MEXICAN OREGANO AGAINST SENSIBLE AND MULTIRRESISTANT BACTERIAL STRAINS ISOLATED FROM STOOL SAMPLES OF CHILDREN WITH DIARRHEA.

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Introduction. Gastrointestinal diseases are one of the most important public health problems in Mexico, and affect mainly children (1). On the other hand, all bacterial species are involved in resistance to antimicrobials, and this represents a significant problem for chemotherapy. Herbal medicine has been used for many years, and it is well known that the components present in medicinal plants, may have beneficial effects on health, but not enough research has been done experimentally to prove the actual mechanisms involved (2). There are several studies on the antimicrobial activity of extracts of different types of oregano against Gram negative and Gram positive bacteria, even against those strains with multiple resistances to antibiotics (3).
The objective of this research was to evaluate the antimicrobial activity of the essential oil of Mexican oregano (*Lippia berlandieri* Schauer) against sensible and multirresistant bacterial strains isolated from stool samples of children with diarrhea.

Methodology. Bacterial strains was isolated from stool samples of children with diarrhea, the identification was carried out by biochemical tests, and the Kirby Bauer method was used for resistance to 12 antibiotics used against Gram negative bacteria. The Rezarsurin Microtitre Assay (REMA) was used to determine Minimal Inhibitory and Bactericidal Concentration (MIC, MBC) dilutions were made of essential oil in absolute alcohol, and appropriate dilutions were place in the microplate, added with bacterial suspension (adjusted to 0.5 Mac Farland's Nephelometer), and incubated. After incubation, samples of each microwell were placed in Nutrient Agar plates to determine MIB, and resazurin was added to the microplate, to determine the MIC value.

Results.
A total of 19 Gram negative bacterial strains were isolated form stool samples obtained from children with diarrhea during summer of 2011. According to the results of identification, most of the strains were from Enterobacteriaceae family, and two *Pseudomonas* spp. were isolated. Based on the results of antibiotic resistance, 12 were resistant to two or less antibiotics, and are considered for this work as non-multirresistant, while 7 were considered as multirresistant, since they were resistant to up to five different antibiotics (Table 1). MIC (red) and MBC (blue) values were similar, regardless of antibiotic resistance results (Fig 1).

Table 1. Antibiotic sensitivity of isolated bacterial strains

	ANTIBIOTICS											
STRAINS	**AM**	**CF**	**CB**	**NF**	**ST**	**GE**	**NT**	**CX**	**PF**	**CL**	**CR**	**AK**
Citrobacter braakii	**R**	**R**	**R**	**R**	**S**	*I*	**R**	S	*I*	S	S	S
Pseudomonas sp.	**R**	**R**	**R**	**R**	**S**	S	S	**R**	S	S	*I*	S
Salmonella spp.	**R**	**R**	**R**	S	**R**	S	**R**	S	*I*	S	S	S
E. coli	**R**	S	**R**	S	**R**	**R**	S	S	*I*	S	S	S
Escherichia hermanni	**R**	S	**R**	R	S	S	*I*	S	S	S	S	S
Serratia spp.	**R**	S	**R**	S	S	**R**	S	S	S	S	S	S
Kluyvera cryocrescens	**R**	S	**R**	S	S	**R**	S	S	S	S	S	S
Klebsiella spp.	**R**	S	**R**	*I*	S	*I*	S	S	*I*	S	S	S
Citrobacter freundii	**R**	**R**	S	S	S	*I*	S	S	S	*I*	S	S
Citrobacter freundii	**R**	**R**	*I*	S	S	*I*	S	S	S	S	S	S
Pseudomonas sp.	S	*I*	S	**R**	S	**R**	S	S	*I*	S	S	S
Enterobacter spp.	**R**	**R**	S	S	S	*I*	S	S	S	S	S	S
Serratia spp.	S	*I*	S	**R**	S	**R**	S	S	S	S	S	S
Enterobacter spp.	*I*	**R**	S	S	S	*I*	S	*I*	S	S	S	S
Salmonella spp.	*I*	**R**	*I*	*I*	S	S	S	S	S	S	S	S
Citrbacter freundii	*I*	**R**	S	S	S	*I*	S	S	S	S	S	S
Enterobacter spp.	S	**R**	S	S	S	S	S	S	S	S	S	S
E. coli	S	S	S	S	S	S	S	S	S	S	S	S
Shigella sp.	S	S	S	S	S	S	S	S	S	S	S	S

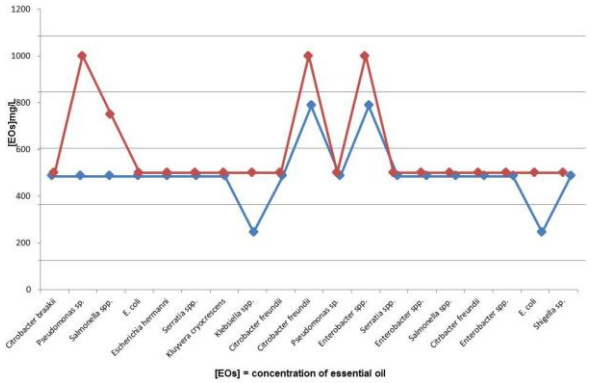

Fig.1 MICs and MBCs of Mexican oregano essential oil.

Conclusions. The antimicrobial activity of Mexican oregano show similar antimicrobial effect against multiresistant and non-multiresistant bacteria strains, therefore it can be considered as a good alternative for pharmacological treatment.

References.

1. Hernández C. C., Aguilar A. M., Castro E. G. (2011). Gastrointestinal diseases, situation in Mexico. *Enf Inf Microbiol.* 31(4)137-151.
2. Briskier A. (2005). Epidemiology of Resistance to Antibacterial Agents. *Antimicrobial Agents*. ASM Press. USA. 39-42
3. Sosa Gómez R. (2002). *El poder medicinal de las plantas*. APIA.. Mexico. 12-19.