

Bioactive molecules, Antioxidant EGCG polyphenols extract of Green tea *Camellia sinensis* L.

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Abstract: Polyphenols are bioactive molecules exhibiting a lot of scientific attention due to their multiple biological activities. They are antioxidants and are the active principles of many medicinal plants. We find them, in general, in all vascular plants, where they can be located in various organs : roots, stems, wood, leaves, flowers. Reason of this, our study consists on extracting polyphenols from green tea *Camellia sinensis* leaves, measuring their toxicity (LD₅₀) and their antioxidant effects and some therapeutic activities: slimming activity and antibacterial activity. Polyphenols ultrasonic extract, identification of bioactive molecules with LC-MS.

Analytical results of this extract allows us to identify the presence of therapeutic molecule so-called Epigallocatechin gallate (EGCG) revealed by LC-MS (Up to 60,1 %); The analysis by LC-MS identified 4 polyphenolic components included in the obtained lyophilisate which EGCG is the most abundant. For therapeutic settings, the results obtained show that the polyphenols of green tea have a strong slimming activity and a very effective antibacterial activity against *Pseudomonas aeruginosa* and screw-negative against *Escherichia coli*.

The application of green tea polyphenols as a natural remedy is very efficient so it is a return to the traditional pharmacy, and used this antioxidant bioactive molecule in the pharmaceutical industry.

Keywords: Green tea, Antioxidant, Bioactive molecule, Polyphenols (EGCG).

Introduction

✓ Polyphenols are secondary métabolites of plants, (Macheix et al., 2006).

✓ Epigallocatechin 3-gallate (EGCG) is the most abundant and potent green tea (*Camellia sinensis*) catechin.

✓ EGCG is the major catechin in green tea and accounts for 50–80% (Khan N, et al., 2006);

✓ Present a big structural diversity.

✓ Protective effect,

✓ Antioxydants activity, (Ananingsih V et al., 2011; Chandrasekara A, Shahidi F. 2011).

Objective of the work

- Ultrasound extraction of polyphenols green tea *Camellia sinensis* and lyophilised
- antioxidant activity (DPPH)
- Identification of catechin green tea by LC-MS
- Toxicity.
- Therapeutic study of some effects
 - Slimming activity
 - antibacterial activity

II. Material and Methods

II.1. Vegetable material



Fig 1. Green tea *Camellia sinensis*

II.2 Biological Material

➤ Swiss white mouse, weight 17-20g

➤ Rabbit 2,300 - 3,800 kg

❖ Bacteria, yeast and Mold :

- ✓ *E Coli*
- ✓ *Pseudomonas aeruginosa*
- ✓ *Geobacillus thermophilus*
- ✓ *Bacillus subtilis*
- ✓ *Candida albicans*
- ✓ *Aspergillus niger*

III. Results and discussion

III.1. Antioxidant activity (DPPH)

The antioxidant activity ultrasound polyphenols extract of green tea present 90.22 % and that of the BHT 92 %. Compound phenolic present a very good antioxidant activity

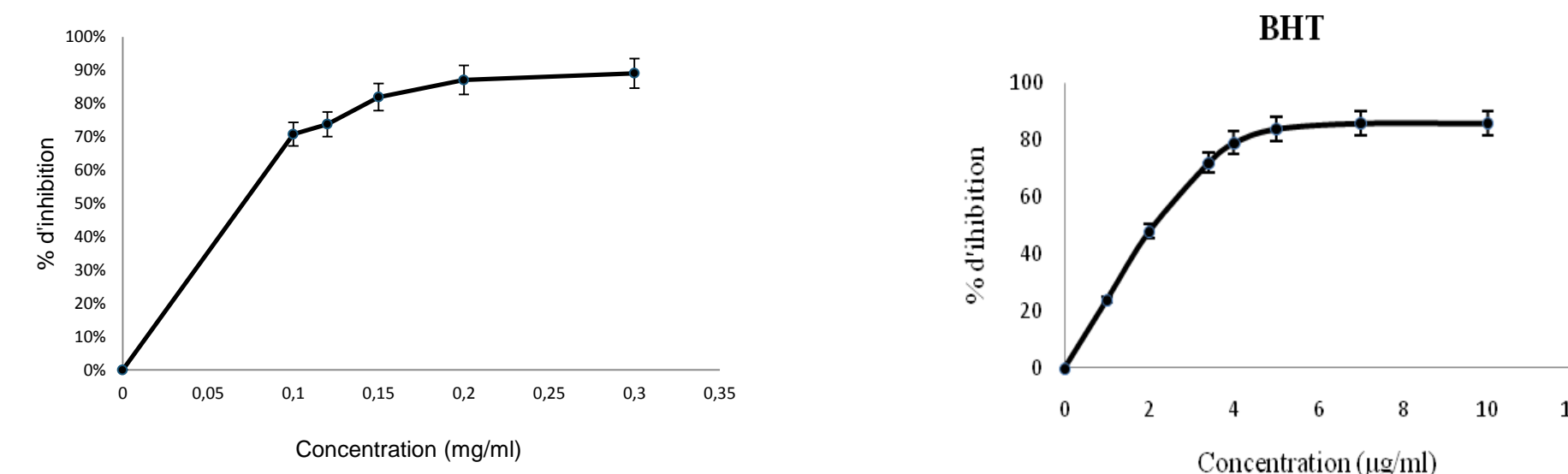


Fig 2. Comparison antioxidant activity with BHT.

III.2. Toxicity

The level of mortality is 15 % then, according to the standards of the European pharmacopoeia 2008, the applied dose (2500 mg / kg) is not toxic and thus she can be increased.

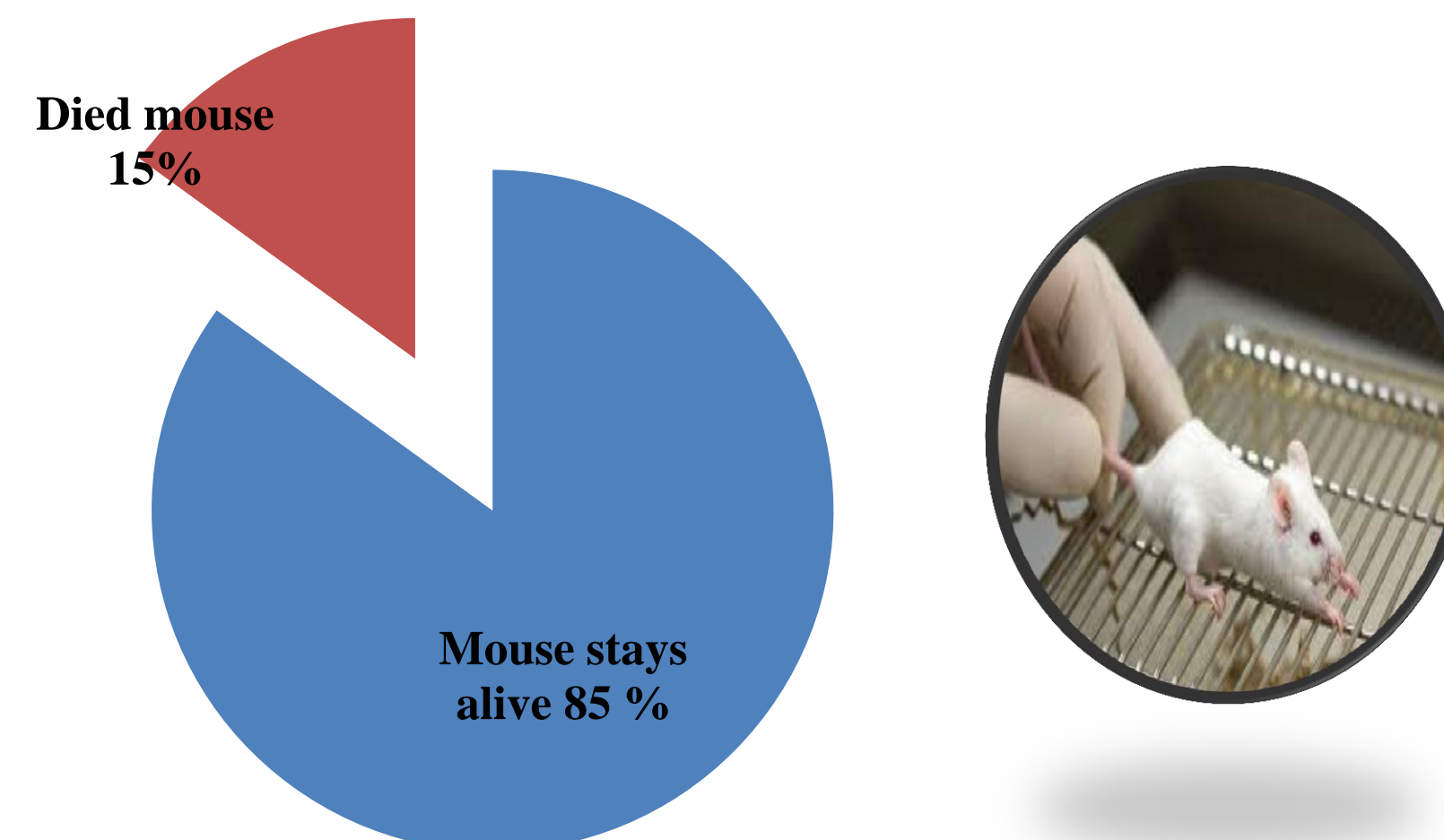
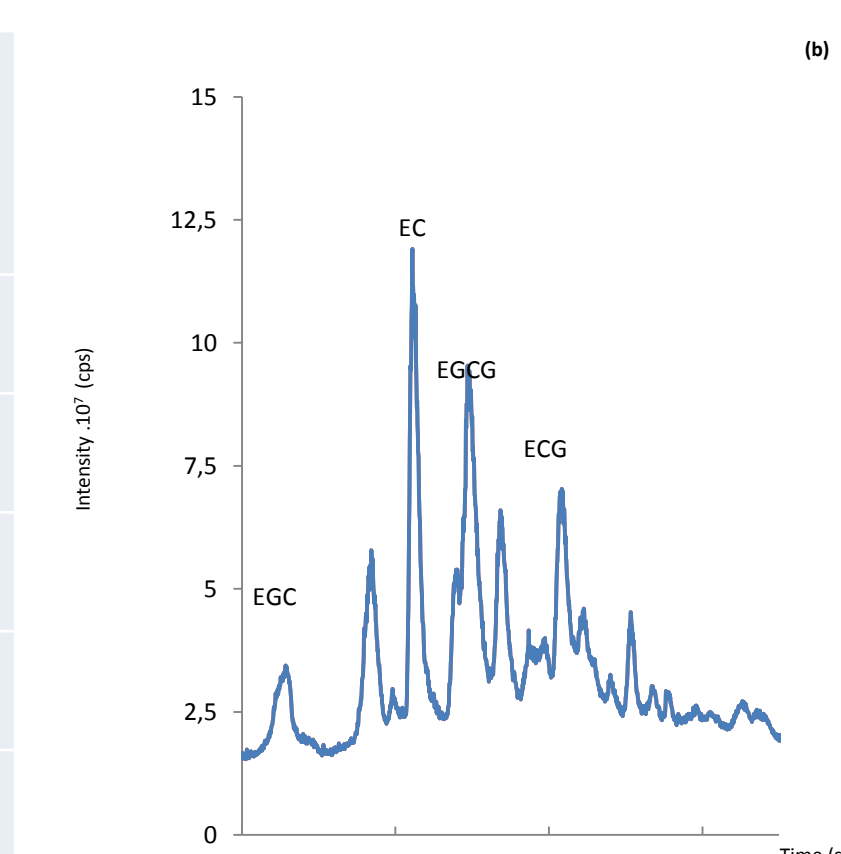


Fig 3. Test of toxicity

III.3. Phenolic Catechin identification by LC-MS

Table 1. Proportion of major catechins extract

Compound	Extract (%)
-Epigallocatechin (EGC)	12
-Epigallocatechin-3-gallate (EGCG)	60.1
-Epicatechin (EC)	5
-Epicatechin-3-gallate (ECG)	13
Autres	9.89



III.4. Therapeutic effects

III.4.1. Slimming activity

The quantity of polyphenols administered every time is 130 mg. During 87 days, rabbits took the polyphenols of the green tea, by force-feeding, 3 times a day (at 7 am, 12 hours and 19 hours).

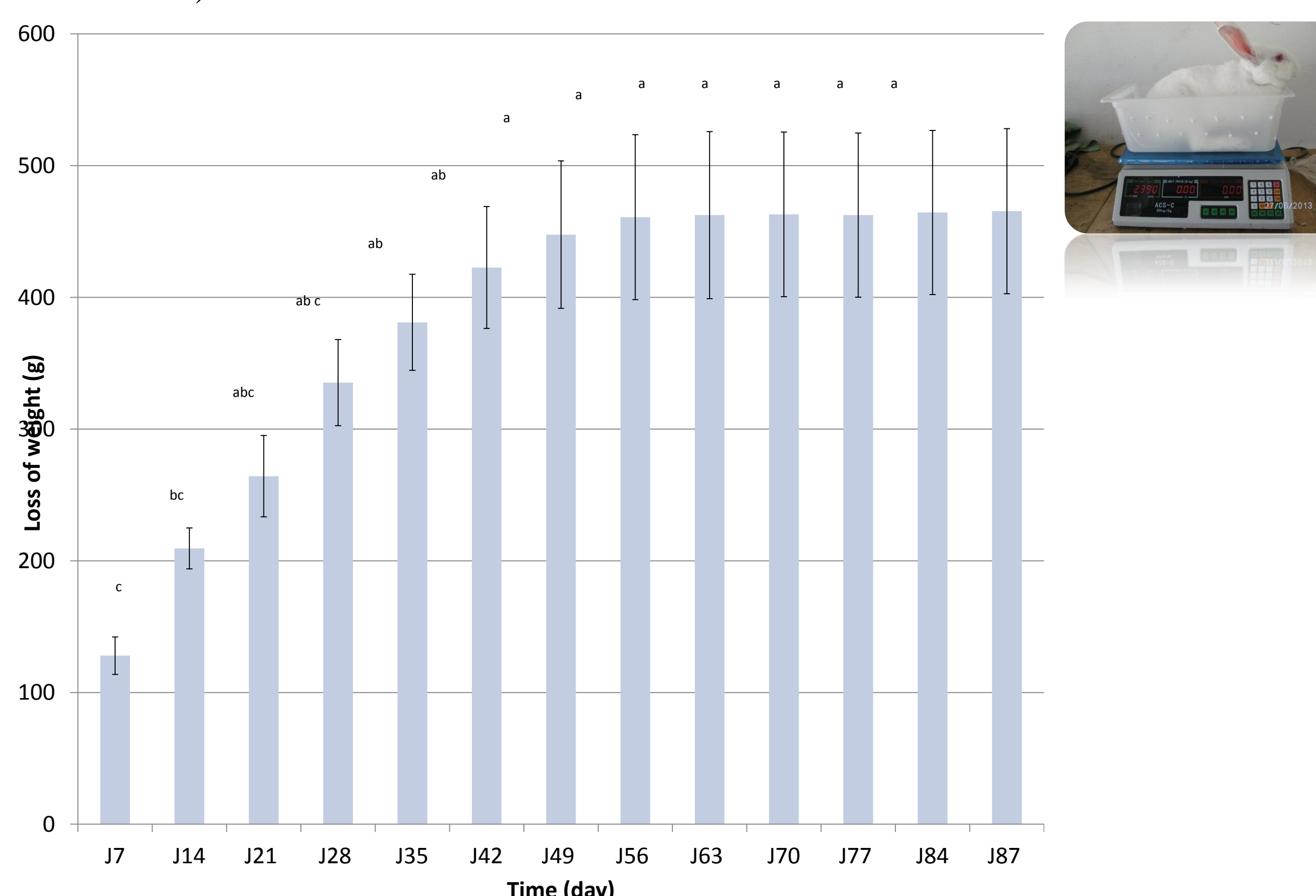


Fig 4. The loss of the weight according to time

III.4.2. Antibacterial activity

This study is made to show the efficiency of polyphenols and their protective effect against the bacterial attacks.

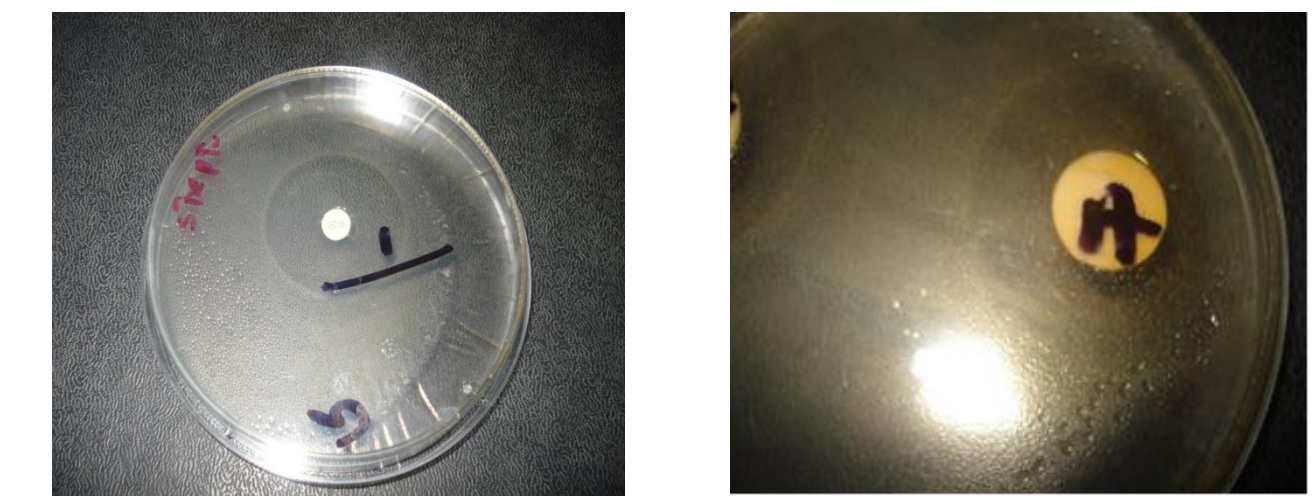


Fig 5. Inhibition of *Geobacillus thermophilus* by the streptomycin (control) and the total polyphenols extracts from green tea

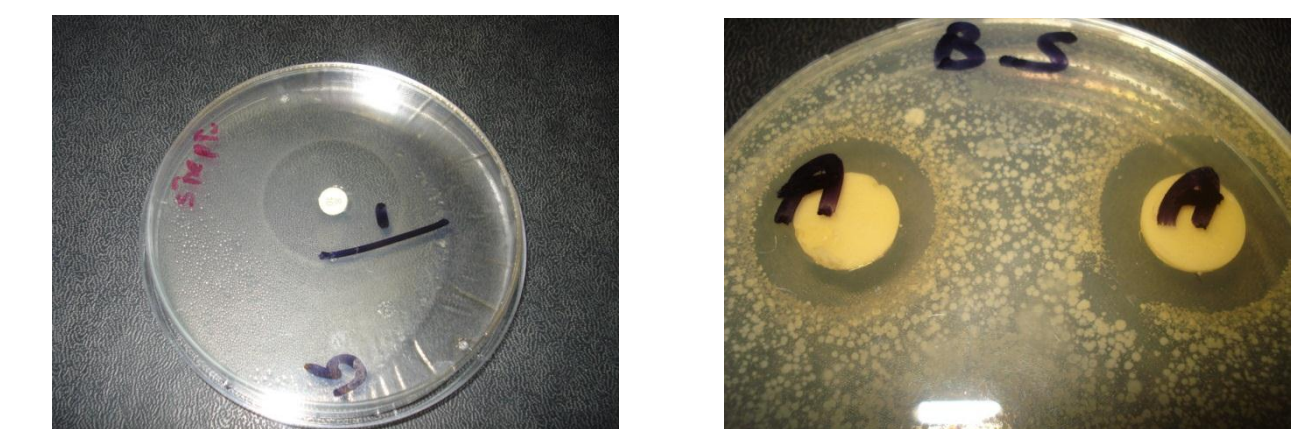


Fig 6. Inhibition of *Bacillus subtilis* by the streptomycin (control) and the total polyphenols extracts from some green tea

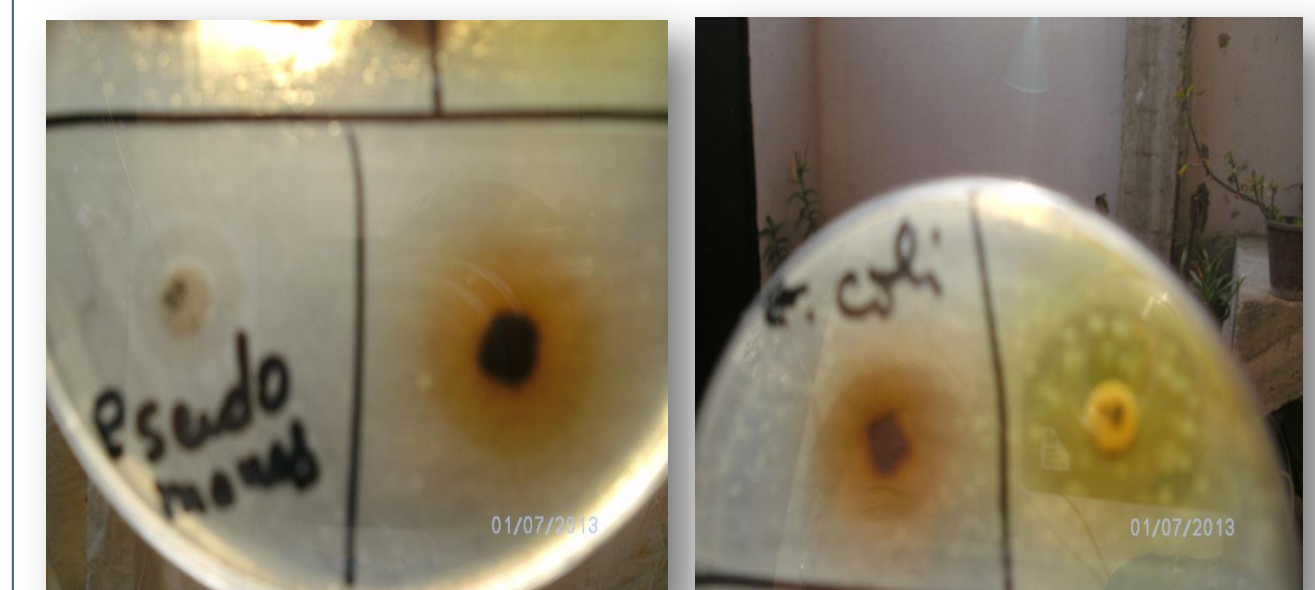


Fig 8. Inhibition of *Pseudomonas aeruginosa* and *E coli* by the total polyphenols extracts from green tea

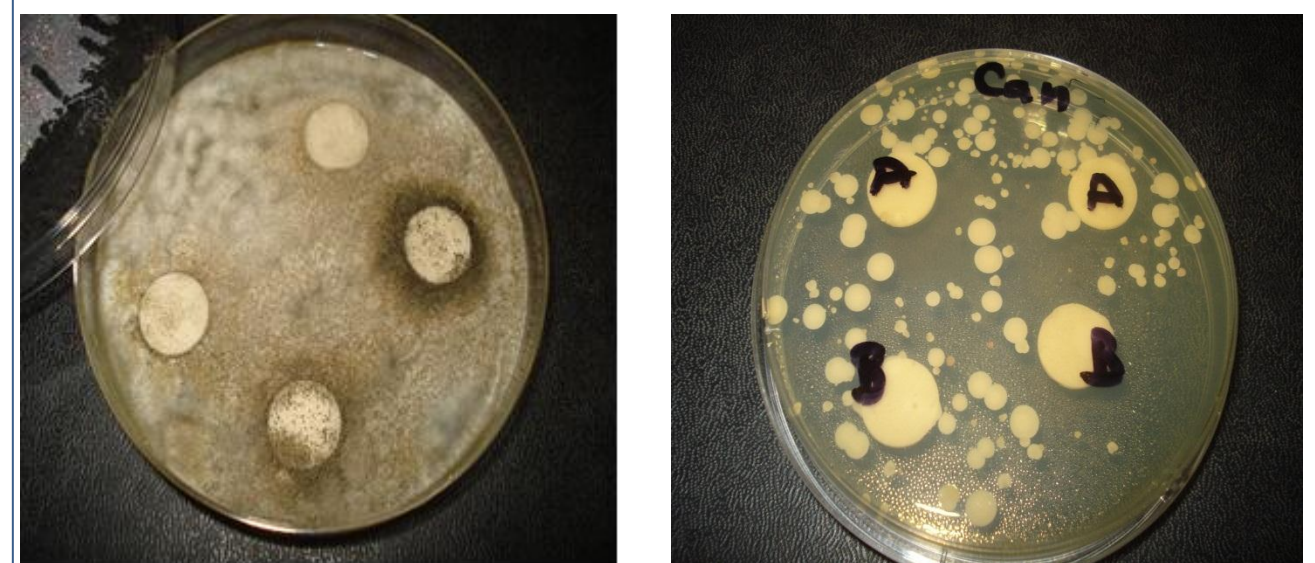


Fig 9. *Aspergillus niger* inhibition and *Candida albicans* total polyphenols extracts from some green tea

Conclusion

➤ Certain diseases are linked to obesity, polyphenols reduce considerably or prevent the increase of the weight,

➤ EGCG could be useful for the treatment (processing) of the obesity.

➤ Polyphenols have, in one hand, an antibacterial activity raised against diverse microorganisms:

Pseudomonas aeruginosa, *Geobacillus stearothermophilus*, *Bacillus subtilis*, on the other hand the anti-microbial activity goes away at *Escherichia coli*,

➤ The antifungal activity revealed no zone of inhibition for *Candida albicans* and *Aspergillus niger*

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