ISOLATION AND CHARACTERIZATION OF ANTIBACTERIAL LACTIC ACID BACTERIA FROM MOROCCAN FERMENTED TABLE OLIVES.

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Abstract - Lactic acid bacteria are Gram positive, anaerobic and non-sporulating bacteria; produced by fermentation of carbohydrates, lactic acid as the main end product (Khalid & others, 2011). They are among the most important groups of microorganisms used in food fermentation, and play an important role in preserving food by producing substances that inhibit the growth of pathogenic bacteria. They colonize the human digestive tract, including the colon, intestine and saliva (Tannock& al., 1990). They are generally recognized as safe for human consumption (probiotics), and contribute to enormous environmental and health benefits (Food, 2002). Several species have received a recognized presumptive safety status (QPS) given by the European Food Safety Authority (EFSA). Several criteria were used to consider new lactic acid bacteria isolates as probiotics, including tolerance to acidic conditions, cholesterol reduction potential, be non-hemolytic, have antimicrobial properties, survive during the fermentation process, and antibiotic-sensitive (non-multi-resistant) ... (Kumar & al., 2015). Resistance of lactic acid bacteria to antibiotics could be transferred to bacteria in the gastrointestinal tract and thus to pathogenic bacteria, leading to the spread of antibiotic-resistant strains (Mathur& Singh, 2005). The potential transfer of these resistant genes poses a threat to public health (Chang & al., 2009). The objective of this study was to study the antibiotic resistance of lactic acid bacteria isolated from fermented table olives in Morocco. On the basis of the results obtained, we were able to estimate the presence of resistant strains in table olives, which poses a potential risk for the health of consumers. On the other hand, isolates sensitive to antibiotics and pathogen inhibitors can be selected for their use in the food and pharmaceutical industry. From 127 samples of table olives, 114 lactic strains with antibacterial activity against Listeria innocua were isolated by the double layer method. Only 15 isolates produce the inhibitory agent by the well diffusion method. The action spectrum of the 15 isolates encompasses Gram-positive bacteria (Listeria innocua CECT 4030, Listeria monocytogenes CECT 4032, Staphylococcus aureus 25923 ATTC, Staphylococcus aureus 43300 ATCC, Staphylococcus aureus 29213 ATCC, Staphylococcus epidermidis ATCC 12228) and Gram negative bacteria (Escherichia coli CECT 25922, Klebsiella pneumonia ATCC 13883 and Salmonella typhimirium ATCC 14028). According to the antibiotic sensitivityassay(Soltani& al., 2016), LB62 strain showed sensitive to ten different antibiotics; Tetracycline, streptomycin, penicillin, rifampicin, amoxicillin, amikacin, gentamicin, erythromycin, ampicillin and chloramphenicol. LB6, LB48, LB15 and LB21 are each resistant to one of ten antibiotic. The other strains are susceptible to at least four antibiotics tested. Depending on the acidification profile, LB21 and LB8 show respectively high and low acidification rates. The temperature and time of incubation influence the growth of both lactic strains and the production of their inhibitory substances. The optimal growth temperature of the 15 strains is between 30°C and 37°C. The maximum biomass is obtained between 48h and 72h, whereas the antibacterial activity varies as a function of the incubation time and temperature.

Key words - Table olives, lactic acid bacteria, antibacterial activity, antibiotic.

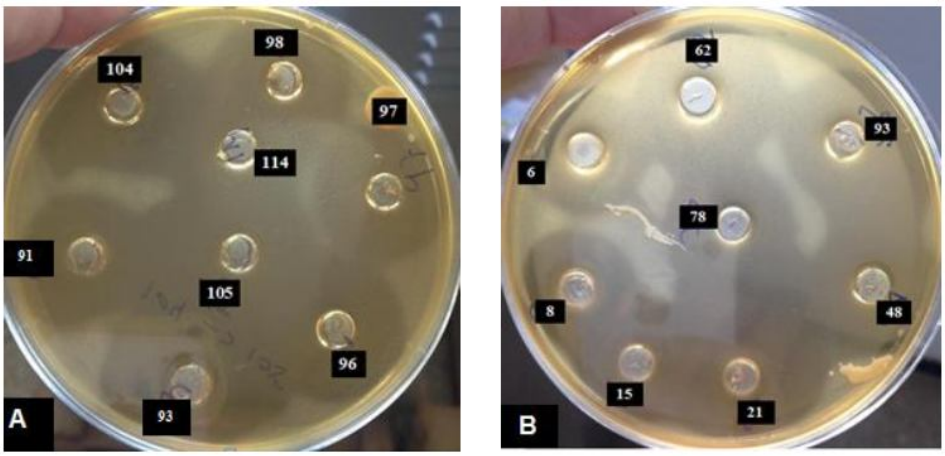

Figure 1: A and B: Agar Well Diffusion Assay showing inhibition zones on Mueller Hinton Agar medium (MHA) by LAB isolates against L. monocytogenes CECT 4032 after 24 h of incubation at 30°C after pH neutralization.

Antibiotiques	Souches bactériennes														
	LB_6	LB_8	LB_{15}	LB_{21}	LB_{48}	LB_{62}	LB_{78}	LB_{91}	LB_{93}	LB_{96}	LB_{97}	LB_{98}	LB_{104}	LB_{105}	LB_{114}
Amoxicilline	S	S	S	S	R	S	S	S	S	S	S	S	S	S	S
Pénicilline	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Ampicilline	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Oxacilline	R	R	R	R	R	S	R	R	R	R	R	S	R	R	R
Vancomycine	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R
Amikacine	S	R	I	S	I	S	R	R	R	I	R	I	S	S	S
Gentamicine	I	I	I	S	I	S	I	R	I	R	R	R	R	S	R
Streptomycine	I	R	I	R	I	S	R	R	R	I	R	R	R	R	R
Erythromycine	S	R	I	S	R	S	R	R	R	R	R	R	R	R	R
Rifampicine	S	I	S	I	S	S	I	I	I	S	R	I	S	S	S
Chloramphénicol	I	S	S	S	S	S	I	R	I	S	S	I	S	S	S
Tétracycline	S	S	S	I	S	S	S	S	I	S	R	S	R	S	S
Ciprofloxacine	S	I	I	I	I	S	I	S	I	S	R	S	R	R	R

Table 1: Antibiotic susceptibility testing of LABs isolated from table olives.

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