



Foro Latinoamericano- Caribeño de Cacao

Desafíos y pautas para una cacaocultura moderna y sostenible en la región

La interacción de la genética, el entorno y el manejo en la fermentación de cacao

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Fecha: 31 de agosto 2023, San José – Costa Rica



Factores influyentes en la fermentación



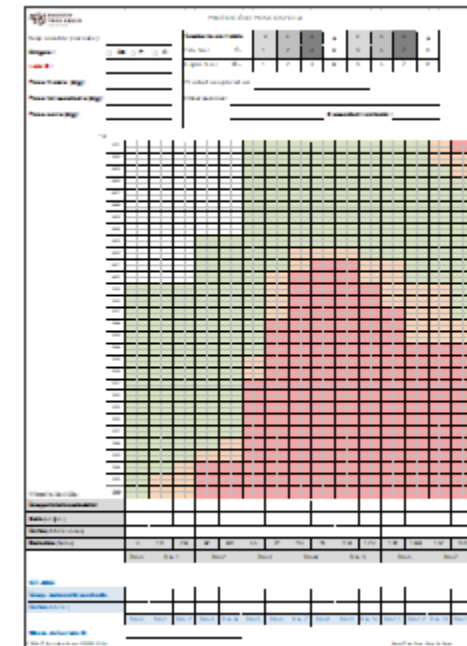
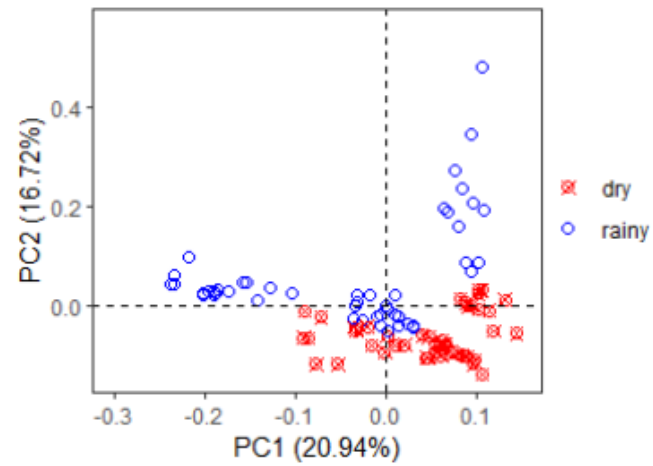
La genética



El entorno



El manejo





La genética



Variación en las características

✓ bioquímicas

Polifenoles

Grasa

Proteína

Metilxantinas

(teofilina, teobromina, cafeína)

Actividad de Enzimas

Volátiles en la pulpa

✓ físicas

Forma y tamaño del grano

Propiedades de la Testa



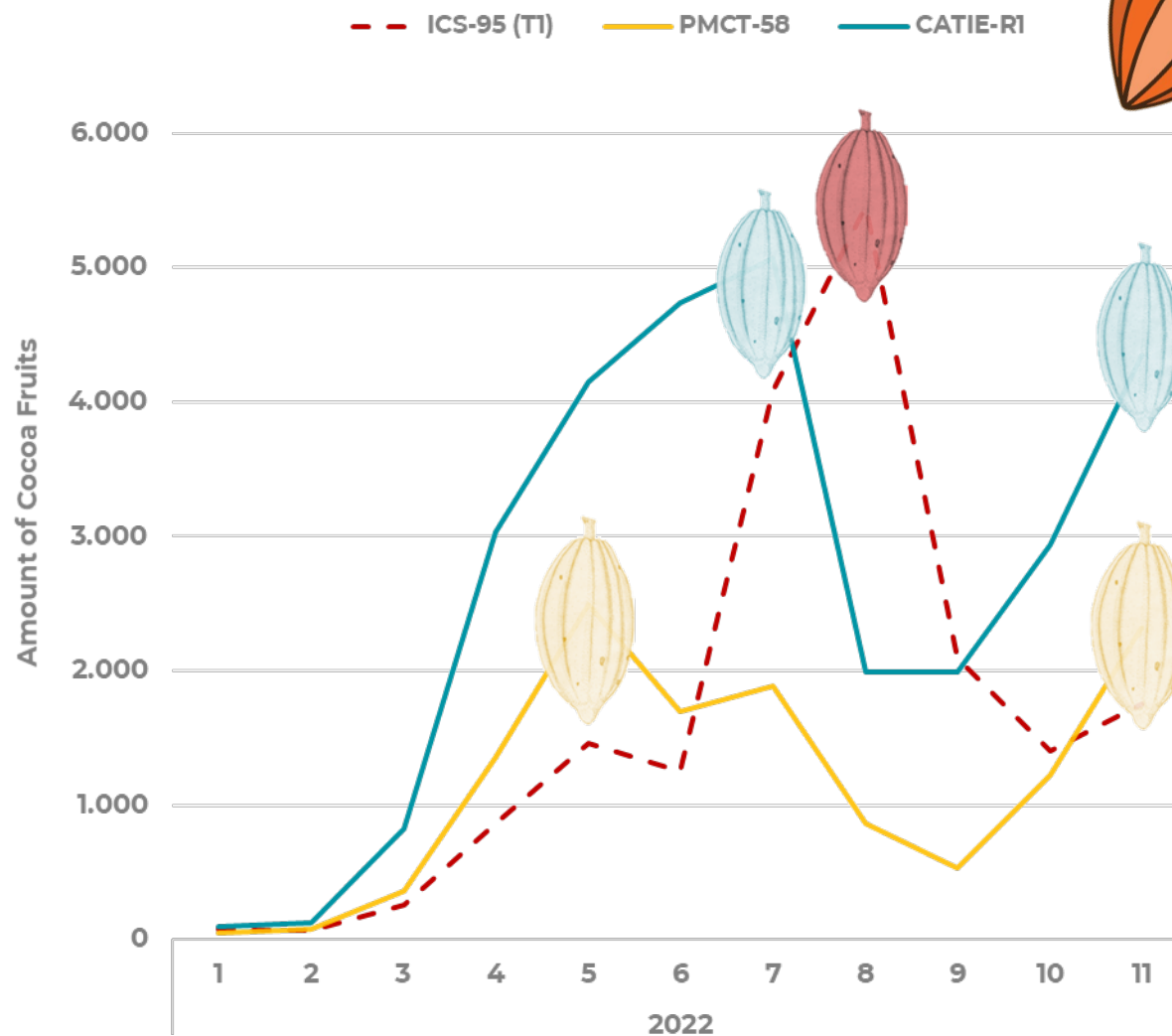


La genética



Variedades tienen diferentes ciclos de crecimiento y picos de producción

1. Dos picos de producción similares *versus* un pico alto y uno bajo



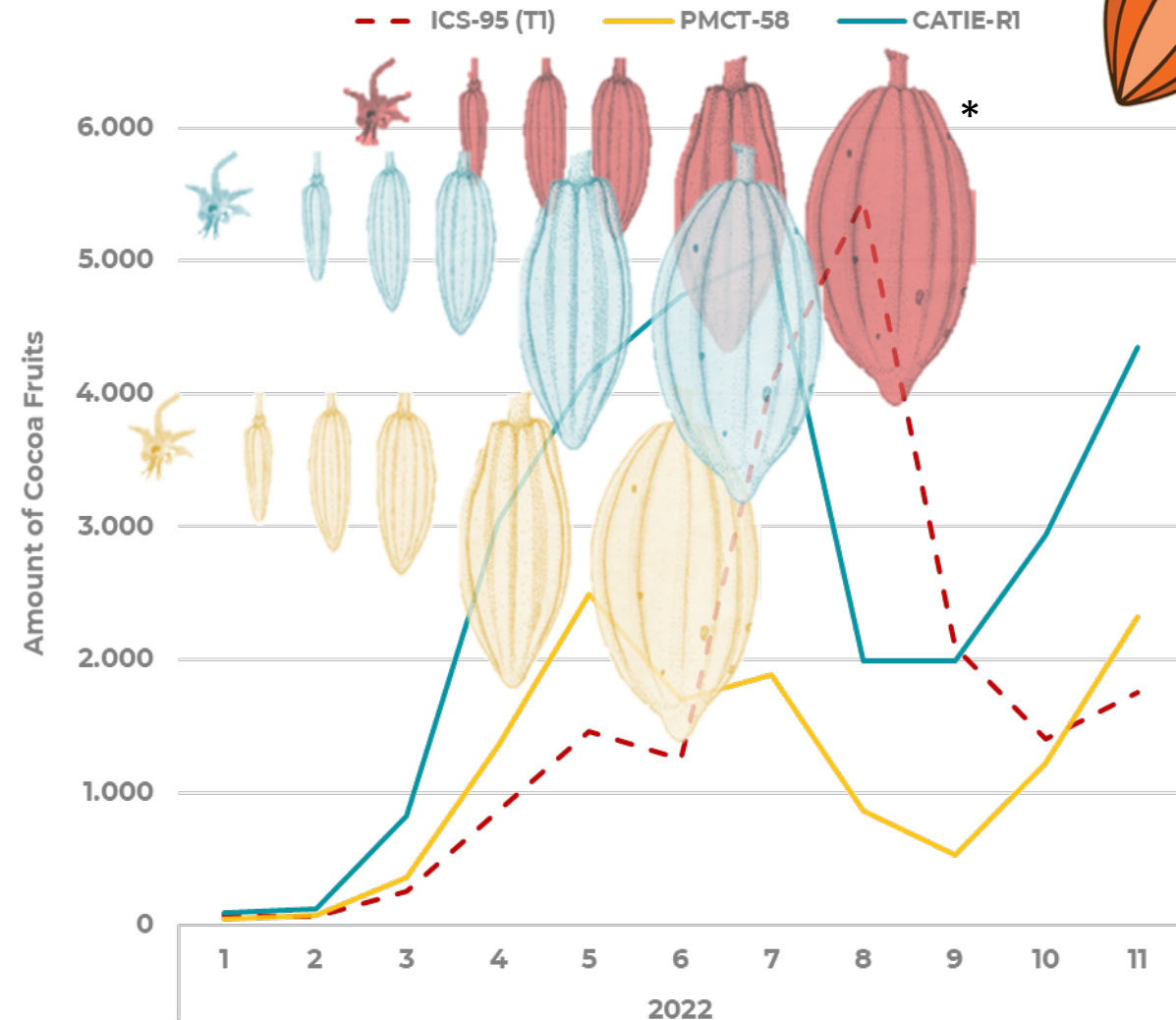


La genética



Variedades tienen diferentes ciclos de crecimiento y picos de producción

1. Dos picos de producción similares *versus* un pico alto y uno bajo
2. Retraso de hasta dos meses entre los picos de producción de las variedades





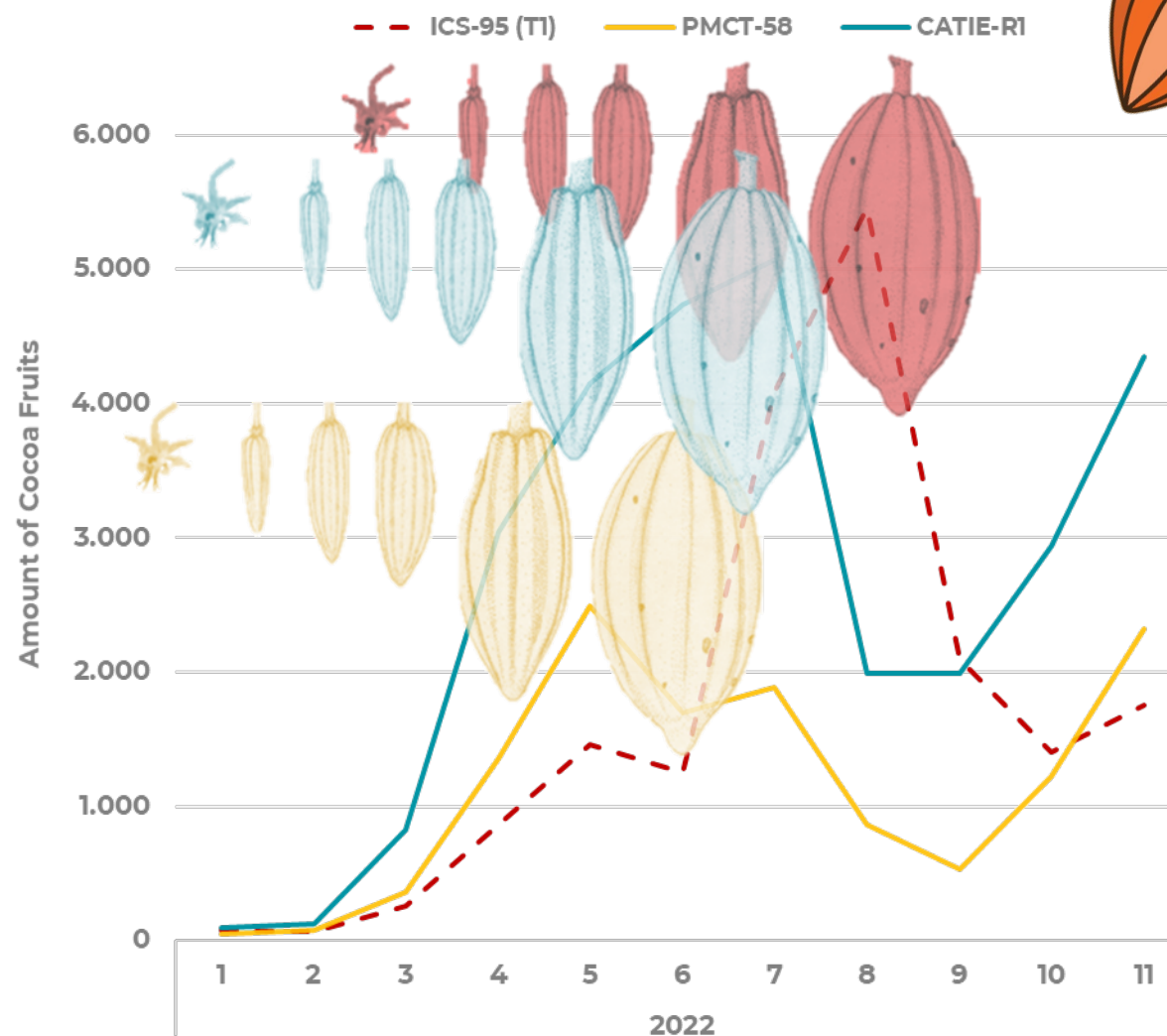
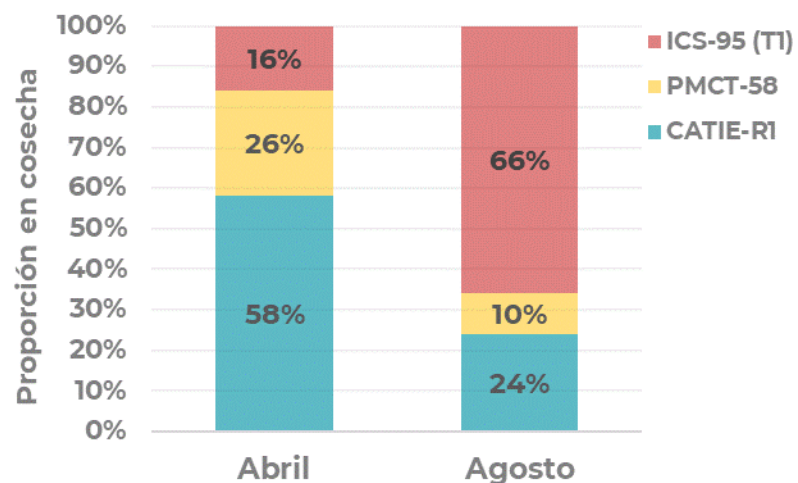
La genética



Variedades tienen diferentes ciclos de crecimiento y picos de producción

1. Dos picos de producción similares *versus* un pico alto y uno bajo
2. Retraso de hasta dos meses entre los picos de producción de las variedades

Proporciones diferentes de cada variedad en las cosechas durante el año



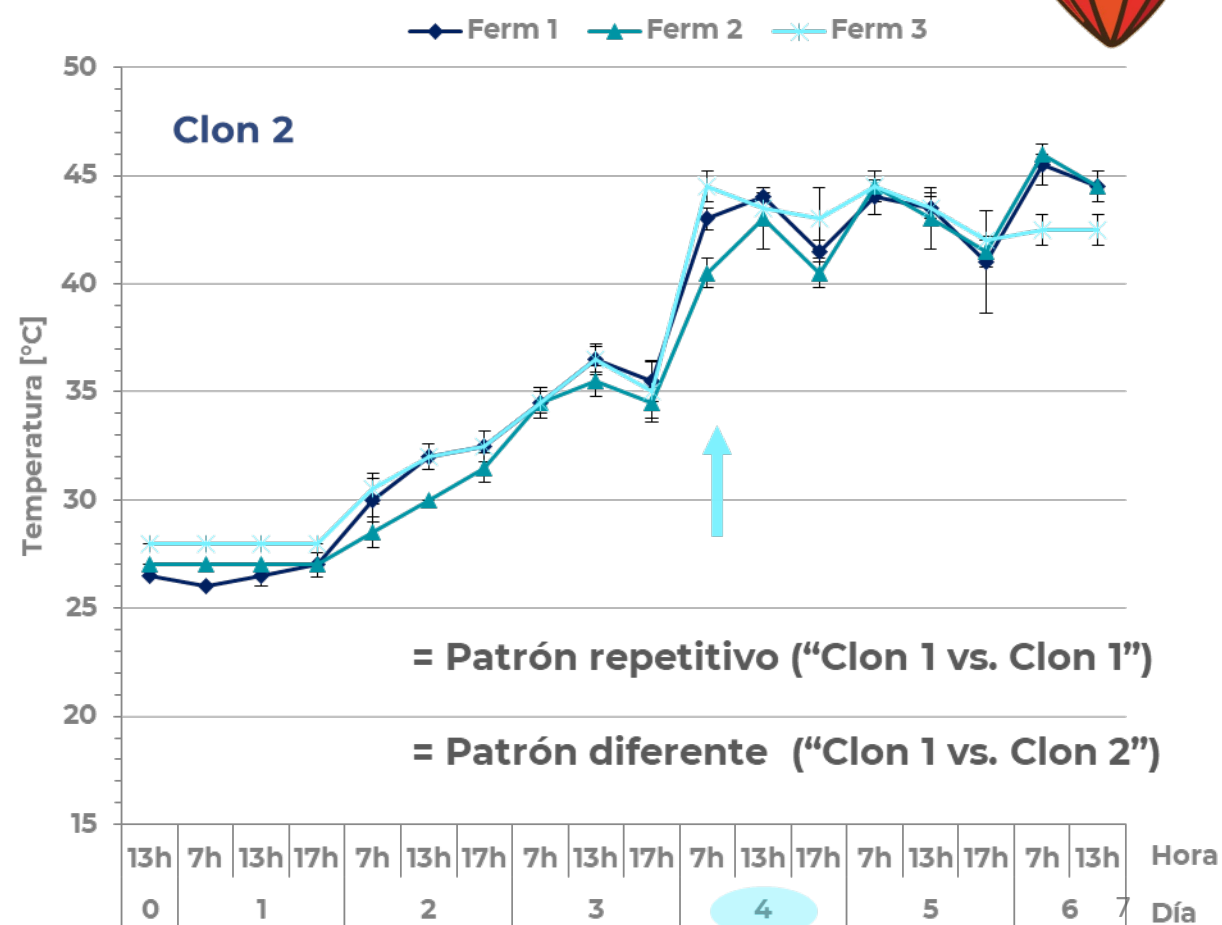
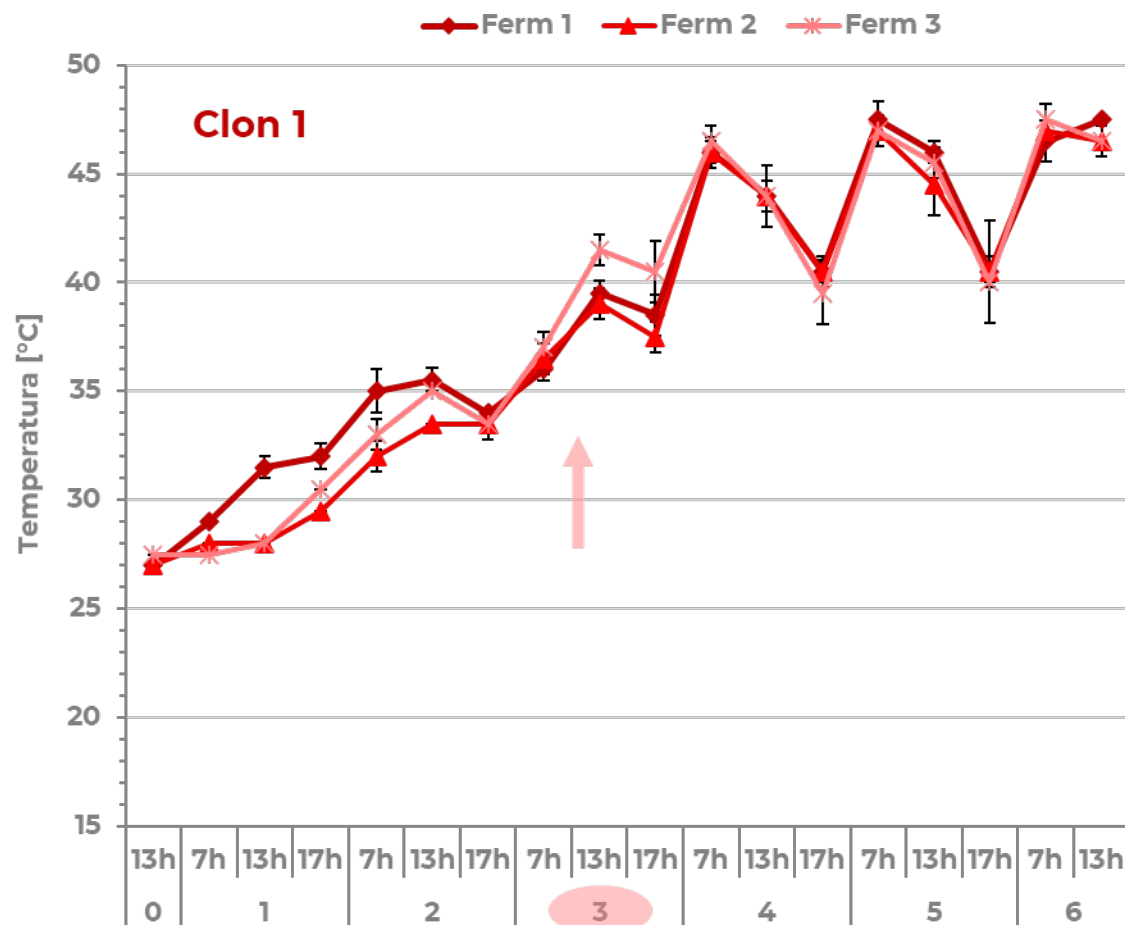


La genética



Por sus propiedades bioquímicas, físicas, y la actividad microbiana, cacaos tienen diferentes comportamientos en la fermentación

Hegmann (2015):
Link: <https://ediss.sub.uni-hamburg.de/handle/ediss/4388>



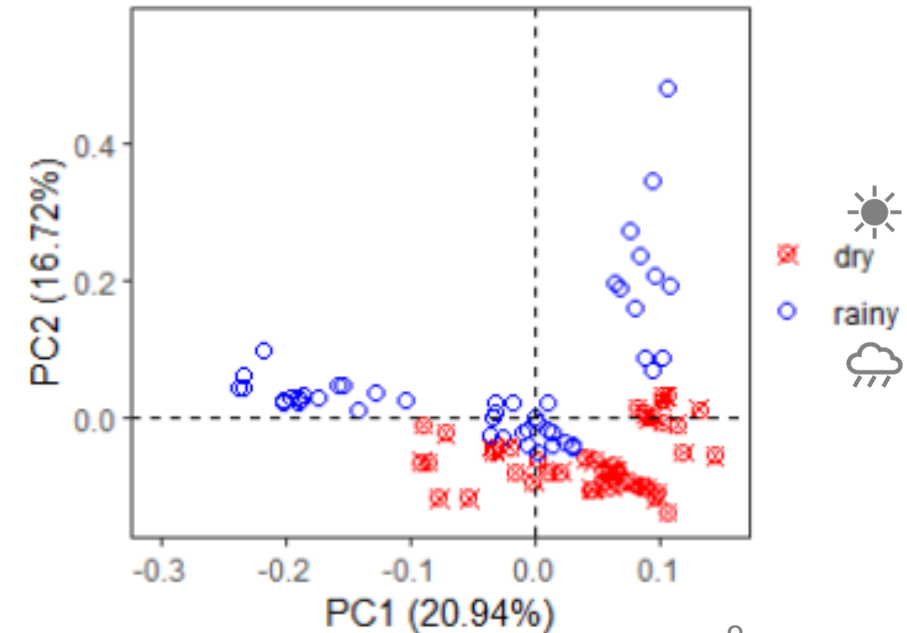
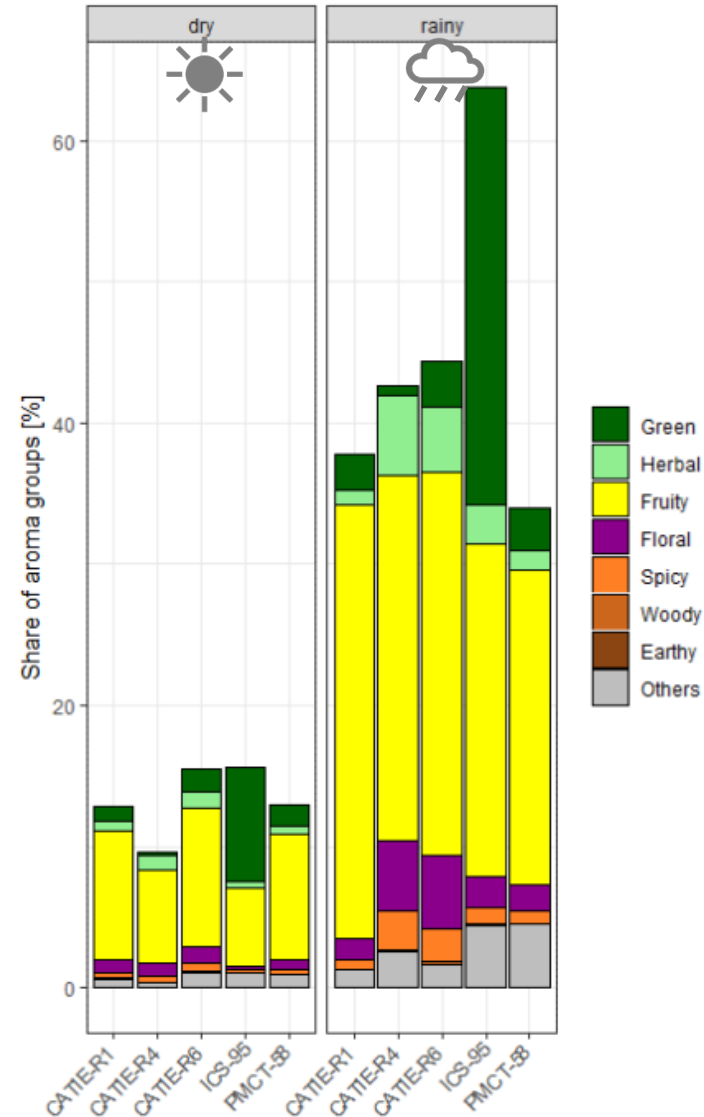


El entorno



Diferencias estacionales en los aromas almacenados en la pulpa

La **intensidad** y **diversidad** de volátiles en la pulpa varía entre la época lluviosa y seca.



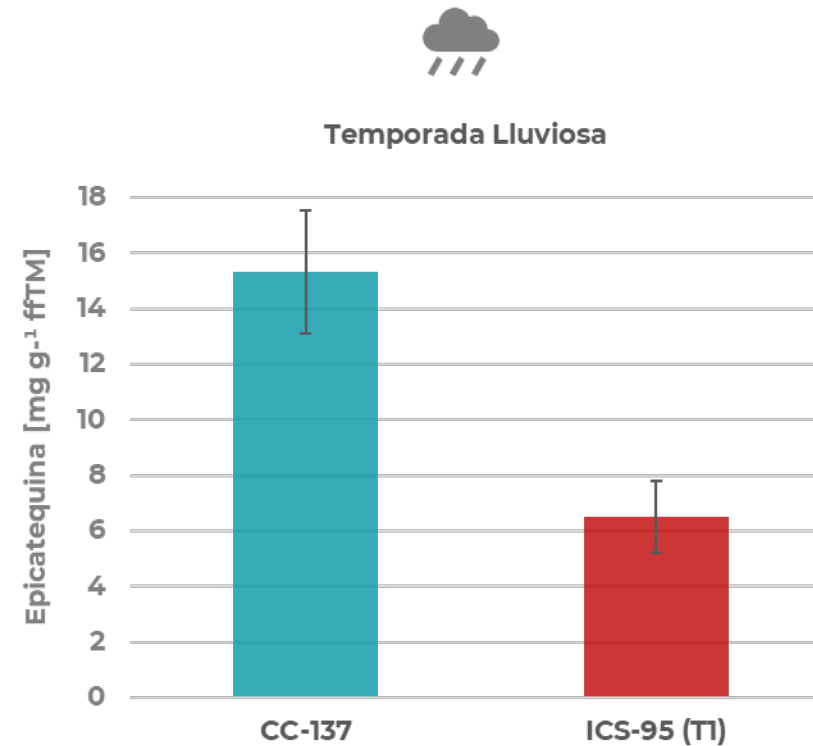
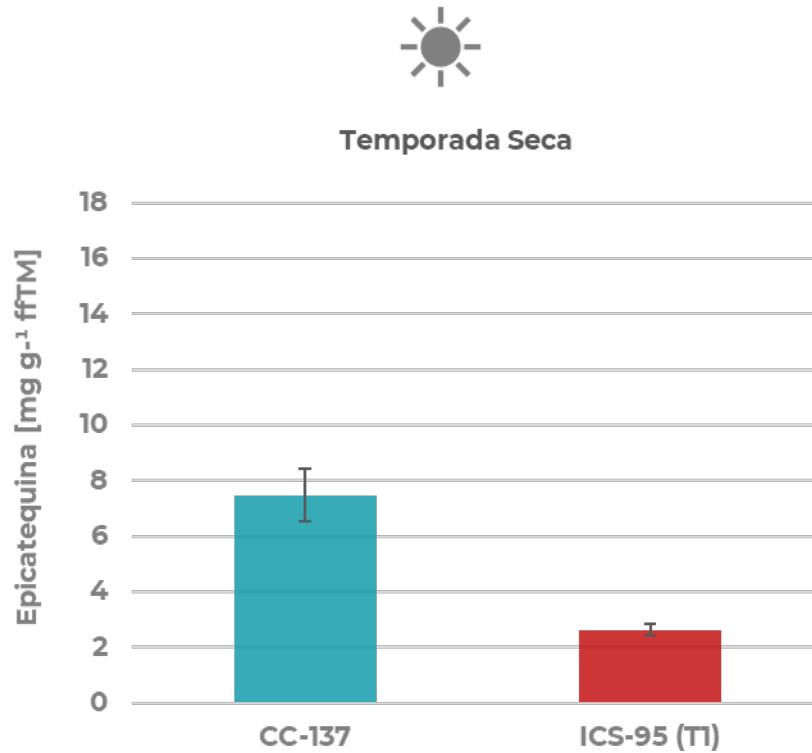
*Hegmann et al. (2020):
DOI:10.5073/JABFQ.2020.093.00X
Link: <https://ojs.openagrar.de/index.php/JABFQ/article/view/15512>



El entorno



Epicatequina (antioxidante polifenólico) almacenado en cotiledones
es más alto en la época lluviosa



*Hegmann (2015):

Link: <https://ediss.sub.uni-hamburg.de/handle/ediss/6461>

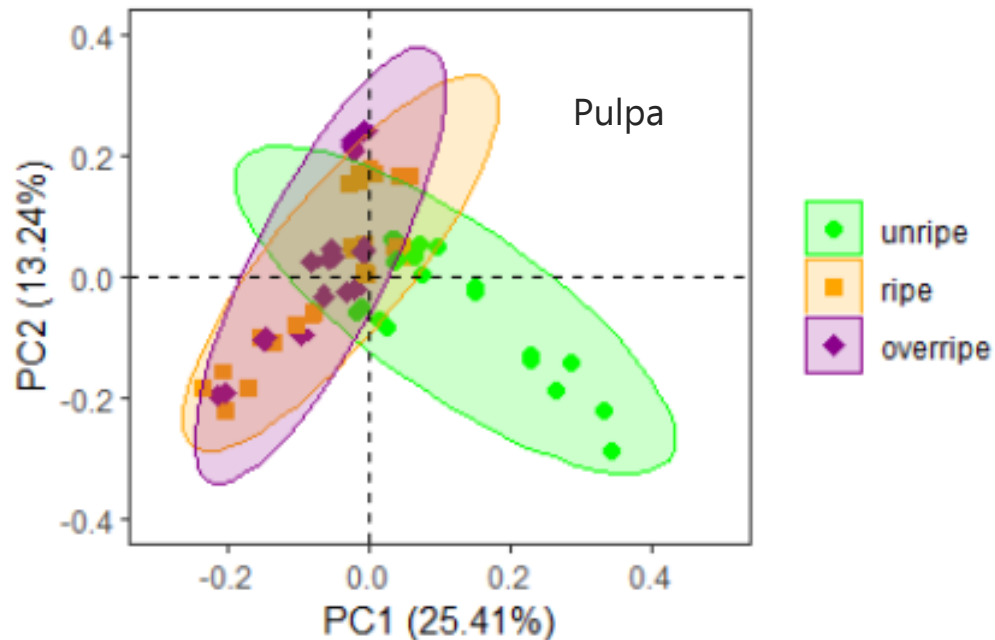


El manejo

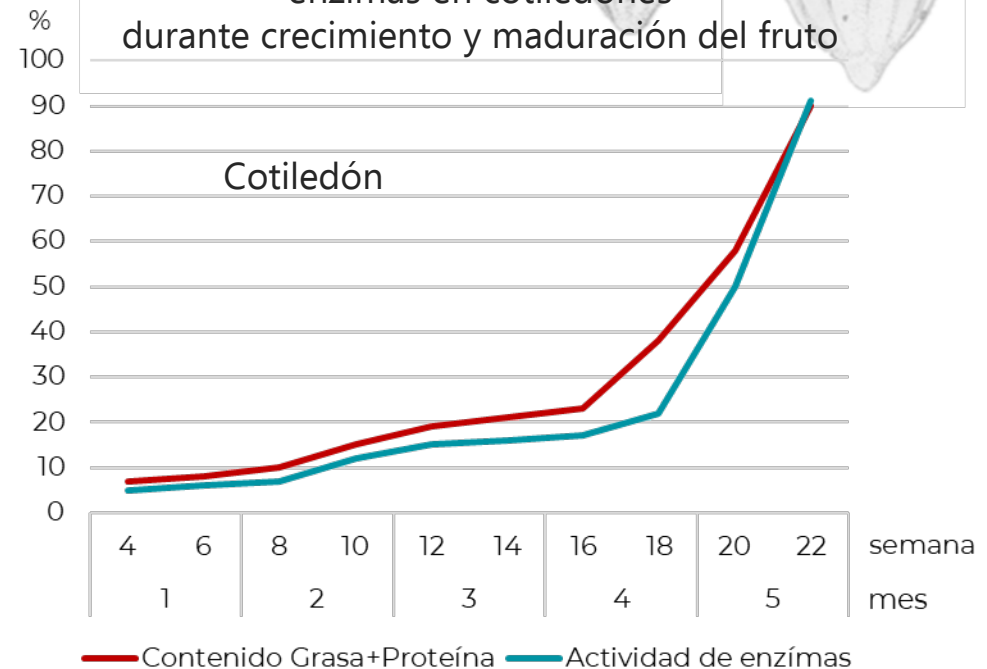


La selección de frutos *maduros* maximiza el potencial del aromas tanto en la pulpa cómo en el cotiledón

Comparación de volátiles en la pulpa de frutos inmaduros, maduros y sobremaduros



Almacenamiento de grasa+proteína y actividad de enzimas en cotiledones durante crecimiento y maduración del fruto





El manejo



©lebensmittellexikon



©heavensenses



©freshideen



©wholesalesupplies



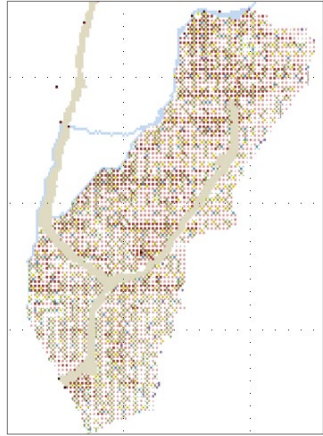
©alraune esoterik



Intensidad y Diversidad de Aromas



El manejo



Harvest			Fermentation and Drying Process																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
Lot No.	Harvest Year (YYYY)	Harvest Month (MM)	Harvest Day (DD)	Field location	Size of field (hectares or total [ha])	Cocoa Variety	Result: dried Cocoa kg	Amount of cocoa fruits [kg]	Fresh weight [kg]	Ferm. Box No.	Total weight [kg] At 100% FER.	Total weight [kg] At 100% FER.	Date Begin Fermentation (YYYY-MM-DD)	Hour Begin Ferment. (see am, pm)	Ferment. Temp (°C) 18 hrs	F1 1. 6 am 24 hrs	F1 2. 6 am 42 hrs	F1 3. 6 am 60 hrs	F1 4. 6 am 90 hrs	F1 5. 6 am 114 hrs	F1 6. 6 am 130 hrs	F1 7. 6 am 144 hrs	F1 8. 6 am 162 hrs	F1 9. 6 am 180 hrs	F1 10. 6 am 204 hrs	F1 11. 6 am 228 hrs	F1 12. 6 am 252 hrs	F1 13. 6 am 276 hrs	F1 14. 6 am 300 hrs	F1 15. 6 am 324 hrs	F1 16. 6 am 348 hrs	F1 17. 6 am 372 hrs	F1 18. 6 am 396 hrs	Ambient Temp. in fermentator (°C)	At 1. 6 am 18 hrs	At 2. 6 am 24 hrs	At 3. 6 am 30 hrs	At 4. 6 am 36 hrs	At 5. 6 am 42 hrs	At 6. 6 am 48 hrs	At 7. 6 am 54 hrs	At 8. 6 am 60 hrs	At 9. 6 am 66 hrs	At 10. 6 am 72 hrs	At 11. 6 am 78 hrs	At 12. 6 am 84 hrs	At 13. 6 am 90 hrs	At 14. 6 am 96 hrs	At 15. 6 am 102 hrs	At 16. 6 am 108 hrs	At 17. 6 am 114 hrs	At 18. 6 am 120 hrs	At 19. 6 am 126 hrs	At 20. 6 am 132 hrs	At 21. 6 am 138 hrs	At 22. 6 am 144 hrs	At 23. 6 am 150 hrs	At 24. 6 am 156 hrs	At 25. 6 am 162 hrs	At 26. 6 am 168 hrs	At 27. 6 am 174 hrs	At 28. 6 am 180 hrs	At 29. 6 am 186 hrs	At 30. 6 am 192 hrs	At 31. 6 am 198 hrs	At 32. 6 am 204 hrs	At 33. 6 am 210 hrs	At 34. 6 am 216 hrs	At 35. 6 am 222 hrs	At 36. 6 am 228 hrs	At 37. 6 am 234 hrs	At 38. 6 am 240 hrs	At 39. 6 am 246 hrs	At 40. 6 am 252 hrs	At 41. 6 am 258 hrs	At 42. 6 am 264 hrs	At 43. 6 am 270 hrs	At 44. 6 am 276 hrs	At 45. 6 am 282 hrs	At 46. 6 am 288 hrs	At 47. 6 am 294 hrs	At 48. 6 am 300 hrs	At 49. 6 am 306 hrs	At 50. 6 am 312 hrs	At 51. 6 am 318 hrs	At 52. 6 am 324 hrs	At 53. 6 am 330 hrs	At 54. 6 am 336 hrs	At 55. 6 am 342 hrs	At 56. 6 am 348 hrs	At 57. 6 am 354 hrs	At 58. 6 am 360 hrs	At 59. 6 am 366 hrs	At 60. 6 am 372 hrs	At 61. 6 am 378 hrs	At 62. 6 am 384 hrs	At 63. 6 am 390 hrs	At 64. 6 am 396 hrs	At 65. 6 am 402 hrs	At 66. 6 am 408 hrs	At 67. 6 am 414 hrs	At 68. 6 am 420 hrs	At 69. 6 am 426 hrs	At 70. 6 am 432 hrs	At 71. 6 am 438 hrs	At 72. 6 am 444 hrs	At 73. 6 am 450 hrs	At 74. 6 am 456 hrs	At 75. 6 am 462 hrs	At 76. 6 am 468 hrs	At 77. 6 am 474 hrs	At 78. 6 am 480 hrs	At 79. 6 am 486 hrs	At 80. 6 am 492 hrs	At 81. 6 am 498 hrs	At 82. 6 am 504 hrs	At 83. 6 am 510 hrs	At 84. 6 am 516 hrs	At 85. 6 am 522 hrs	At 86. 6 am 528 hrs	At 87. 6 am 534 hrs	At 88. 6 am 540 hrs	At 89. 6 am 546 hrs	At 90. 6 am 552 hrs	At 91. 6 am 558 hrs	At 92. 6 am 564 hrs	At 93. 6 am 570 hrs	At 94. 6 am 576 hrs	At 95. 6 am 582 hrs	At 96. 6 am 588 hrs	At 97. 6 am 594 hrs	At 98. 6 am 600 hrs	At 99. 6 am 606 hrs	At 100. 6 am 612 hrs	At 101. 6 am 618 hrs	At 102. 6 am 624 hrs	At 103. 6 am 630 hrs	At 104. 6 am 636 hrs	At 105. 6 am 642 hrs	At 106. 6 am 648 hrs	At 107. 6 am 654 hrs	At 108. 6 am 660 hrs	At 109. 6 am 666 hrs	At 110. 6 am 672 hrs	At 111. 6 am 678 hrs	At 112. 6 am 684 hrs	At 113. 6 am 690 hrs	At 114. 6 am 696 hrs	At 115. 6 am 702 hrs	At 116. 6 am 708 hrs	At 117. 6 am 714 hrs	At 118. 6 am 720 hrs	At 119. 6 am 726 hrs	At 120. 6 am 732 hrs	At 121. 6 am 738 hrs	At 122. 6 am 744 hrs	At 123. 6 am 750 hrs	At 124. 6 am 756 hrs	At 125. 6 am 762 hrs	At 126. 6 am 768 hrs	At 127. 6 am 774 hrs	At 128. 6 am 780 hrs	At 129. 6 am 786 hrs	At 130. 6 am 792 hrs	At 131. 6 am 798 hrs	At 132. 6 am 804 hrs	At 133. 6 am 810 hrs	At 134. 6 am 816 hrs	At 135. 6 am 822 hrs	At 136. 6 am 828 hrs	At 137. 6 am 834 hrs	At 138. 6 am 840 hrs	At 139. 6 am 846 hrs	At 140. 6 am 852 hrs	At 141. 6 am 858 hrs	At 142. 6 am 864 hrs	At 143. 6 am 870 hrs	At 144. 6 am 876 hrs	At 145. 6 am 882 hrs	At 146. 6 am 888 hrs	At 147. 6 am 894 hrs	At 148. 6 am 900 hrs	At 149. 6 am 906 hrs	At 150. 6 am 912 hrs	At 151. 6 am 918 hrs	At 152. 6 am 924 hrs	At 153. 6 am 930 hrs	At 154. 6 am 936 hrs	At 155. 6 am 942 hrs	At 156. 6 am 948 hrs	At 157. 6 am 954 hrs	At 158. 6 am 960 hrs	At 159. 6 am 966 hrs	At 160. 6 am 972 hrs	At 161. 6 am 978 hrs	At 162. 6 am 984 hrs	At 163. 6 am 990 hrs	At 164. 6 am 996 hrs	At 165. 6 am 1002 hrs	At 166. 6 am 1008 hrs	At 167. 6 am 1014 hrs	At 168. 6 am 1020 hrs	At 169. 6 am 1026 hrs	At 170. 6 am 1032 hrs	At 171. 6 am 1038 hrs	At 172. 6 am 1044 hrs	At 173. 6 am 1050 hrs	At 174. 6 am 1056 hrs	At 175. 6 am 1062 hrs	At 176. 6 am 1068 hrs	At 177. 6 am 1074 hrs	At 178. 6 am 1080 hrs	At 179. 6 am 1086 hrs	At 180. 6 am 1092 hrs	At 181. 6 am 1098 hrs	At 182. 6 am 1104 hrs	At 183. 6 am 1110 hrs	At 184. 6 am 1116 hrs	At 185. 6 am 1122 hrs	At 186. 6 am 1128 hrs	At 187. 6 am 1134 hrs	At 188. 6 am 1140 hrs	At 189. 6 am 1146 hrs	At 190. 6 am 1152 hrs	At 191. 6 am 1158 hrs	At 192. 6 am 1164 hrs	At 193. 6 am 1170 hrs	At 194. 6 am 1176 hrs	At 195. 6 am 1182 hrs	At 196. 6 am 1188 hrs	At 197. 6 am 1194 hrs	At 198. 6 am 1200 hrs	At 199. 6 am 1206 hrs	At 200. 6 am 1212 hrs	At 201. 6 am 1218 hrs	At 202. 6 am 1224 hrs	At 203. 6 am 1230 hrs	At 204. 6 am 1236 hrs	At 205. 6 am 1242 hrs	At 206. 6 am 1248 hrs	At 207. 6 am 1254 hrs	At 208. 6 am 1260 hrs	At 209. 6 am 1266 hrs	At 210. 6 am 1272 hrs	At 211. 6 am 1278 hrs	At 212. 6 am 1284 hrs	At 213. 6 am 1290 hrs	At 214. 6 am 1296 hrs	At 215. 6 am 1302 hrs	At 216. 6 am 1308 hrs	At 217. 6 am 1314 hrs	At 218. 6 am 1320 hrs	At 219. 6 am 1326 hrs	At 220. 6 am 1332 hrs	At 221. 6 am 1338 hrs	At 222. 6 am 1344 hrs	At 223. 6 am 1350 hrs	At 224. 6 am 1356 hrs	At 225. 6 am 1362 hrs	At 226. 6 am 1368 hrs	At 227. 6 am 1374 hrs	At 228. 6 am 1380 hrs	At 229. 6 am 1386 hrs	At 230. 6 am 1392 hrs	At 231. 6 am 1398 hrs	At 232. 6 am 1404 hrs	At 233. 6 am 1410 hrs	At 234. 6 am 1416 hrs	At 235. 6 am 1422 hrs	At 236. 6 am 1428 hrs	At 237. 6 am 1434 hrs	At 238. 6 am 1440 hrs	At 239. 6 am 1446 hrs	At 240. 6 am 1452 hrs	At 241. 6 am 1458 hrs	At 242. 6 am 1464 hrs	At 243. 6 am 1470 hrs	At 244. 6 am 1476 hrs	At 245. 6 am 1482 hrs	At 246. 6 am 1488 hrs	At 247. 6 am 1494 hrs	At 248. 6 am 1500 hrs	At 249. 6 am 1506 hrs	At 250. 6 am 1512 hrs	At 251. 6 am 1518 hrs	At 252. 6 am 1524 hrs	At 253. 6 am 1530 hrs	At 254. 6 am 1536 hrs	At 255. 6 am 1542 hrs	At 256. 6 am 1548 hrs	At 257. 6 am 1554 hrs	At 258. 6 am 1560 hrs	At 259. 6 am 1566 hrs	At 260. 6 am 1572 hrs	At 261. 6 am 1578 hrs	At 262. 6 am 1584 hrs	At 263. 6 am 1590 hrs	At 264. 6 am 1596 hrs	At 265. 6 am 1602 hrs	At 266. 6 am 1608 hrs	At 267. 6 am 1614 hrs	At 268. 6 am 1620 hrs	At 269. 6 am 1626 hrs	At 270. 6 am 1632 hrs	At 271. 6 am 1638 hrs	At 272. 6 am 1644 hrs	At 273. 6 am 1650 hrs	At 274. 6 am 1656 hrs	At 275. 6 am 1662 hrs	At 276. 6 am 1668 hrs	At 277. 6 am 1674 hrs	At 278. 6 am 1680 hrs	At 279. 6 am 1686 hrs	At 280. 6 am 1692 hrs	At 281. 6 am 1698 hrs	At 282. 6 am 1704 hrs	At 283. 6 am 1710 hrs	At 284. 6 am 1716 hrs	At 285. 6 am 1722 hrs	At 286. 6 am 1728 hrs	At 287. 6 am 1734 hrs	At 288. 6 am 1740 hrs	At 289. 6 am 1746 hrs	At 290. 6 am 1752 hrs	At 291. 6 am 1758 hrs	At 292. 6 am 1764 hrs	At 293. 6 am 1770 hrs	At 294. 6 am 1776 hrs	At 295. 6 am 1782 hrs	At 296. 6 am 1788 hrs	At 297. 6 am 1794 hrs	At 298. 6 am 1800 hrs	At 299. 6 am 1806 hrs	At 300. 6 am 1812 hrs	At 301. 6 am 1818 hrs	At 302. 6 am 1824 hrs	At 303. 6 am 1830 hrs	At 304. 6 am 1836 hrs	At 305. 6 am 1842 hrs	At 306. 6 am 1848 hrs	At 307. 6 am 1854 hrs	At 308. 6 am 1860 hrs	At 309. 6 am 1866 hrs	At 310. 6 am 1872 hrs	At 311. 6 am 1878 hrs	At 312. 6 am 1884 hrs	At 313. 6 am 1890 hrs	At 314. 6 am 1896 hrs	At 315. 6 am 1902 hrs	At 316. 6 am 1908 hrs	At 317. 6 am 1914 hrs	At 318. 6 am 1920 hrs	At 319. 6 am 1926 hrs	At 320. 6 am 1932 hrs	At 321. 6 am 1938 hrs	At 322. 6 am 1944 hrs	At 323. 6 am 1950 hrs	At 324. 6 am 1956 hrs	At 325. 6 am 1962 hrs	At 326. 6 am 1968 hrs	At 327. 6 am 1974 hrs	At 328. 6 am 1980 hrs	At 329. 6 am 1986 hrs	At 330. 6 am 1992 hrs	At 331. 6 am 1998 hrs	At 332. 6 am 2004 hrs	At 333. 6 am 2010 hrs	At 334. 6 am 2016 hrs	At 335. 6 am 2022 hrs	At 336. 6 am 2028 hrs	At 337. 6 am 2034 hrs	At 338. 6 am 2040 hrs	At 339. 6 am 2046 hrs	At 340. 6 am 2052 hrs	At 341. 6 am 2058 hrs	At 342. 6 am 2064 hrs	At 343. 6 am 2070 hrs	At 344. 6 am 2076 hrs	At 345. 6 am 2082 hrs	At 346. 6 am 2088 hrs	At 347. 6 am 2094 hrs	At 348. 6 am 2100 hrs	At 349. 6 am 2106 hrs	At 350. 6 am 2112 hrs	At 351. 6 am 2118 hrs	At 352. 6 am 2124 hrs	At 353. 6 am 2130 hrs	At 354. 6 am 2136 hrs	At 355. 6 am 2142 hrs	At 356. 6 am 2148 hrs	At 357. 6 am 2154 hrs	At 358. 6 am 2160 hrs	At 359. 6 am 2166 hrs	At 360. 6 am 2172 hrs	At 361. 6 am 2178 hrs	At 362. 6 am 2184 hrs	At 363. 6 am 2190 hrs	At 364. 6 am 2196 hrs	At 365. 6 am 2202 hrs	At 366. 6 am 2208 hrs	At 367. 6 am 2214 hrs	At 368. 6 am 2220 hrs	At 369. 6 am 2226 hrs	At 370. 6 am 2232 hrs	At 371. 6 am 2238 hrs	At 372. 6 am 2244 hrs	At 373. 6 am 2250 hrs	At 374. 6 am 2256 hrs	At 375. 6 am 2262 hrs	At 376. 6 am 2268 hrs	At 377. 6 am 2274 hrs	At 378. 6 am 2280 hrs	At 379. 6 am 2286 hrs	At 380. 6 am 2292 hrs	At 381. 6 am 2298 hrs	At 382. 6 am 2304 hrs	At 383. 6 am 2310 hrs	At 384. 6 am 2316 hrs	At 385. 6 am 2322 hrs	At 386. 6 am 2328 hrs	At 387. 6 am 2334 hrs	At 388. 6 am 2340 hrs	At 389. 6 am 2346 hrs	At 390. 6 am 2352 hrs	At 391. 6 am 2358 hrs	At 392. 6 am 2364 hrs	At 393. 6 am 2370 hrs	At 394. 6 am 2376 hrs	At 395. 6 am 2382 hrs	At 396. 6 am 2388 hrs	At 397. 6 am 2394 hrs	At 398. 6 am 2400 hrs	At 399. 6 am 2406 hrs	At 400. 6 am 2412 hrs	At 401. 6 am 2418 hrs	At 402. 6 am 2424 hrs	At 403. 6 am 2430 hrs	At 404. 6 am 2436 hrs	At 405. 6 am 2442 hrs	At 406. 6 am 2448 hrs	At 407. 6 am 2454 hrs	At 408. 6 am 2460 hrs	At 409. 6 am 2466 hrs	At 410. 6 am 2472 hrs	At 411. 6 am 2478 hrs	At 412. 6 am 2484 hrs	At 413. 6 am 2490 hrs	At 414. 6 am 2496 hrs	At 415. 6 am 2502 hrs	At 416. 6 am 2508 hrs	At 417. 6 am 2514 hrs	At 418. 6 am 2520 hrs	At 419. 6 am 2526 hrs	At 420. 6 am 2532 hrs	At 421. 6 am 2538 hrs	At 422. 6 am 2544 hrs	At 423. 6 am 2550 hrs	At 424. 6 am 2556 hrs	At 425. 6 am 2562 hrs	At 426. 6 am 2568 hrs	At 427. 6 am 2574 hrs	At 428. 6 am 2580 hrs	At 429. 6 am 2586 hrs	At 430. 6 am 2592 hrs	At 431. 6 am 2598 hrs	At 432. 6 am 2604 hrs	At 433. 6 am 2610 hrs	At 434. 6 am 2616 hrs	At 435. 6 am 2622 hrs	At 436. 6 am 2628 hrs	At 437. 6 am 2634 hrs	At 438. 6 am 2640 hrs	At 439. 6 am 2646 hrs	At 440. 6 am 2652 hrs	At 441. 6 am 2658 hrs	At 442. 6 am 2664 hrs	At 443. 6 am 2670 hrs	At 444. 6 am 2676 hrs	At 445. 6 am 2682 hrs	At 446. 6 am 2688 hrs	At 447. 6 am 2694 hrs	At 448. 6 am 2700 hrs	At 449. 6 am 2706 hrs	At 450. 6 am 2712 hrs	At 451. 6 am 2718 hrs	At 452. 6 am 2724 hrs	At 453. 6 am 2730 hrs	At 454. 6 am 2736 hrs	At 455. 6 am 2742 hrs	At 456. 6 am 2748 hrs	At 457. 6 am 2754 hrs	At 458. 6 am 2760 hrs	At 459. 6 am 2766 hrs	At 460. 6 am 2772 hrs	At 461. 6 am 2778 hrs	At 462. 6 am 2784 hrs	At 463. 6 am 2790 hrs	At 464. 6 am 2796 hrs	At 465. 6 am 2802 hrs	At 466. 6 am 2808 hrs	At 467. 6 am 2814 hrs	At 468. 6 am 2820 hrs	At 469. 6 am 2826 hrs	At 470. 6 am 2832 hrs	At 471. 6 am 2838 hrs	At 472. 6 am 2844 hrs	At 473. 6 am 2850 hrs	At 474. 6 am 2856 hrs	At 475. 6 am 2862 hrs	At 476. 6 am 2868 hrs	At 477. 6 am 2874 hrs	At 478. 6 am 2880 hrs	At 479. 6 am 2886 hrs	At 480. 6 am 2892 hrs	At 481. 6 am 2898 hrs	At 482. 6 am 2904 hrs	At 483. 6 am 2910 hrs	At 484. 6 am 2916 hrs	At 485. 6 am 2922 hrs	At 486. 6 am 2928 hrs	At 487. 6 am 2934 hrs	At 488. 6 am 2940 hrs	At 489. 6 am 2946 hrs	At 490. 6 am 2952 hrs	At 491. 6 am 2958 hrs	At 492. 6 am 2964 hrs	At 493. 6 am 2970 hrs	At 494. 6 am 2976 hrs	At 495. 6 am 2982 hrs	At 496. 6 am 2988 hrs	At 497. 6 am 2994 hrs	At 498. 6 am 3000 hrs	At 499. 6 am 3006 hrs	At 500. 6 am 3012 hrs	At 501. 6 am 3018 hrs	At 502. 6 am 3024 hrs	At 503. 6 am 3030 hrs	At 504. 6 am 3036 hrs	At 505. 6 am 3042 hrs	At 506. 6 am 3048 hrs	At 507. 6 am 3054 hrs	At 508. 6 am 3060 hrs	At 509. 6 am 3066 hrs	At 510. 6 am 3072 hrs	At 511. 6 am 3078 hrs	At 512. 6 am 3084 hrs	At 513. 6 am 3090 hrs	At 514. 6 am 3096 hrs	At 515. 6 am 3102 hrs	At 516. 6 am 3108 hrs	At 517. 6 am 3114 hrs	At 518. 6 am 3120 hrs	At 519. 6 am 3126 hrs	At 520. 6 am 3132 hrs	At 521. 6 am 3138 hrs	At 522. 6 am 3144 hrs	At 523. 6 am 3150 hrs	At 524. 6 am 3156 hrs	At 525. 6 am 3162 hrs	At 526. 6 am 3168 hrs	At 527. 6 am 3174 hrs	At 528. 6 am 3180 hrs	At 529. 6 am 3186 hrs	At 530. 6 am 3192 hrs	At 531. 6 am 3198 hrs	At 532. 6 am 3204 hrs	At 533. 6 am 3210 hrs	At 534. 6 am 3216 hrs	At 535. 6 am 3222 hrs	At 536. 6 am 3228 hrs	At 537. 6 am 3234 hrs	At 538. 6 am 3240 hrs	At 539. 6 am 3246 hrs	At 540. 6 am 3252 hrs	At 541. 6 am 3258 hrs	At 542. 6 am 3264 hrs	At 543. 6 am 3270 hrs	At 544. 6 am 3276 hrs	At 545. 6 am 3282 hrs	At 546. 6 am 3288 hrs	At 547. 6 am 3294 hrs	At 548. 6 am 3300 hrs	At 549. 6 am 3306 hrs	At 550. 6 am 3312 hrs	At 551. 6 am 3318 hrs	At 552. 6 am 3324 hrs	At 553. 6 am 3330 hrs	At 554. 6 am 3336 hrs	At 555. 6 am 3342 hrs	At 556. 6 am 3348 hrs	At 557. 6 am 3354 hrs	At 558. 6 am 3360 hrs	At 559. 6 am 3366 hrs	At 560. 6 am 3372 hrs	At 561. 6 am 3378 hrs	At 562. 6 am 3384 hrs	At 563. 6 am 3390 hrs	At 564. 6 am 3396 hrs	At 565. 6 am 3402 hrs	At 566. 6 am 3408 hrs	At 567. 6 am 3414 hrs	At 568. 6 am 3420 hrs	At 569. 6 am 3426 hrs	At 570. 6 am 3432 hrs	At 571. 6 am 3438 hrs	At 572. 6 am 3444 hrs	At 573. 6 am 3450 hrs	At 574. 6 am 3456 hrs	At 575. 6 am 3462 hrs	At 576. 6 am 3468 hrs	At 577. 6 am 3474 hrs	At 578. 6 am 3480 hrs	At 579. 6 am 3486 hrs	At 580. 6 am 3492 hrs	At 581. 6 am 3498 hrs	At 582. 6 am 3504 hrs	At 583. 6 am 3510 hrs	At 584. 6 am 3516 hrs	At 585. 6 am 3522 hrs	At 586. 6 am 3528 hrs	At 587.

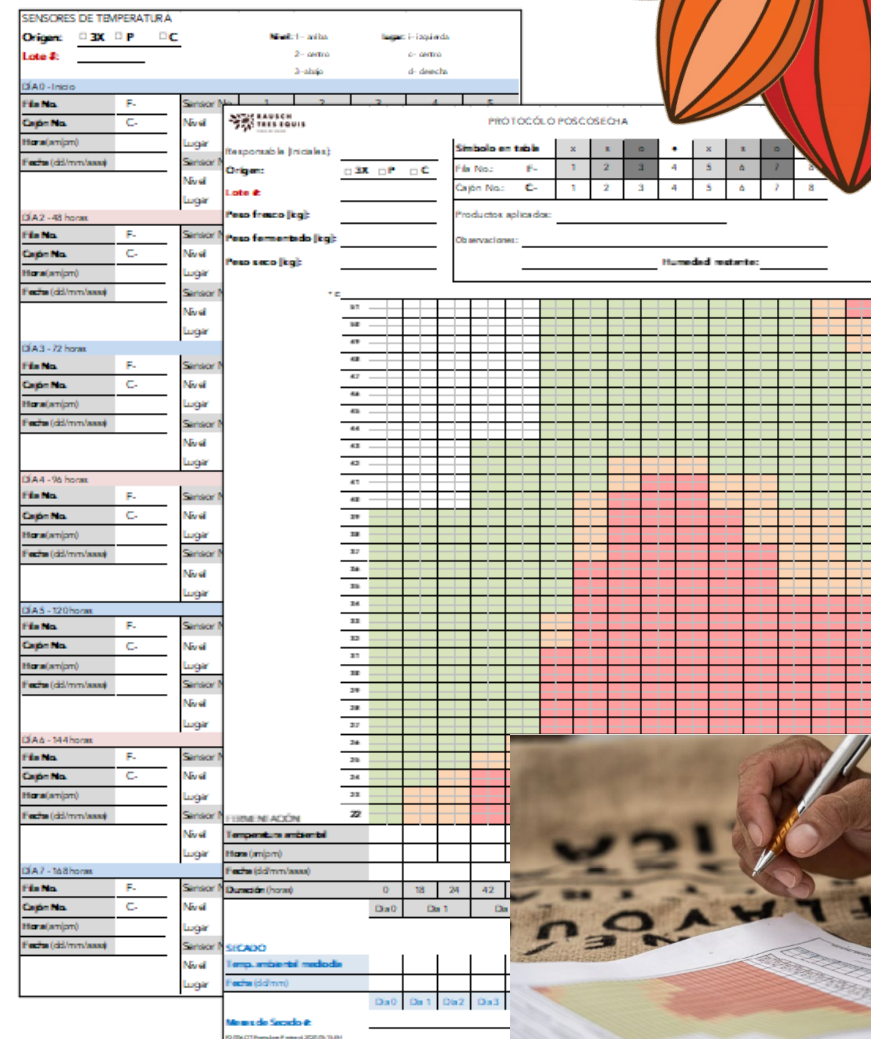
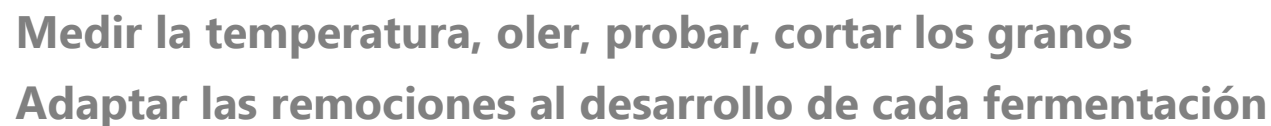


El manejo



vs.







Conclusiones



La genética



El entorno



El manejo

La fermentación de cacao está sujeto

- a las características de las variedades, la dinámica y biodiversidad microbiana del entorno
- al grado de higiene y aislamiento de los granos respecto a factores externos
- al protocolo implementado por el productor / la productora
 - ritmo de volteos, manipulación de los granos, etc.



Foro Latinoamericano- Caribeño de Cacao

Desafíos y pautas para una cacaocultura moderna y sostenible en la región



GRACIAS

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www.rausch.de

