Sociedad Argentina de Microbiología General

XIX CONGRESO DE LA SOCIEDAD ARGENTINA DE MICROBIOLOGÍA GENERAL

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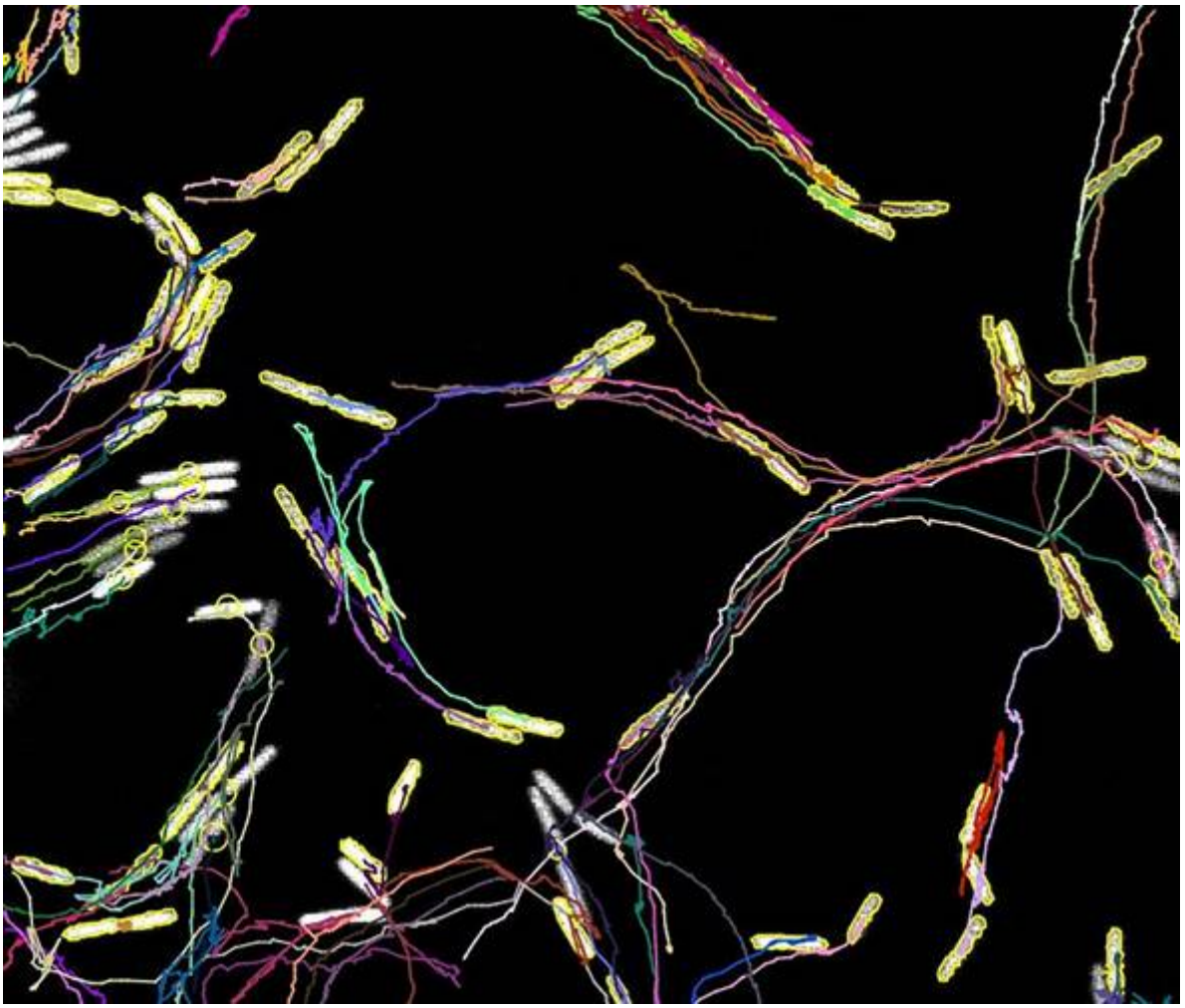

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

189 - Biotecnología y Bioprocesos

EXOPOLYSACCHARIDE PRODUCING BIFIDOBACTERIA FROM *Gallus gallus domesticus*

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In the last years, bifidobacteria have attracted considerable attention due to their potential probiotic properties. The persistence of these microbes in the gut would enhance their beneficial effects. Exopolysaccharides (EPS) have been shown to play a key role in the persistence of bacteria in the intestinal tract. Also, these compounds could exhibit a wide range of technological and biological properties based on their chemical structure, which has prompted interest in their potential applications. The objective of this work was to select the optimal conditions for the production of EPS by selected *Bifidobacterium* strains previously isolated from *Gallus gallus domesticus*. Additionally, the extracted EPS were partially characterized by spectroscopy techniques. The strains growth and phenotype of the produced EPS (philance and refringence) were analyzed in MRS agar media modified by the addition of one of the following sugars: Glucose, fructose, galactose, lactose, sucrose, and raffinose. The interaction of different sugar concentrations (1, 2, and 4%), pH (4.5, 5.5, and 6.5), and temperature (37 and 41 °C) with EPS production capacity was evaluated by response surface methodology (RSM). Finally, the EPS was produced in the optimized media, extracted, lyophilized, and structurally characterized by FT-IR and NMR. Results indicated that four out of eight strains exhibited refringence according to Burri's method. Additionally, slight filamentous threads were observed when colonies were picked up with a loop. Two strains were selected for further investigation using the RSM approach, based on their observation with negative staining, and the amount of total carbohydrates determined by the phenol-sulfuric method in the different media. *B. animalis* subp. *lactis* LET 401 and *B. termophilum* LET 411 had the potential to produce more capsular EPS in MRS glucose and MRS fructose, respectively, compared to the other sugars. According to RSM, the optimal working conditions for EPS production would be 3% glucose, pH 5.0, and a temperature of 41 °C and 3.5% fructose, pH 5.5, and temperature of 41°C for strains LET 401 and LET 411, respectively. Analysis of the FT-IR spectra in the anomeric region (800-1000 cm^{-1}) suggested the possibility of beta configuration bonds in the EPS of LET 401, while it indicated the possibility of alpha-type

bonds in the EPS of LET 411 (bands at 900 and 920 cm^{-1}). The observed signals agree with those detected by NMR in the anomeric region of the HSQC spectra. The most notable signals indicated that the EPS of LET 401 included predominantly galactose monosaccharides in the form of beta-bonded pyranose, whereas LET 411 exhibited predominantly alpha-type bonds. In conclusion, the results of this work provide the basis for further research aimed at elucidating the functional and biological properties of EPS of *Bifidobacterium* species of *Gallus gallus* origin.

Palabras clave: EPS – poultry – bifidobacteria – spectroscopy