CARRIERS FOR BIOFORMULATIONS OF *Bacillus mojavensis* MC3B-22 AND *Paenibacillus* sp. TS3B-45 FOR ANTRACNOSE CONTROL

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Biocontrol, carriers, antracnose

Introduction.

In the tropics there is a high incidence of fruit diseases caused by fungi, especially the genus *Colletotrichum*. Strains MC3B-22 from marine origin and identified as a *Bacillus mojavensis* y TS3B-45 isolated from mango phyllospher, belonging to the genus *Paenibacillus* have proved their efficiency in biological control of these diseases (1), *in vitro* (2) and *in vivo* (3), however, for commercial use by fruit producer they must be part of a bioformulation; that is to say, a product resulting from the mixture of biomass and carriers. For this reason it was decided to evaluate the carriers glycerol, xanthan gum (4), tween 20 (3), talc and kaolin (5) at different concentrations to get the best conjugated bioformulations (two carriers).

Methods.

Biomass of microorganisms was cultured and harvested; then was added to the experimental bioformulations to reach a final concentration of $1X10^{10}$ ufc/mL (6) and stored at 25°C. Viability of these bioformulations was evaluated in the first month after elaboration. And the carriers that did not get a concentration equal or greater than $5X10^{9}$ ufc/mL (50%) after one month of storing were discarded. In a second step the two carriers with the best result of viability were evaluated by an experimental design 3^2 to get the best bioformulation. The biomass that came from these bioformulations were tested for antagonistic activity (7) against *C. gloeosporioides* in different growth mediums after one month of storing.

Results.

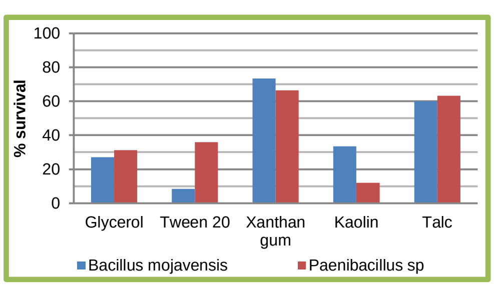

Fig. 1 Viability of the best bioformulations with single carriers of *B. mojavensis* and *Paenibacillus* sp.

Figure 1 shows that the highest viability were given by xanthan gum and talc for both bacteria. Table 1 and Table 2 show viable cells and spores concentration of bioformulations of experimental design 3^2 for *B. mojavensis* and *Paenibacillus* sp.; in this experimental phase almost all trials had above 95% Vc/S (Viable cells/spores)

Table 1 and Table 2. Behavior of viable cells and spores of *B. mojavensis* and *Paenibacillus* sp in bioformulations dictated by experimental design 3^2 after one month of storing to 25°C±2°C.

Trials*	Viable cells	Spores	% Vc/S
1	1.85E+10	1.54E+10	83.24
2	2.06E+10	7.48E+09	36.31
3	2.12E+10	2.06E+10	97.17
4	2.05E+10	2.02E+10	98.54
5	2.18E+10	2.16E+10	99.08
6	2.25E+10	2.17E+10	96.44
7	2.26E+10	2.26E+10	100
8	2.31E+10	2.27E+10	98.27
9	2.33E+10	2.32E+10	99.57

Trials*	Viable cells	Spores	% Vc/S
1	2.17E+10	2.03E+10	93.55
2	2.37E+10	2.30E+10	97.05
3	2.28E+10	2.23E+10	97.81
4	2.33E+10	2.21E+10	94.85
5	2.41E+10	2.35E+10	97.51
6	2.39E+10	2.37E+10	99.16
7	2.17E+10	2.15E+10	99.08
8	2.37E+10	2.34E+10	98.73
9	2.16E+10	2.06E+10	95.37

In figure 2a is appreciated that *B. mojavensis* inhibits the radial growth of the fungus from 44.79% up to above 60% and the figure 2b shows *Paenibacillus* sp. inhibits the fungus until 74.37%.

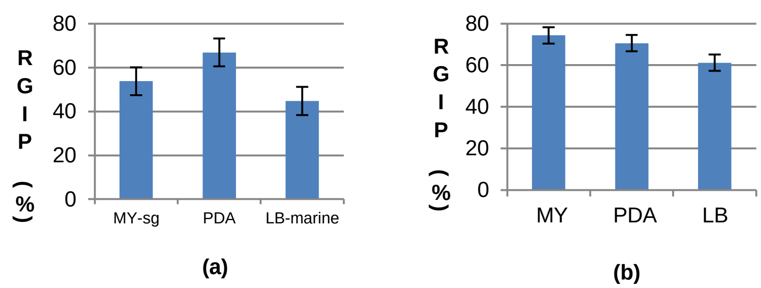

Fig. 2 Inhibition of radial growth *in vitro* of *C.gloeosporioides* by (a) *B. mojavensis* and (b) *Paenibacillus* sp. in three different growth media.

Conclusions.

The carriers talc y xanthan gum keep the better viability of both bacteria, especially conjugated.
Conjugated bioformulations of talc and xanthan gum give % spores/viable for above of 95%
Biomass from conjugated bioformulations of xanthan gum and talc hold their antagonist ability against the fungus *C. gloeosporioides*.

Acknowledgements.

Founded project by FOMIX-Campeche 146245 and CONACYT Master Scholarship.

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