Changes in Sugarcane Plants after Microgravity using VSB-30 sounding Rocket

Katia Castanho Scortecci - Depto de Biologia Celular e Genética, CB -UFRN - Brazil
kacscort@yahoo.com

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Microgravity

✓ Plants evolved in presence of gravity 1 g

✓ SSI development problems - germination, seeds production, etc...
Sugarcane:
- Monocot
- C4
- *Saccharum spp.*
- 27% new genes

- Complex genome
- ESTs e BAC

Sucrose stocked in stalks
- 0.7 M

Sugar and ethanol

100 countries produced
- 45% world production
- 0.5% world area

8.5 mi ha
↑2.1%
Microgravity Effects

How plants respond to?

Which is the signal pathway?

How plant grown after this?
Hermetic boxes
- late access
CLA station

- Base da Flórida
- Base de Alcântara

- 242 km
- 145 km
- 18 min
- 06 min microgravity
Plants were isolated
• leaves;
• roots.

Anatomic analyses (light microscopy and SEM)
Biochemistry analyses
RNA seq
Root analysis
Anatomic analysis

Zinc chloride
Leaves

Microgravity related to metabolic changes?

Stress
Lignin
RNA extraction and sequency

- Sequences obtained with 95% quality
- Changes in metabolic and RNA expression pattern in leaves and roots
Microgravity effects – two boxes

How plant responds?

Proteomic analysis one box for molecular

How plants grow after this stimulus?
Others tools (simulated microgravity)

Clinostat - UNOOSA

Sugarcane plants

Medicinal plants

Educational approach
Science class, chemistry, biology
Plant Group

Helaine Cristiane Silva (Former master student)
Vladmir Nascimento (Master Student)

Colaborators

Dr. Hugo A. O. Rocha (DBQ- UFRN)
Dr. João Paulo L. Matos (DBQ- UFRN)
Dr. Marie Anne Van Slyus (USP)
Dr. Rutiger Hampp (Tuebigen - Germany)