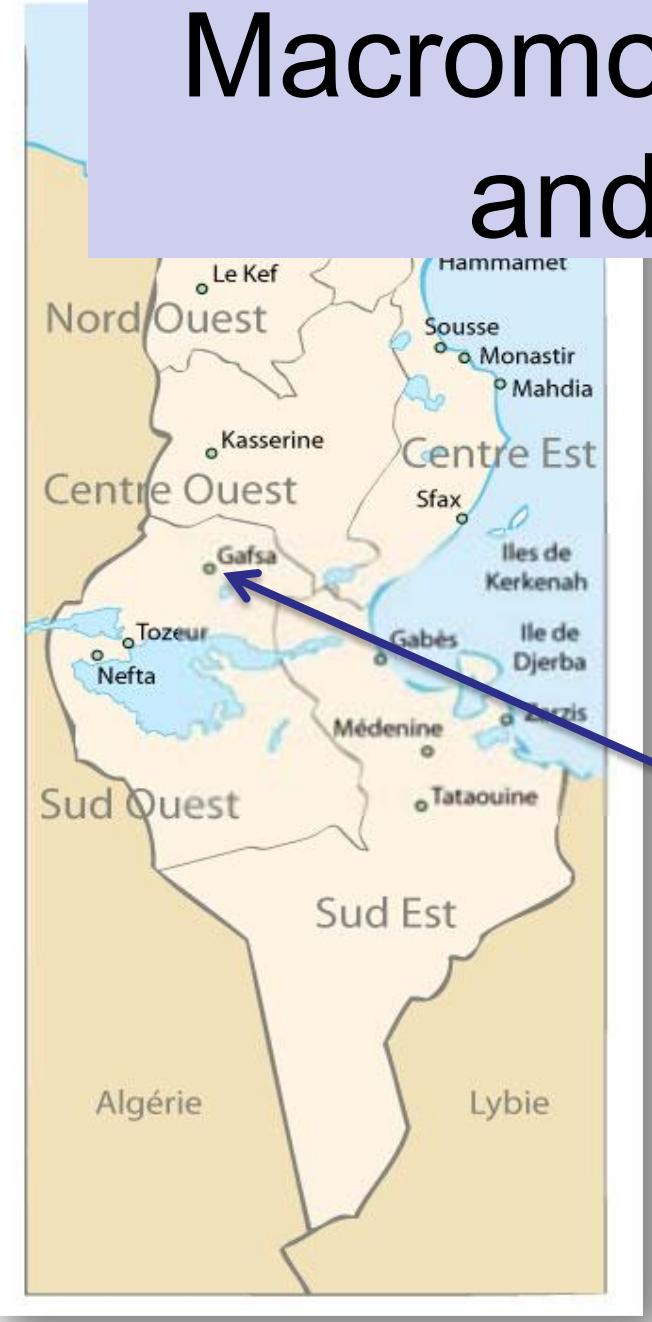
Preventive role of Cactus (*Opuntia ficus-indica*) cladodes on the toxicity of Zearalenone in Balb/C Mice

Pr. ZOURGUI Lazhar

Director of Research Unit of Macromolecular Biochemistry & Genetics
Faculty of sciences Gafsa - Tunsia
High Institute Sup of Applied Biology ISBA Médenine Tunisia

Macromolecular Biochemistry and Genetic: BMG



GAFSA BMG

Unité de recherche Biochimie Macromoléculaire et Génétique

Faculty of Sciences Gafsa

Evaluation of biological activities of Cactus

Opuntia ficus indica

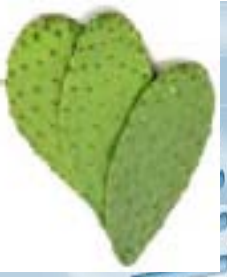



Cladodes, flower, Fruits, roots, seed oil

Research topics in BMG Gafsa

- Anti-bacterial, anti-fungal activities (Karima et al 2009)
- Antiulcerogenic effect (Alimi et al 2010)
- Diuretic effect
- Anti-ER Stress (Souid et al. 2011)
- Protective effects against:
    - Pesticides : Clorpyrifos (N'cibi et al. 2008)
    - Heavy metal: Nickel (Hfaiedh et al. 2008)
    - Methotrexate (MTX) (Amira et al. In press)
    - Mycotoxins (Zearalenone) (Zourgui et al. 2008,2009, 2011)

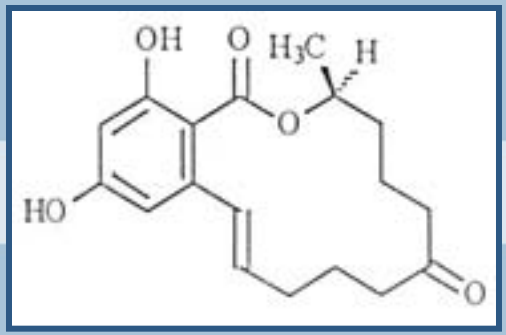
*Protective and curatif effects of Benzo-(a) Birene, Aflatoxin....



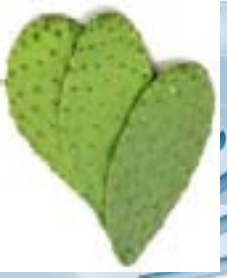
Preventive role of Cactus (*Opuntia ficus-indica*) cladodes on the toxicity of Zearalenone in Balb/C Mice

Why Zéaralénone?

Zéaralénone



- produced by *Aspergillus* and *Penicillium* species
- High incidence in many important corps intended for human and animal consumptions
  - Cytotoxic effect
  - Genetoxic effect
  - Hepatotoxic, Haematotoxic effects



Objective:

The protective effect of cactus Cladode against :

1- Oxydative stress induced by the Zen

2- The genetoxic effet of the Zen

3- Biochemicals, Heamatologicals and Pathologicals changes

I- Protective effect of Cactus cladode against the oxidative stress induced by Zéaralénone

Experimental conditions

- Balb/c mice: 25 g
- 6 groups : 5 mices
- Administration intra-péritoral of:
  - Gpe 1:100 µl Éthanol/H2O: control 1
  - Gpe 2: 100 mg/Kg of cladode extract : control 2
  - **Gpe 3: 40 mg/Kg of Zearalenone (ZEN)**
  - Gpe 4: 40 mg/Kg of ZEN + 25 mg/Kg of cladode extract
  - Gpe 5: 40 mg/Kg of ZEN + 50 mg/Kg of cladode extract
  - Gpe 6: 40 mg/Kg of ZEN + 100 mg/Kg of cladode extract
- Sacrificed after 24 heures **:liver, Kidney, blood, bone marow…**

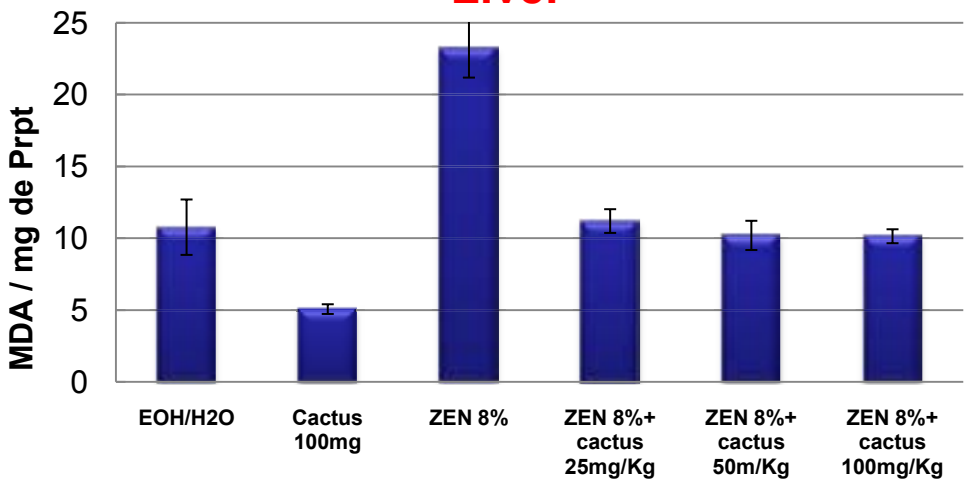
Stress Protein: Hsp 70 and Hsp 27 analysis

-1: control 1: Éthanol/H2O
-2: control 2: 100 mg/Kg of cladode extract
-3: **Zéralenone 40 mg/Kg**
-4: Zéralenone 40 mg/Kg + **25** mg/Kg of cladode extract
-5: Zéralenone 40 mg/Kg + **50** mg/Kg of cladode extract
-6: Zéralenone 40 mg/Kg + **100** mg/Kg of cladode extract

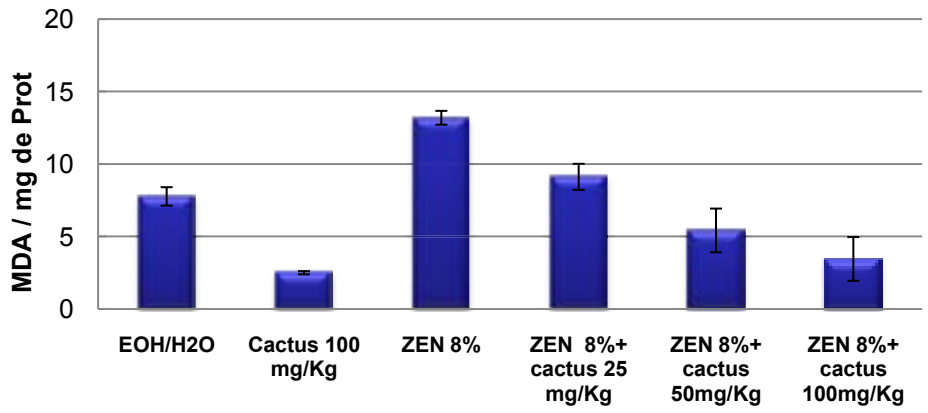
Induction of lipid peroxidation

Dosage of MDA (malonaldialdéhyde)

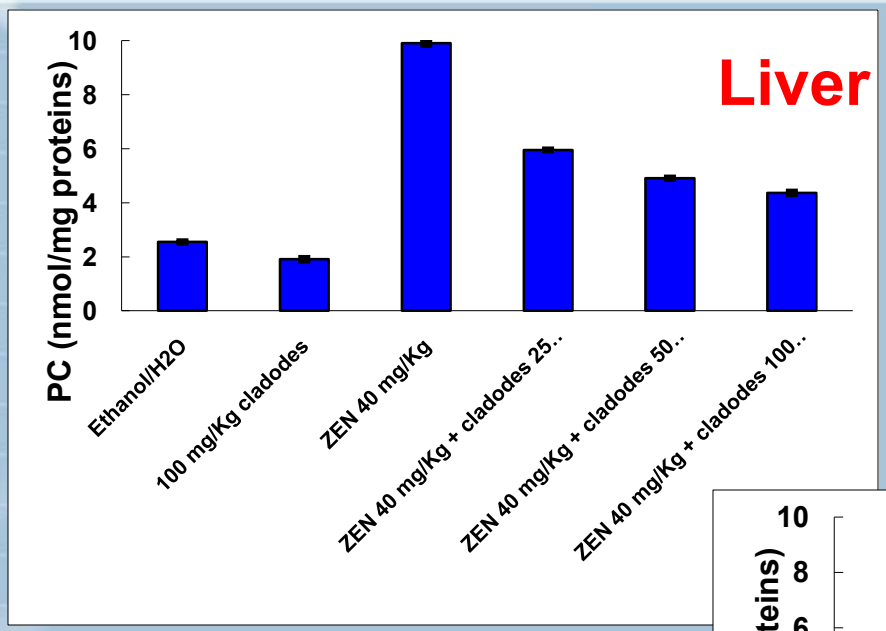
Liver

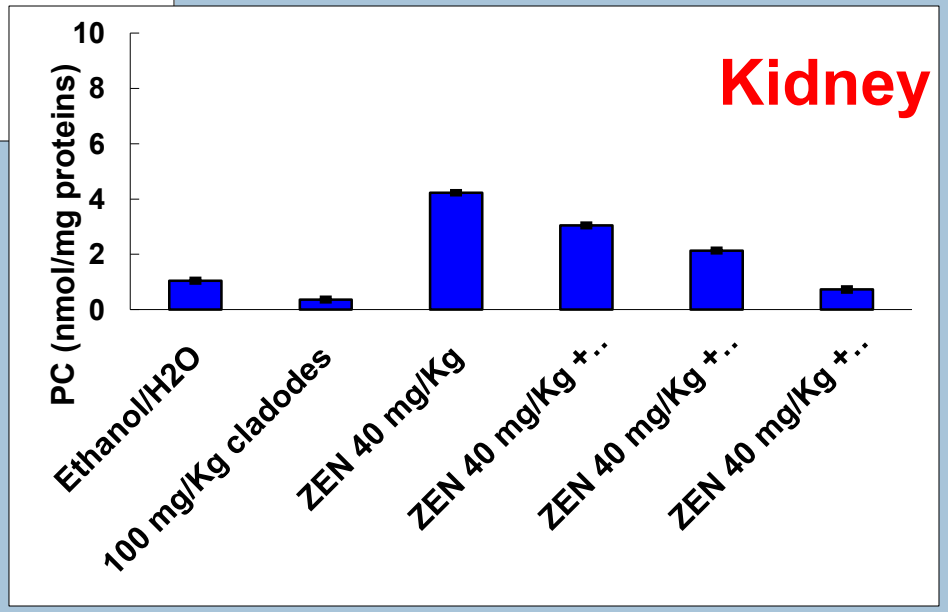


Kidney



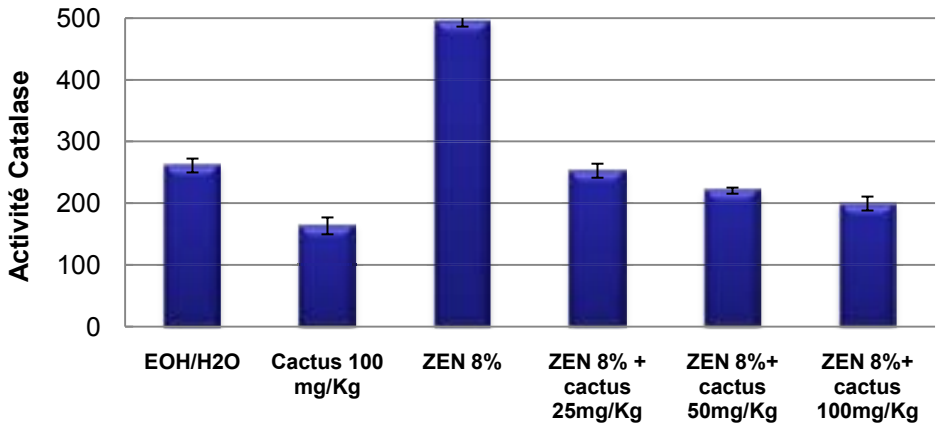
Protein carbonyl assay



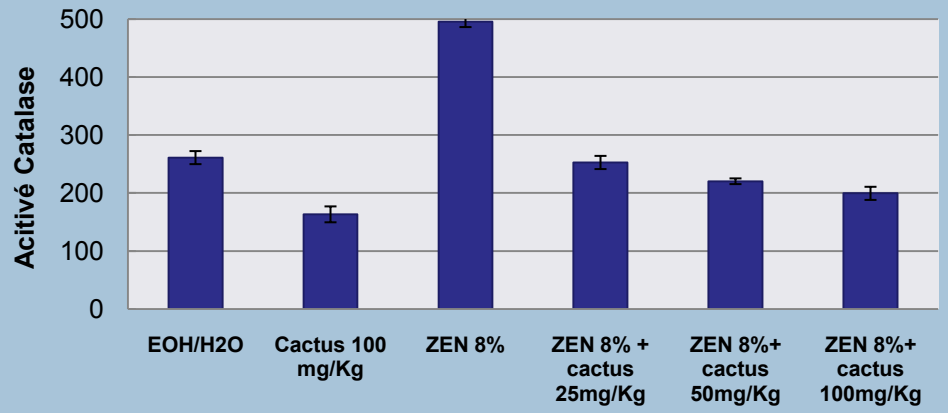


Catalase activity

Liver



Kidney



Conclusion

The extract of Cactus cladode has the activity: Anti-oxydative stress

Zourgui & al. 2008 *Food and Chemical Toxicology* 46, 1817-1824.

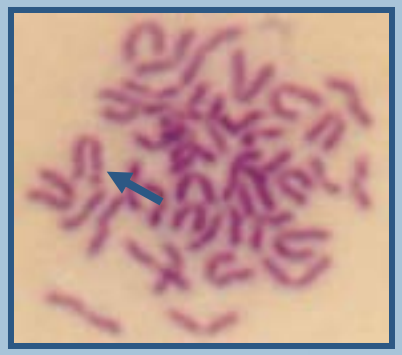
II- Protective effect of Cactus cladode against the genotoxicity induced by Zéaralénone

Objective:

Induced the chromosomal aberrations and DNA damage by the Zen:

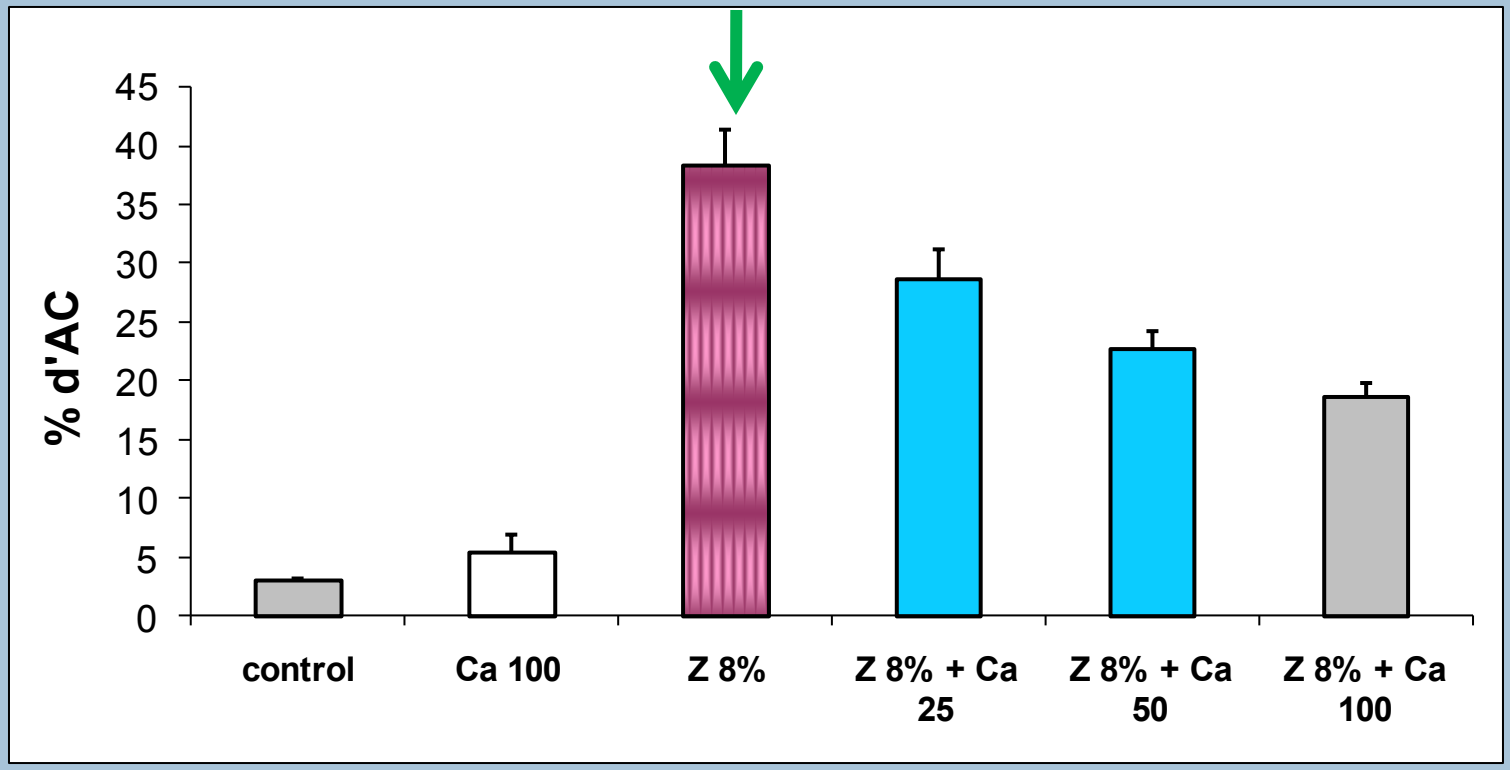
- Inter-chromosomic anomaly: (Breaks, Centric Fusions)
- Intra-chromosomic anomaly : (Gaps, Rings)

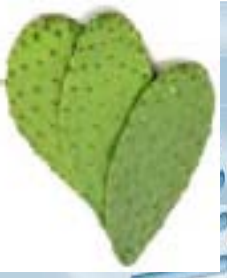





Chromosomal aberration assay:

Results





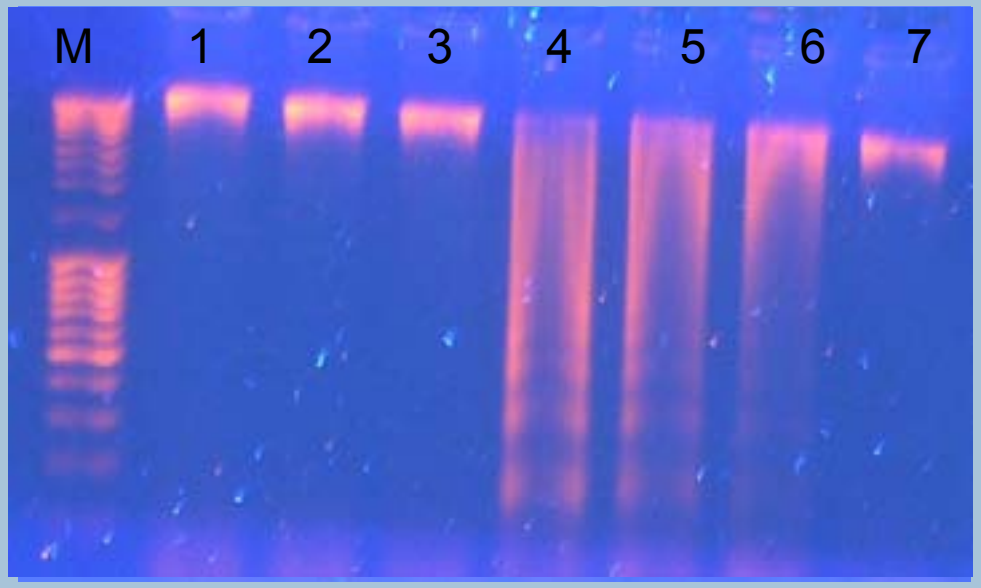
Chromosomal aberration assay

Results: percentage of chromosome aberrations

	Centric Fusions (%)	Rings (%)	Breaks (%)	Gaps (%)	Total (%)
Control 1	2,33	1,67	0,00	0,00	4,00
Control 2: Cactus 100 mg/Kg	3,67	1,67	0,00	0,00	5,33
ZEN 8%	**15,33**	**15,00**	**5,00**	**1,67**	**38,33**
ZEN 8% + Cactus 25 mg/Kg	9,67	14,33	3,67	1,00	28,67
ZEN 8% + Cactus 50 mg/Kg	11,67	7,67	2,67	0,67	22,67
ZEN 8% + Cactus 100 mg/Kg	**10,67**	**7,00**	**1,00**	**0,00**	**18,67**

DNA damage

Kidney



M: MW

1: control 1: H2O

2: control 2: Ethanol/H20

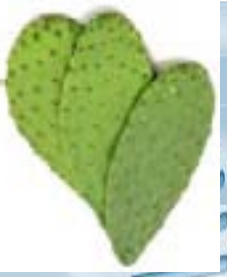
3: control 3: 100mg/Kg du Cactus

4: ZEN (8%)

5: ZEN (8%) + 25mg/Kg du Cactus

6: ZEN (8%) + 50mg/Kg du Cactus

7: ZEN (8%) + 100mg/Kg du Cactus



confirmation results:

- Comet assay
- Frequency of Micronuclei

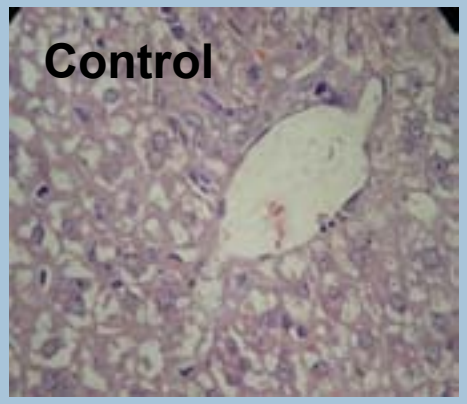
Conclusion:

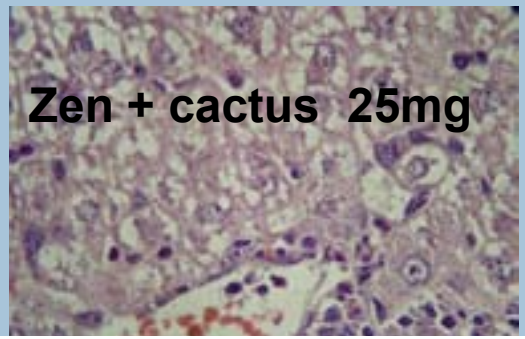
Anti-genotoxic activities of cactus caldodes: Preventive of miconuclei, Abberation chromosomic, DNA damages

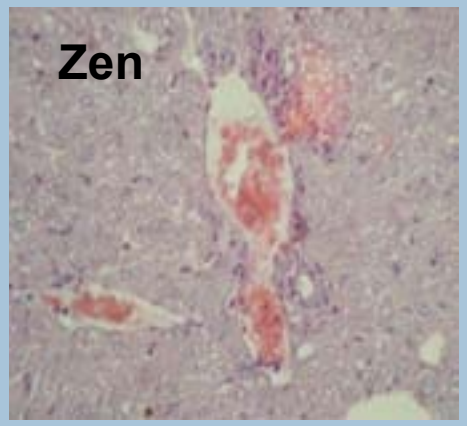
Zorgui & al. 2009 Journal Food and chemical Toxicology 47, 662-667

III- Protective effect of Cactus cladode against the Pathological changes induced by Zéaralénone

Liver



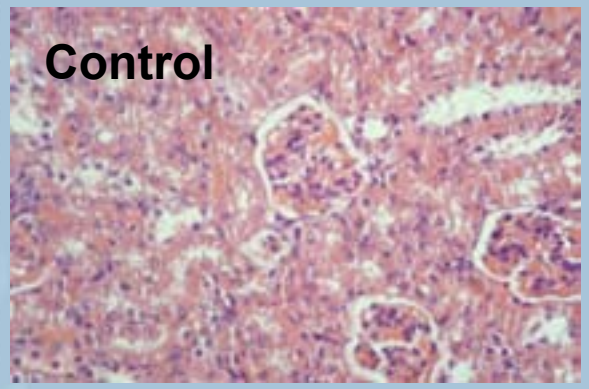


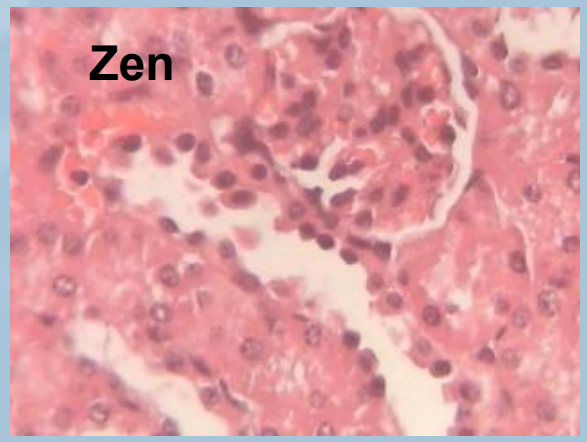


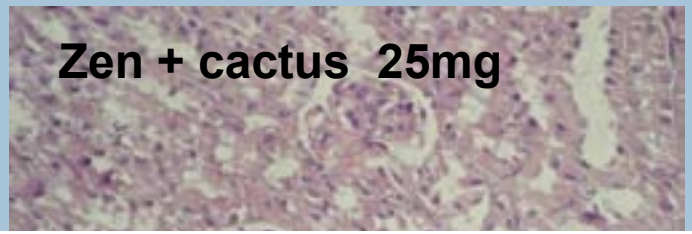
-Periportal necrotic-inflammatory lesion
-Pericanalair bilary inflammation
- Microvascular steatosis

III- Protective effect of Cactus cladode against the Pathological changes induced by Zéaralénone

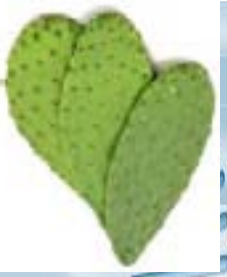
Kidney



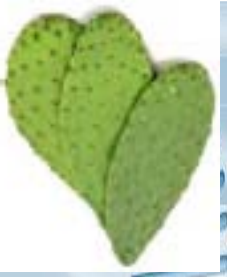




- necrotic lesions
- limited inflammatory around glomerules and cortico-medullary zones



III- Protective effect of Cactus cladode against the Biochemical, Hematological induced by Zéaralénone



General Conclusion

Cactus (Opuntia ficus indica) cladode extract has a protective effect against toxicity induced by Zearalenone

Current works (Ongoing Studies)

-Isolation and identification of protein(s) and biomolecule (s) involved in this mecanisme

Our Partners

Faculté des Sciences de Tunis
U.R de Physiologie
Pr. Mohamed AMRI,

Faculté de Méd. Dentaire de Monastir
Laboratoire de Recherche sur les Substances Biologiquement Compatibles
Pr. Hassen BACHA

INRA, Sophia Antipolis, Nice
Equipe de toxicologie moléculaire et génomique
Dr. Roger RAHMANI

Faculté de Pharmacie de Monastir
Laboratoire de Recherche des maladies transmissibles et substances biologiquement actives
Pr. Mahjoub OUNI

Faculté de Médecine de Sfax
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Pr. Tarak REBAI,

Hopital H. Bourguiba Sfax
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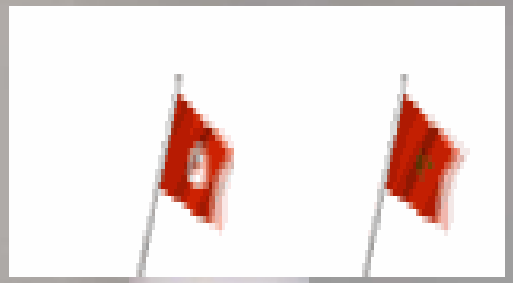

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Association Marocaine de Développement de Cactus

CACTUSNET
International Technical Co-operation Network on Cactus Pear

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The VIIth International Congress on Cactus Pear and Cochineal and The VIIth General Meeting
of the FAO-ICARDA International Technical Cooperation Network on Cactus Pear and Cochineal
Agadir (Morocco), October 17-22, 2010