that the Algarrobina is nutritious for the Human consumption based on a simple bromatologic analysis; Against the Swedisch Standard Norm 161618. This is void due to the Algarrobina sent to laboratories in the European Union showed levels of Acrylamide well above the permissible maximum limit (4mg-50 mg per kg), The present productive process has a lot of contingencies that consequently make Carob Syrup as a non-optimal product for the European Innocuity and therefore non-exportable. Likewise, a joint study is being carried out in which it is necessary to establish epidemiologically how algarrobine can affect a population, analyzing samples and determining how much algarrobin produces a worrisome concentration of compounds such as acrylamide or glycidamide in our body.

Indicator	Permissible Range established by Codex Alimentarus	Sample Results
Level of acrylamide in carob syrup samples	4 mg (mín) per kg- 50 mg (máx) per kg	212 mg/ Kg
Source:Study" Detection of acrylamide in carob syrup, Dr. Ludeña, 2016	Innocuous	Potential danger

Table 1: Level of acrylamide in carob syrup samples.

Resource

Study" Detection of acrylamide in carob syrup, Dr. Ludeña, 2016

Interpretation

The table 1 shows that the carob syrup obtained from the Popular Market Sanchez Cerro of Piura and analyzed later in an European Union Market lab, present a high quantity of acrylamid, specifically 212 mg/kg that is much higher than the maximum limit permission established by the Swedisch Standard Norm of 4mg per kg-50 mg-kg for sweet bakery products. Correlatively, for the European Conformity standards products with elevated acrylamid have a potencial danger for consumer health.

Goal 02

Establish How are the Praxis During the Productive Process of the

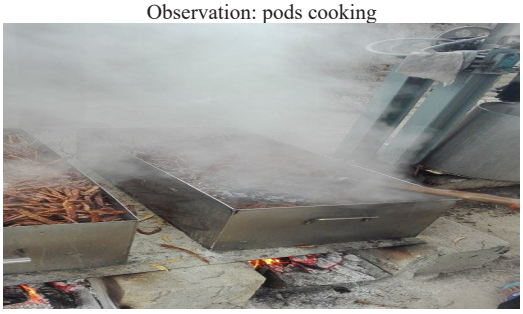
<table>
<tr><th>Calculus</th><th>Formula</th><th>Contamination factor(PPM)</th></tr>
<tr>
<td rowspan="3">Wood volume = lengthy x width x high = (80*15*65)= 78000 m^3
2.5 mg/m^3* 78000m^3 = 195,000 mg = 195 kg (LMP)
9 g de PM * 161 Kg = 1449 Kg contaminated PPM</td>
<td rowspan="3">E = DM x F = A x B x C x F
E: emissions from biomass burning (kg);
DM: dry fuel mass combusted (kg);
A: burned area (km2);
B: biomass density (kg/km2);
C: fraction of biomass consumed during a fire event.
F: factor of consumed biomass that is released as trace gases and smoke particulates.
Fuente: Wooster,2002</td>
<td>Emission factors for biomass energy use in traditional cook stoves (g/kg of dry fuel)
<table>
<tr><th>Fuel Type</th><th>CO_2</th><th>CO</th><th>CH_4</th><th>PM</th></tr>
<tr><td>Fuel wood</td><td>1705</td><td>80</td><td>9</td><td>9</td></tr>
<tr><td>Crop Waste</td><td>1266</td><td>75</td><td>300 kg/TJ</td><td>7.4</td></tr>
<tr><td>Cow Dung</td><td>1060</td><td>83</td><td>300kg/TJ</td><td>20</td></tr>
</table>
Fuente: [Selectively extracted from Table 5, Bhattacharya, S.C. and Salam, A.P., 2002]
Observation: pods cooking
  </td>
</tr>
<tr><td>PPM GUIDE (WHO)
Maximum permisible limit
Supreme Decree Nº 074-2001-PCM
National Standards Regulation Ambiental Air Quality(Peru)</td></tr>
<tr><td>2.5 mg/m^3</td></tr>
</table>

Table 2: Atmospheric emission factor of fuel wood burning during the cooking process.

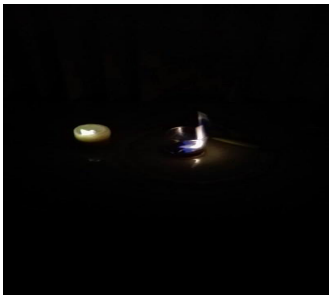
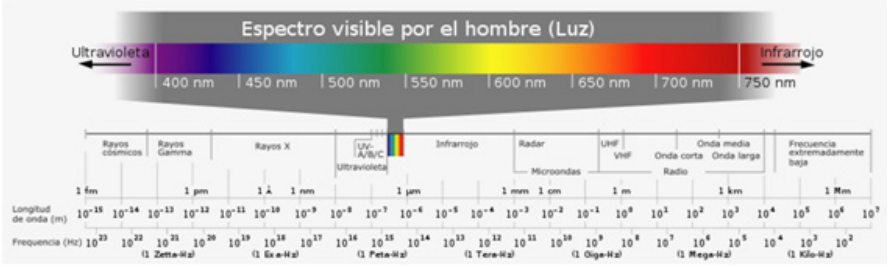
<table>
<tr><th>Tool</th><th>Measure</th><th>Theory</th></tr>
<tr>
<td>Artisan spectrophotometer</td>
<td>Wavelength in Nanómeters
750- 300NM</td>
<td>During the combustion of a food the electrons of the atoms of the different nutritional compounds such as sugars, proteins are excited migrating to another orbit, releasing energy in the form of luminous electromagnetic wave
Source: Beer theory</td>
</tr>
<tr>
<td>Previous stage: Ignition of the carob syrup jar and excitation of the electrons
 
<table>
<tr><th colspan="2">Results</th></tr>
<tr><td>Wavelength of maximum absorbance (nm) - in acrylamide and HMF</td><td>Absorbed color</td></tr>
<tr><td>230-300 Nanómeters</td><td>Violet</td></tr>
</table>
Source: Aguilar & Ibarz, 2016</td>
<td colspan="2"> 

</td>
</tr>
</table>

Table 3: Atmospheric emission factor of fuel wood burning during the cooking process.

Carob Syrup for the European Market.

Source

Observation Guide during the productive process of carob syrup in Sancor Village

Interpreation

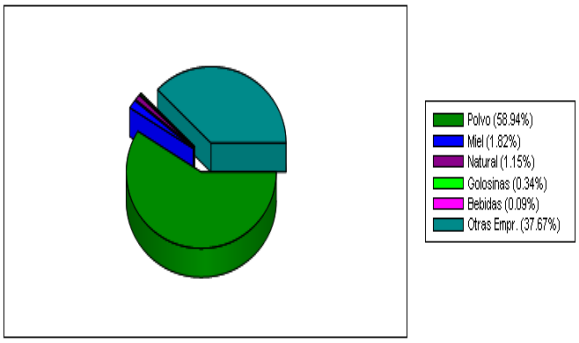
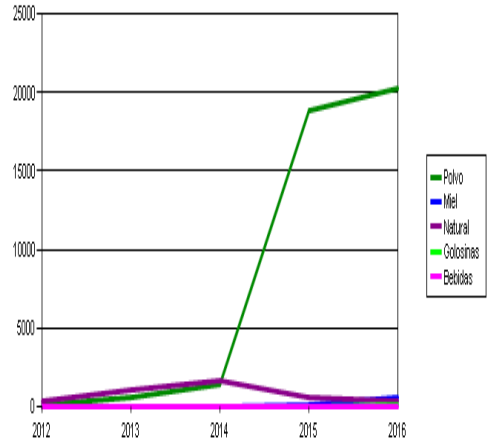
In the table 2 it has been determined that during the pods cooking and dehydration process, 1449 Kg of ppm are liberated to the atmosphere, nine times more than the limit maximum permissible of 195 kg ppm for fuel food burning, considering the aire quality standard of 2,5 mg/m^3 established by the WHO and the peruvian Supreme Decree Nº 074-2001-PCM.

Source

Observation Guide during the productive process of carob syrup in Sancor Village

Interpreation

In the table 4 it has been determined that during the pods cooking and dehydration process, 1449 Kg of ppm are liberated to the atmosphere, nine times more than the limit maximum permissible of 195 kg ppm for fuel food burning, considering the aire quality standard of 2,5 mg/m^3 established by the WHO and the peruvian Supreme Decree Nº 074-2001-PCM.

Graphic	Tool
Main carob presentations(kg) exported during 2016	Promperu Sat
	Evolution of the exports of Carob products according to its main presentation 2012-2016 
Evolution of the exports of Carob products according to its main presentations 2015-2016	Source: Sunat

	2015	2016	2017
Polvo	18,808.50	20,283.14	0.00
Otras Presentaciones	10,637.24	12,962.75	7221,34
Miel	142.80	627.53	0.00
Natural	658.00	395.65	0.00
Golosinas	0.00	116.11	0.00
Bebidas	49.42	30.07	0.00
Semilla	0.00	0.00	0.00
Primera	0.00	0.00	0.00
Capsulas	0.00	0.00	0.00
Extracto	178.01	0.00	0.00
Jarabe	0.00	0.00	0.56
Total	30,473.97	34,415.25	7221.90

Source: Sunat

Table 4: Top demand of carob presentation in the international market.

Interpretation

The present table reffering to the European Union market demand, shows through the graphics "PRODUCT EXPORT ALGARROBO ACCORDING TO ITS MAIN PRESENTATIONS IN KG 2012 - 2017" obtained from the Promperú portal that the presentation that registers the highest percentage is powder with 58, 94%, followed by 1.82% in the form of honey, 1.15% in natural presentation, sweets with 0.34%, drinks 0.09% and other presentations with 37.67%. Likewise, the following table called "Evolution of exports of the algarrobo product according to its main presentations 2015-2016" shows in numerical terms that, the leading presentation is in the form of powder recording an 18,808.50 kg in 2015 and 20,283.14 kg for the period 2016 Correlatively follows the item "other presentations" with a total of 10,637.24 kg for 2015 and 12,962.75 kg during 2016. Then, you have the presentation in the form of honey in third place recording a sum of 142.80 kg and 627.53 kg during the two periods. On the other hand, we have the "natural" presentation in fourth place registering values of 658 kg for 2015 and about 395, 65 kg in 2016. It is then appreciated that the products of the carob in the form of candy registered a value total of 116.11 kg for the year 2016. Finally, lastly we have the

presentation in the form of beverages with 49.42 kg and drinks 30.07 kg for both periods. From these data it is identified that the algarrobina (honey presentation) registers some export values in terms of insignificant quantity for the periods 2015, 2016 and for 2017 it does not register any exportable volume.

Conclusions

Conclusion 01: The productive process of the carob syrup is below the rank of production, that is because the low invest in industrial machinery presenting a defficient performance.

Conclusion 02: The carob syrup is not accepted in to the European market because it is process in an unhealthy way that caused carcinogenic metabolites harmful to human health.

Conclusion 03: The minimum requeriments are not met: The use of unchlorinated water to explotation of the dry forest and a high emission of particles per million during the cooking when using carob wood.

Future directions

Implement a quality control system composed by a series of kpis (key performance indicators) for the evaluation and monitoring of each productive stage;" The measurement of microorganisms present in the use of water, temperature of the heating and the dehydration phases of the carob syrup extract, the material particulate emissions by mg^3 during the combustion until the quantification of acrylamide in the peruvian technical norm.

Propose the implementation of a modern industrial infrastructure based on the rapid vacuum cooking and a preenzymatic treatment; surgical steel pots that cook carob syrup in absence of atmospheric pressure at low tempertures for the goal of saveguarding the organoleptic and nutritive properties of carob syrup according to the European customers preference.

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