**4. Supplementary material**

**Physicochemical data reported on unmodified agave fructans (NAF) and high- performance (HPAF) and high degree of polymerization (HPAF) fractions.**

The use of NAF, HPAF and HDPAF has been studied by some authors, who have reported specific physicochemical characteristics. Table S1 shows some properties

Table S1. Characteristic of *Agave tequilana* fructans fractions as additives and wall material in the encapsulation.

|  |  |  |  |
| --- | --- | --- | --- |
| Characteristic (g·100 g−1) | NAF | HPAF | HDPAF |
| Moisture | 4.62 ± 0.2 | 3.01 ± 0.03 | 2.52 ± 0.23 |
| Ash | 0.1 ± 0.02 | 0.15 ± 0.05 | 0.1 ± 0.05 |
| Total carbohydrate | 97.5 ± 1.7 | 98.2 ± 0.7 | 98.6 ± 0.5 |
| Reducing sugars | 13.6 ± 0.5 | 0.8 ± 0.06 | 0.4 ± 0.04 |
| Fructans | 83.9 ± 0.3 | 97.4 ± 0.5 | 98.2 ± 0.3 |
| aw | 0.41 ± 0.02 | 0.33 ± 0.001 | 0.3 ± 0.003 |
| Enriched DP | ---- | 4–80 | 30–80 |
| Tg (°C) | 52.68 | ---- | 130.05 |

HPAF= High Performance Agave Fructans; HDPAF= High Degree of Polymerization Agave Fructans and NAF= Native Agave Fructans.

Source: (Rodríguez-Furlán *et al*., 2014; Aldrete-Herrera, P.I., 2013; Ceja-Medina *et al*., 2020; Jimenez-Sánchez *et al.,* 2019; Ramos-Hernández *et al.,* 2021)*.*

Table S2. Physicochemical properties of the capsules obtained by spray drying using HDPAF fraction as wall material in the encapsulation of a symbiotic

|  |  |
| --- | --- |
| Property | Spray drying |
| L\* | 87.61 ± 1.90 |
| a\* | 1.75 ± 0.03 |
| b\* | 7.14 ± 0.23 |
| Hue angle | 85.43 ± 0.22 |
| Chroma | 2.32 ± 0.04 |
| Browning index (%) | 0.41 ± 0.02 |
| Total color change | 6.52 ± 0.09 |
| aw | 0.050 ± 0.05 |
| Moisture (%) | 3.27 ± 0.10 |

Source: Juárez-Trujillo *et al*., 2021

Table S3. Properties of stabilized pineapple powder based on NAF and MD

|  |  |  |  |
| --- | --- | --- | --- |
| Treatment |  Moisture (% | aw | Solubility (%) |
| FT (%) MD (%) |  |  |  |
| 0 10 | 2.94 ± 0.09 | 0.1823 ± 0.13 | 95.93 ± 0.03 |
| 2 10 | 2.82 ± 0.22 | 0.1579 ± 0.02 | 96.88 ± 0.08 |
| 4 10 | 2.74 ± 0.02 | 0.1423 ± 0.01 | 97.34 ± 0.18 |

FT: Fructans, MD: Maltodextrin.

Source**:** Jiménez-Sánchez *et al*., 2019

Table S4. Physicochemical characterization of the 70% high degree of polymerization agave fructans(HDPAF) polymer solution with and withoutβ-carotene

|  |  |  |
| --- | --- | --- |
| Parameter | 70% HDPAF without β-Carotene | 70% HDPAF with β-Carotene |
| Viscosity1(Pa·s) | 3.69±0.05a | 3.36±0.03a |
| Surface tension (mN/m) | 30.1±0.1b | 29.6±0.2b |
| Electrical conductivity (mS/cm) | 5.54±0.01c | 7.30±0.03c |

Different letters within the same row indicate significant differences among samples (α=0.05). The average values were obtained from the analysis of three replicas. 1Viscosity values were read at a shear rate of 39.8 s−1

Source: Cruz-Salas *et al.,* 2019

Table S5. Physical properties (conductivity, surface tension, and viscosity) of solutions and emulsions at different high degree of polymerization Agave fructans (HDPAF) concentrations

|  |  |  |  |
| --- | --- | --- | --- |
| Concentration (%w/w) | Viscosity (cP) | Surface Tension (mN/m) | Conductivity (μS/cm) |
| Solutions |
| 5 | 1.61±0.05a | 24.35±0.05a | 69.39±0.03a |
| 10 | 2.37±0.07b | 24.37±0.02a | 82.14±0.03b |
| 20 | 3.42±0.01c | 4.85±0.05b | 101.20±0.05c |
| 30 | 6.82±0.02d | 23.65±0.05c | 93.30±0.06d |
| 40 | 46.05±0.05e | 23.51±0.05d | 76.73±0.05e |
| 50 | 162.22±0.60f | 23.46±0.05d | 52.86±0.01f |
| Emulsions |
| 5 | 2.65±0.03a | 22.42±0.04a | 41.81±0.04a |
| 10 | 3.40±0.03b | 22.91±0.02b | 45.82±0.04b |
| 20 | 8.83±0.08c | 24.05±0.03c | 52.70±0.02c |
| 30 | 12.26±0.09d | 23.20±0.02d | 0.89±0.02d |
| 40 | 45.70±0.12e | 22.73±0.03e | 39.11±0.04e |
| 50 | 93.54±0.24f | 21.13±0.03f | 30.26±0.01f |

a–f: Different superscripts within the same column indicate significant differences among the samples (p< 0.05).

Source: Ramos-Hernández *et al.,* 2018

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Figure S1. Gel-like appearance of the agave fructan fractions formed after acylation at pH 10

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Figure S2. Agave fructans before and after acylation

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