

PREPARATION OF MICROPARTICLES BY COMPLEX POLYELECTROLYTE OF WATER SOLUBLE CHITOSAN- ALOE VERA MUCILAGE

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De-polymerized (30, 60 and 120 min) *A. vera*
mucilage and water soluble chitosan (WSCh) were
used to form microparticles by spray drying.
Genipin was used as a natural cross-linker agent
for the formation of microparticles. The micro-
particles were characterized using thermo-
gravimetric analysis, particle size distribution, FTIR
and electron microscope. The micro-particles
presented a contraction on surface characteristics
and this character diminished using mucilage with
a greater depolymerization time (120 min). Genipin
provided better surface properties to the micro-
particles. Key words: Depolymerization, pectic
substances

The gel in *Aloe* finds applications in the food,
cosmetic, pharmaceutical and medical industries
[1]. Various cross-linking agents have been used to
improve the characteristics in micro-particle
formation using polyelectrolytes. Genipin is a
natural cross-linking agent. The aim of this work
was to evaluate the formation of microparticles by
spray drying using water soluble chitosan-mucilage
of *A. vera* and genipin. The preparation of micro-
particles from WSCh-mucilage of *A. vera* and
diclofenaco: WSCh 10% (w/v). The mucilage (1%;
p/v) was depolymerized in autoclave at 121°C for
30, 60 and 120 min. The mucilage *A. vera* solutions
depolymerized (30, 60 and 90 min) were
incorporated in sodium diclofenac (5 mg/mL) and
genipin (500 mg/L). The solutions were thoroughly
homogenized and then placed independent teams
in the Spray Dryer (Mini B-290, Büchi). The
process parameters were set as: inlet temperature
180°C, outlet temperature 85°C, aspirator setting
100%, air flow was - 0.05 bar and flow velocity 15
mL/min. The microparticles is characterized for
analysis thermogravimetric, particle size, infrared

spectroscopy and microscopy electronic. The
results showed the effect of the duration of thermal
treatment on the loss of viscosity of the mucilage
solutions from *A. vera*. The micro-particles were
studied under electronic microscopy was used to
observe microspheres image. Although the micro-
particles prepared from thermally treated water
soluble chitosan-mucilage from *A. vera* presented a
contraction, this phenomenon was greater in the
mucilage depolymerized in 30 min than 60 and 120
min mucilage (Fig. 1). The controls at 30, 60 and
120 min showed heterogeneity and the size of
particles is ~ 5-7 µm. But use of genipin resulted in
a greater uniformity and bigger size at 30 and 60
min than the controls which were in the range of ~5
µm. It was observed that at the 120 min treatment,
the particle size was homogenous and the micro-
particles showed a bigger size. The infrared
spectrum of the micro-particles The peaks at 1250-
1750 cm⁻¹ region suggested the interaction
between amino groups of WSCh and carboxyl
groups of mucilage *A. vera* in formation of
microparticles.

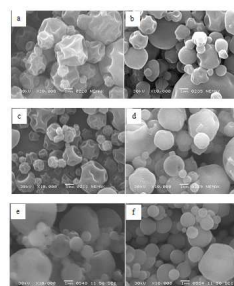


Fig. 1. Electronic microscopy of
micro-particles of water soluble
chitosan-mucilage from *A. vera*
obtained through spray drying.
Mucilage of *A. vera* thermally
treated for 30 min (a) water soluble
chitosan-mucilage from *A. vera*, (b)
water soluble chitosan-mucilage
from *A. vera* thermally treated for 30
min, pharmaceutical product and
genipin. Mucilage from *A. vera*
thermally treated for 60 min, (c)
water soluble chitosan-mucilage from
A. vera, (d) water soluble
chitosan-mucilage from *A. vera*,
pharmaceutical product and
genipin. Mucilage thermally treated
for 120 min, (e) water soluble
chitosan-mucilage from *A. vera*, (f)
water soluble chitosan-mucilage from
A. vera, pharmaceutical product and
genipin.

The conclusions of the work are spray drying is a
useful procedure for the preparation of micro-
particles of water soluble chitosan-mucilage from
A. vera. A key factor affecting the characteristics of
the surface of micro-particles was the duration of
depolymerization of mucilage from *A. vera*. As the
treatment time of mucilage from *A. vera* increases,
the surface of the micro-particles is more uniform.
The genipin is a cross binding agent that allows
generation of spherical micro-particles and of
homogenous in size.

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