International Interdisciplinary Congress on Renewable Energies, Industrial Maintenance, Mechatronics and Informatics

Booklets

RENIECYT 1702902 CONACYT

RENIECYT - LATINDEX - Research Gate - DULCINEA - CLASE - Sudoc - HISPANA - SHERPA UNIVERSIA - Google Scholar DOI - REDIB - Mendeley - DIALNET - ROAD - ORCID

Title: Microencapsulación de extractos de acachul (Ardisia Compressa) mediante secado por aspersión utilizando diferentes materiales poliméricos como agentes encapsulantes

Authors: SANTACRUZ-Vázquez, Claudia and SANTACRUZ-Vázquez, Verónica

Editorial label ECORFAN: 607-8695
BCIERMMI Control Number: 2021-01
BCIERMMI Classification (2021): 271021-0001

Pages: 11
RNA: 03-2010-032610115700-14

ECORFAN-México, S.C.
143 – 50 Itzopan Street
La Florida, Ecatepec Municipality
Mexico State, 55120 Zipcode
Phone: +52 1 55 6159 2296
Skype: ecorfan-mexico.s.c.
E-mail: contacto@ecorfan.org
Facebook: ECORFAN-México S. C.
Twitter: @EcorfanC

www.ecorfan.org

Holdings
Mexico Colombia Guatemala
Bolivia Cameroon Democratic
Spain El Salvador Republic
Ecuador Taiwan of Congo
Peru Paraguay Nicaragua

Introduction

Methodology

Results

Annexes

Conclusions

References

Introduction

Nowadays, consumers demand nutritious and functional products that also contribute to consumer health. For such reason, food and coloring industries have been subject to making changes in reformulation of their products and searching for new alternatives that do not affect consumers health maintaining the desired characteristics of food. For this reason, natural pigments of vegetable origin (carotenoids, chlorophylls, phenolic pigments: flavonoids, anthocyanins, tannins, and betalains) have been chosen as substitutes for artificial colors. In addition to the above, Mexico has a wide range of plant sources with attractive colors that are due to the presence of compounds (anthocyanins) found in the epidermal tissues of flowers and fruits mainly, which provide red, orange, blue and purple colors.

Introduction

The acachul is not entirety exploited, being commonly used as raw material for elaboration of artisan wines, thereby opening a field of application for obtaining natural coloring, having with it an economic and social benefit for producers of Acachul fruit expanding the market and encouraging its production to prevent this endemic crop from being lost by giving it a new added value and greater use. Therefore, importance of this research lies fundamentally in using polymeric agents as protective coatings of interest compounds (anthocyanins) and by means of spray drying used as a micro-encapsulation technique to obtain a natural powder pigment and thuscarrying out its physicochemical characterization, determining stability conditions for its application in food systems.

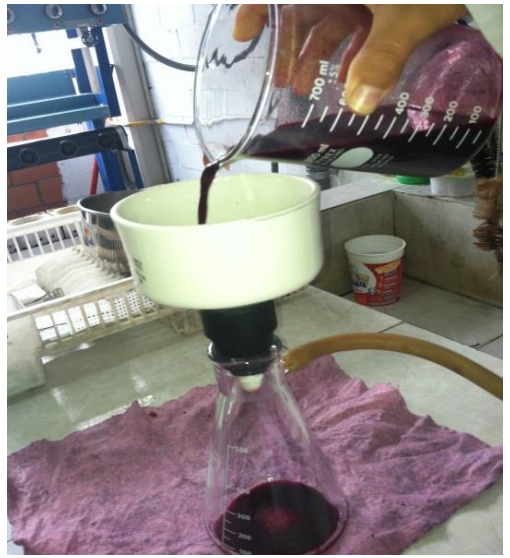
Methodology

Characterization of fresh Acachul fruit

Determination of total soluble solids (TSS)

Color determination

pH Determination



Methodology

Treatment **of Acachul fruit**

Microencapsulation by spray drying

↓

Characterization of natural pigment

↓

Determination of water activity (a_w)

↓

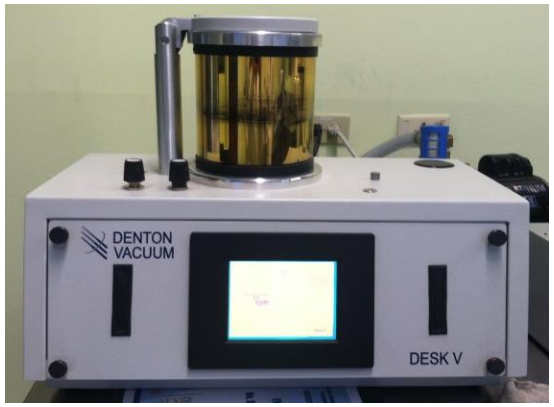
Water content determination

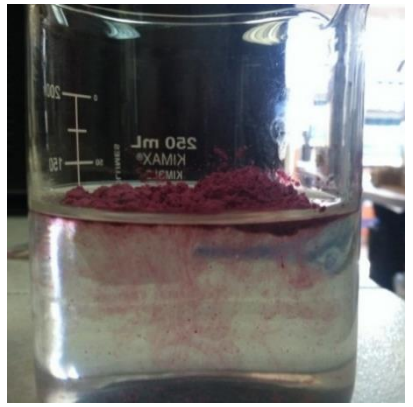
↓

Color determination

Methodology

- Scanning electron microscopy (SEM)
- Determination of total anthocyanins by spectrophotometry
- Hygroscopicity determination
- Density determination
- Reconstitution Test





RESULTS

Physicochemical characterization of fruit and encapsulated pigment

Table shows average values and standard deviation of pH, soluble solid content (°Bx) moisture content (%) of fresh acachul fruit *(Ardisia compressa)* stored at a refrigeration temperature of -4 °C.

Physicochemical characterization of Acachul (*Ardisia compressa*)

pH	°Brix	Moisture Content (%) (%)
3.48 ± 0.72	7.8 ± 0.3	77.45± 2.92

Table 4, it is observed that treatment C when using maltodextrin as an encapsulating agent, moisture content of product is 7.8%, a moisture content lower than that obtained when using treatment A or B. Furthermore, it is considered that the product encapsulated with maltodextrin, has a lower proliferation capacity of deteriorative microorganisms compared to other treatments.

Water Activity (a_w) and moisture (%) of powdered acachul fruit

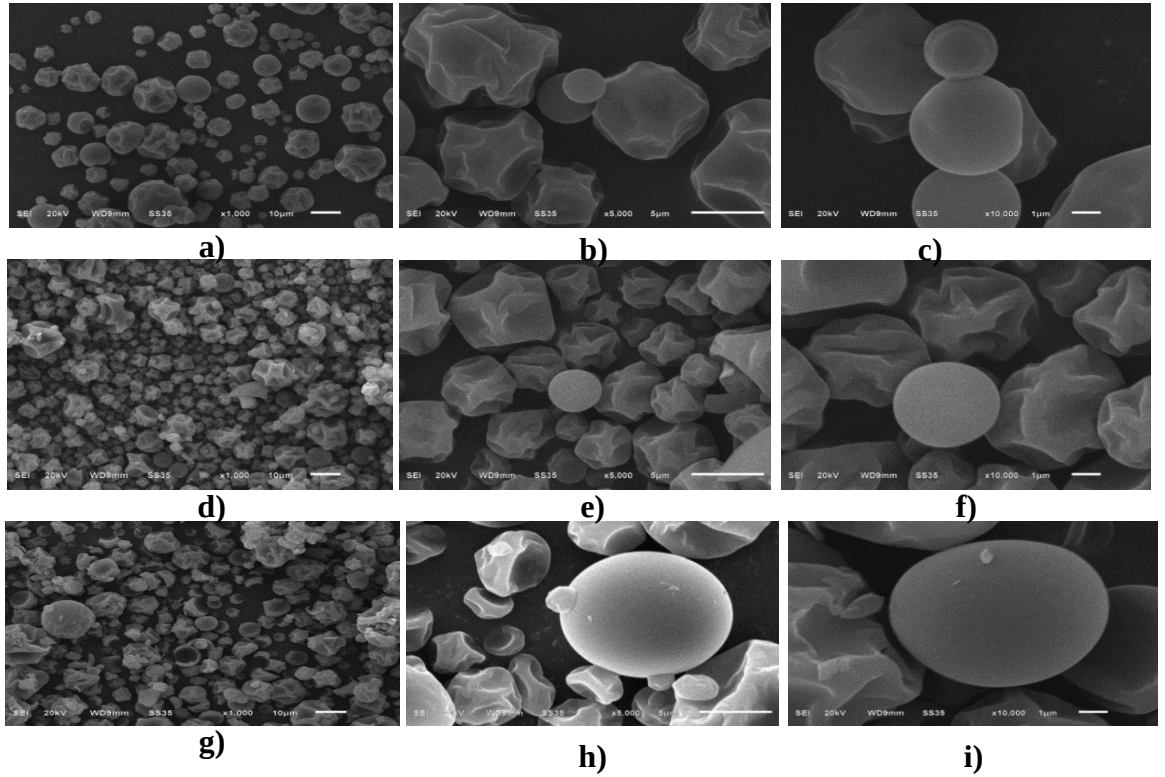
Treatment	(a_w)	Moisture Content (%)
A	0.364 ± 0.009	12.01 ± 0.14
B	0.323 ± 0.004	14.41 ± 0.39
C	0.358 ± 0.004	07.80 ± 0.27

Results

Scanning electron microscopy (SEM) of powders

Scanning electron microscopy photomicrographs of acachul pigment microcapsules from Acachul *(Ardisia Compressa)*, obtained by spray drying for the different treatments.

Treatment A	**a)**1000x	**b)** 5000x **c)** 10000x
Treatment B	**d)** 1000x	**e)** 5000x **f)** 10000x
Treatment C	**g)** 1000x	**h)** 5000x **i)** 10000x



Results

Determination of total anthocyanins was accomplish at (λ) 523nm wavelength. Wavelength that presents response at 523 nm corresponding to cyanidin-3-glucoside (Total anthocyanin content) expressed in mg per 100 g of fresh fruit. Results of absorbance and total anthocyanins (AT) for fresh fruit and treatments A, B and C, are presented in Table

Treatment	**λ nm**	**A**	**AT (mg/100 g)**
A	523	0.4434	82.76
B	523	0.4986	93.57
C	523	0.3232	60.62
Fresh fruit	523	0.8392	157.53

Results

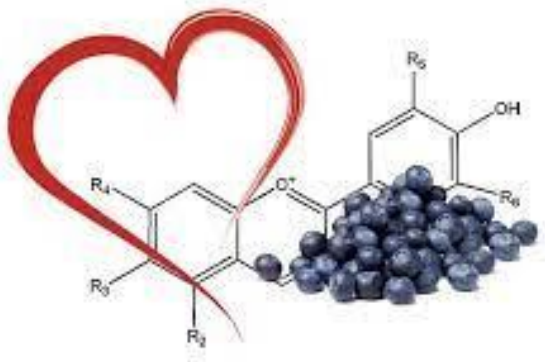
Reconstitution time of dehydrated powder pigment in an aqueous medium to determine the behavior of the dehydrated product when it is subjected to rehydration with water, was carried out at rehydration water temperatures of 25, 30, 50 and 80 ° C, results that are presented in Table. Time to effect the dissolution of the powdered pigment is inversely proportional to time used in the reconstitution. This behavior is attributable to the fact that surface tension of water decreases with temperature, since the cohesion forces decrease with increasing water temperature.

Temperature (ºC)	Treatment A	Treatment B	Treatment C
25	24	24	27
30	22	23	26
50	21	22	23
80	9	21	14

Conclusions

Anthocyanins, although they can be recovered from various types of fruits and vegetables, commonly grapes, strawberries, black currants, purple cabbage and others, for economic reasons, are obtained mainly from by-products derived from wine industry, especially the grape peel, therewithal it can be considered that acachul can be a good alternative to obtain these pigments.

Analysis of acachul anthocyanin content, reveal to have a significantly high anthocyanin content compared to that reported for other fruits and by other authors, which can make acachul an important source for obtaining this type of pigments, especially to obtain extracts with potential for application as food colorants.



ECORFAN®