Application of Biotechnology to added value in vegetable oils of the Amazon: a tool for the bioindustry!

Dr. André Luis Willerding, Biotechnology Dr., Research Assistant, Amazon Biotechnology Center (CBA), Amazonas, Brazil

Abstract (300 word limit)

This work presents the potential areas which the use of enzymes can expand markets for forest products such as oils from plants of the Amazon. This will add value in this raw material served as inputs for the cosmetic, food and pharmaceutical industries. Enzymes can increase the processing power and catalysis of lipids through a green chemistry and these conversions can be incorporated into industrial systems.

The enzymatic modification of oils containing a high percentage of unsaturated fatty acids is an alternative biotech process with excellent commercial prospects, since by traditional chemistry can generate oxidation products and polymers undesirable. Another application is the enrichment of vegetable oils with polyunsaturated fatty acids (PUFA - poly-unsaturated fatty acids) for the production of nutraceuticals foods. In another application line, biodiesel production can also occur by enzyme process, allowing the formation of biofuel. Among the oils studied Amazon, Brazil nuts, buriti, tucumã, passion fruit are considered as important as sources of fatty acids (Fig. 1). Together, the hydrolysis and transesterification enzymatic reactions are gaining ground as an alternative to physical and chemical processes (Fig. 2).

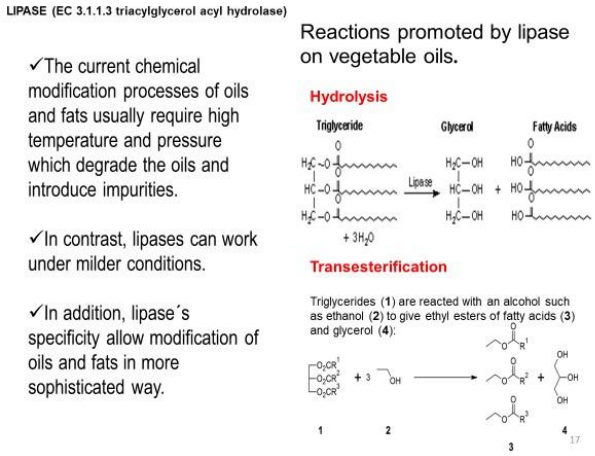


Fig. 1: Reactions promoted by lipase on vegetable oils.

Image

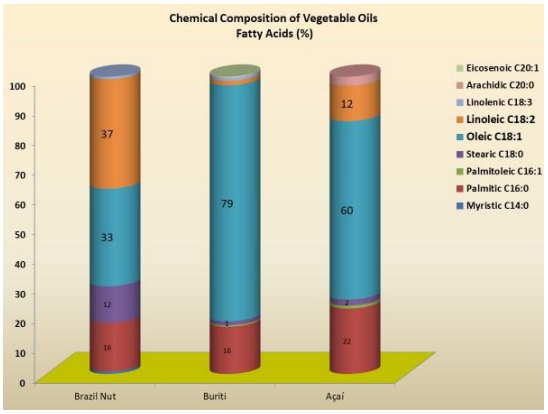


Fig. 2: Chemical Composition of Vegetable Oils Fatty Acids (%)

Recent Publications (minimum 5)

1. Willerding, A.L.; Silva, L.R.; Silva, R.P.; Assis, G.M.O.; PAULA, E.V.C.M.Estratégias para o desenvolvimento da bioeconomia no estado do Amazonas. ESTUDOS AVANÇADOS (ONLINE). , v.34, p.145 - 166, 2020. Home page: [doi:10.1590/s0103-4014.2020.3498.010]

2. Willerding, A. L.; Carvalho Neto, F. G. M. R.; Gama, A. M.; Carioca, C.R.; Oliveira, L.A.. Hydrolytic activity of bacterial lipases in amazonian vegetable oils. Química Nova (Impresso). Fator de Impacto(2019 JCR): 0,6680, v.35, p.1782 - 1786, 2012. [http://dx.doi.org/10.1590/S0100-40422012000900015]

3. Willerding, A.L.; Oliveira, L.A.; Moreira, F.W.; Germano, M.G.; Chagas Jr. A.F.Lipase Activity among Bacteria Isolated from Amazonian Soils. Enzyme Research. , v.2011, p.1 - 5, 2011. [http://www.hindawi.com/journals/er/2011/720194/][doi:10.4061/2011/720194]

4. Chagas Jr., A.F.; Oliveira, L.A.; Oliveira, A.N.; Willerding, A.L. Capacidade de solubilização de fosfatos e eficiência simbiótica de rizóbios isolados de solos da Amazônia1. Acta Scientiarum. Agronomy (Online). [doi:10.4025/actasciagron.v32i2.3185]

5. Chagas Jr., A.F.; Oliveira, L.A.; Oliveira, A.N.; Willerding, A.L Efetividade de rizóbios e caracterização fenotípica dos isolados que nodulam feijão-caupi em solos da Amazônia Central. ACTA AMAZONICA. v.39, p.489 - 494, 2009. [http://acta.inpa.gov.br/fasciculos/39-3/PDF/v39n3a02.pdf]

Photograph



Biography (150 word limit)

Graduated in Agronomy (UFSC - 1994), Specialization in Wood Technology (INPA - 1995), Master in Tropical Forest Sciences (INPA - 1998) and PhD in Biotechnology (UFAM - 2007). He worked at INPA from 2000 to 2004 on scientific projects involving microbiological collection aimed at the application in biotechnological processes in the area of enzymatic technology. He worked at the Amazon Biotechnology Center (CBA) from 2004 to 2015 in the biotransformation of vegetable oils with application of enzymatic technology with microbial lipase in vegetable oil. He worked at the Executive Secretariat of Science, Technology and Innovation of the Government of Amazonas (2015-2020), developing Public Policies in the areas of bioeconomy, biotechnology, forest resources and human resources. Currently works at the Amazon Biotechnology Center (CBA), Coordination of Plant Biotechnology in the Digital Management of germplasm collection.

Email: alwillerding@gmail.com

Notes/Comments: