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UNIVERSIDADE FEDERAL
DE UBERLÂNDIA

GPSi

BHN Research in Brazil

Dr. Gustavo Santos

KP Consultoria

BIO HUMA NETICS Incorporated

HUMA GRO

KP Consultoria LTDA

- Research company
- Staff
  - Dr. Gaspar Konrdorfer
    - Technical advisor
  - Dr. Hamilton Pereira
    - Professor at UFU
  - Dr. Gustavo Santos
    - Research director
  - M.Sc. Camila Gualberto
    - Scientific researcher

- Silicon in Agriculture Research Group
  - Coordinators
    - Gaspar H. Korndorfer
    - Hamilton S. Pereira
  - Team
    - 11 graduate students
    - 18 undergraduate students

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- Research areas
  - **New fertilizers technologies**
    - Coated fertilizers
    - Bio-stimulators
    - Foliar fertilizers
    - Liquid fertilizers
    - Ripeners
    - Fertilizer management
    - Biological fertilizers
    - Granulated lime and gypssum
  - **New/alternative fertilizers**
    - Alternative sources of P
    - Alternative sources of K
  - **Si sources**
    - Availability of Si
    - Agronomic efficiency

- Research crops (field trials)
  - **Sugarcane**
  - Soybean
  - Sorghum
  - Potato

- Research crops (greenhouse studies)
  - **Rice**
  - Beans
  - Maize
  - Forage crops (*Urochloa brizantha*)

- Field trials (sugarcane)

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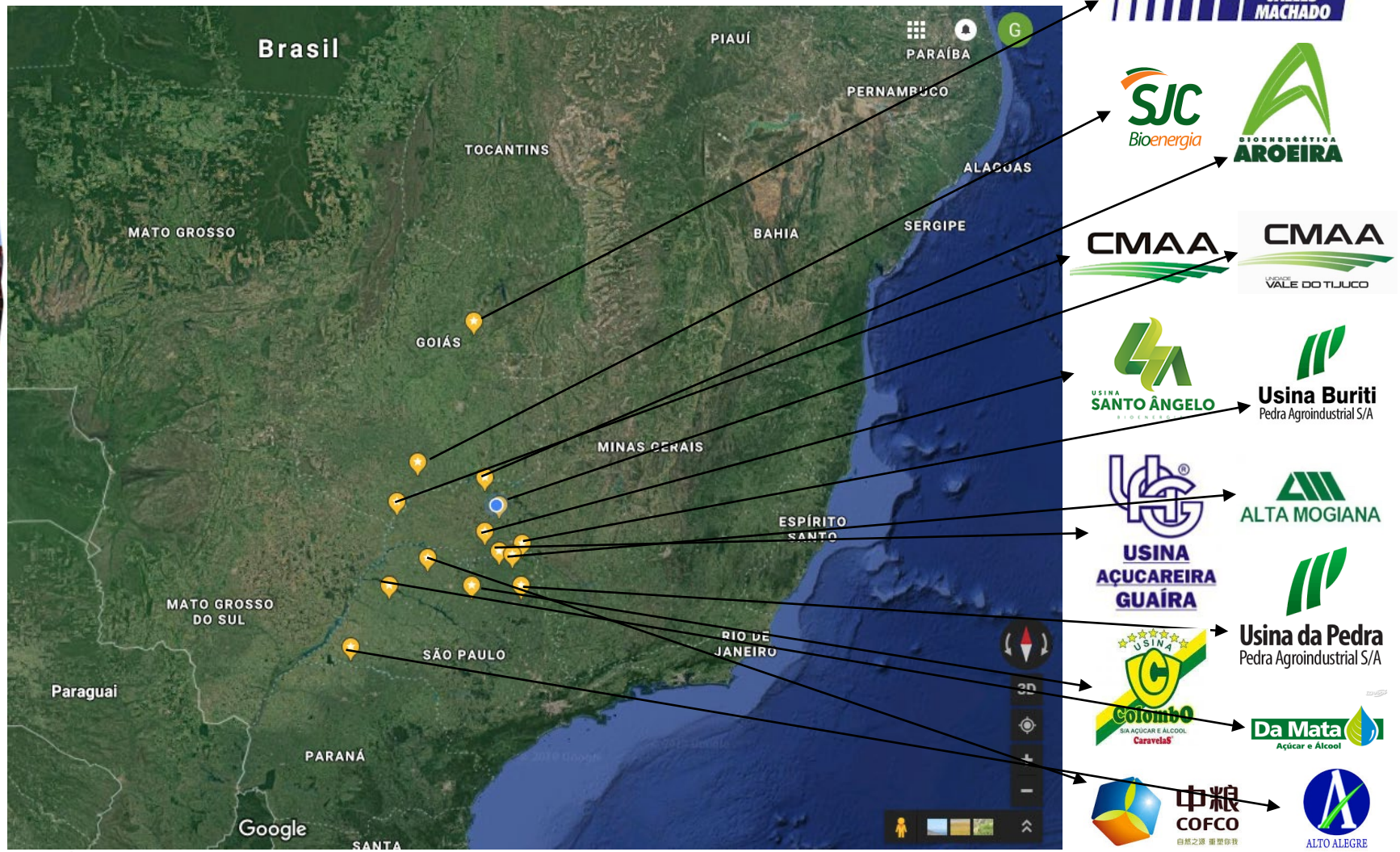


BHN researches in Brazil

- X-Tend®B Con® added at **solid and granulated** NPK formulation on development and yield of **ratoon cane**
- X-Tend® added at **liquid** NPK formulation on development and yield of **ratoon cane**
- X-Tend® added at **liquid** NPK formulation on development and yield of **plant cane**
- Efficiency of Phos-Max® as a P source for plant cane

Introduction

- Tropical soils
  - P fixation
  - Low CEC
- Dry x Wet season
  - N volatilization
  - N and K leaching

IMPROVE FERTILIZER EFFICIENCY

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Objective
  - Evaluate the efficiency of a solid and granulated NPK formulation containing X-Tend® B Con on development and yield of ratoon cane


Guairá Mill (Guaíra –SP)
Santa Guiomar farm, block 21
Variety IAC 5000, 4th ratoon
11/7/17

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Materials and Methods
  - Treatments

Fertilizers	Fertilizer dose (kg ha^{-1})	Rate of formulation with X-Tend® B Con (%)
20-0-20 conventional	600	0
20-0-20 X-TEND® B Con	300	50.0
20-0-20 conventional	300	
20-0-20 with X-TEND® BCon	400	66.7
20-0-20 conventional	200	
20-0-20 with X-TEND® BCon	500	83.3
20-0-20 conventional	100	
20-0-20 with X-TEND® BCon	600	100

X-Tend® B Con rate: 2.0 L / ton

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Materials and Methods

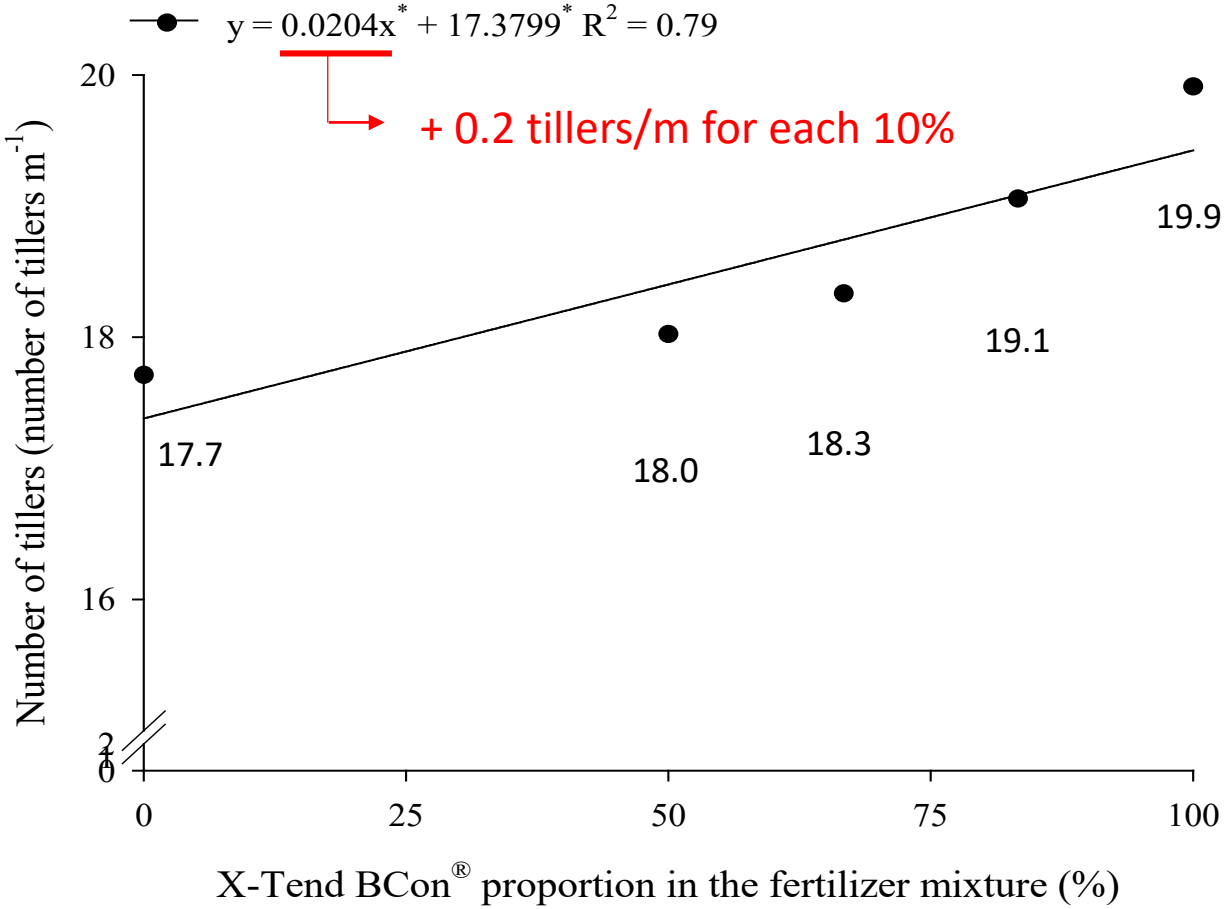
  - Statistical design (Randomized complete block design, 4 rep.)
  - Experimental plots: 5 rows wide, 10 m length – 75m^2

  - Manual application, 20 cm beside sugarcane row

  - **Number of tillers** (91 DAA, 3 central rows)
  - **Foliar N and K content** (91 DAA, 2 leafs/row)
  - **Stalks length and diameter** (5 stalks/plot)
  - **Sugar yield** (TCH) (297 DAA, 3 central rows)
  - **Quality parameters** (10 stalks/plot)
    - Fiber (%), Sucrose content (Pol) (%), TRS (kg t^{-1})

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – number of tillers



Number of tillers per linear meter in response to application of different rates of KPK formulation containing X-Tend B Con® added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 91 DAA)

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – Foliar N and K content

Foliar N and K content in response to application of different rates of KPK formulation containing X-Tend® B Con added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 91 DAA)

Rate of formulation with X-Tend® B Con	**N**	**K**
%	g kg^{-1}	
0	22.2 a	11.1 ab
50	21.7 a	10.0 c
66.7	21.8 a	10.6 bc
83.3	21.5 a	**11.6 a**
100	22.6 a	**11.8 a**
Average	22.0	11.0

N: CV (%): 5.7; DMS: 2.4. K: CV (%): 4.0; DMS: 0.86.

Averages followed by different letter, in the column, are different by Tukey test at 10% of significance

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – Stalks length and diameter

Stalks length and diameter in response to application of different rates of KPK formulation containing X-Tend® B Con added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 297 DAA)

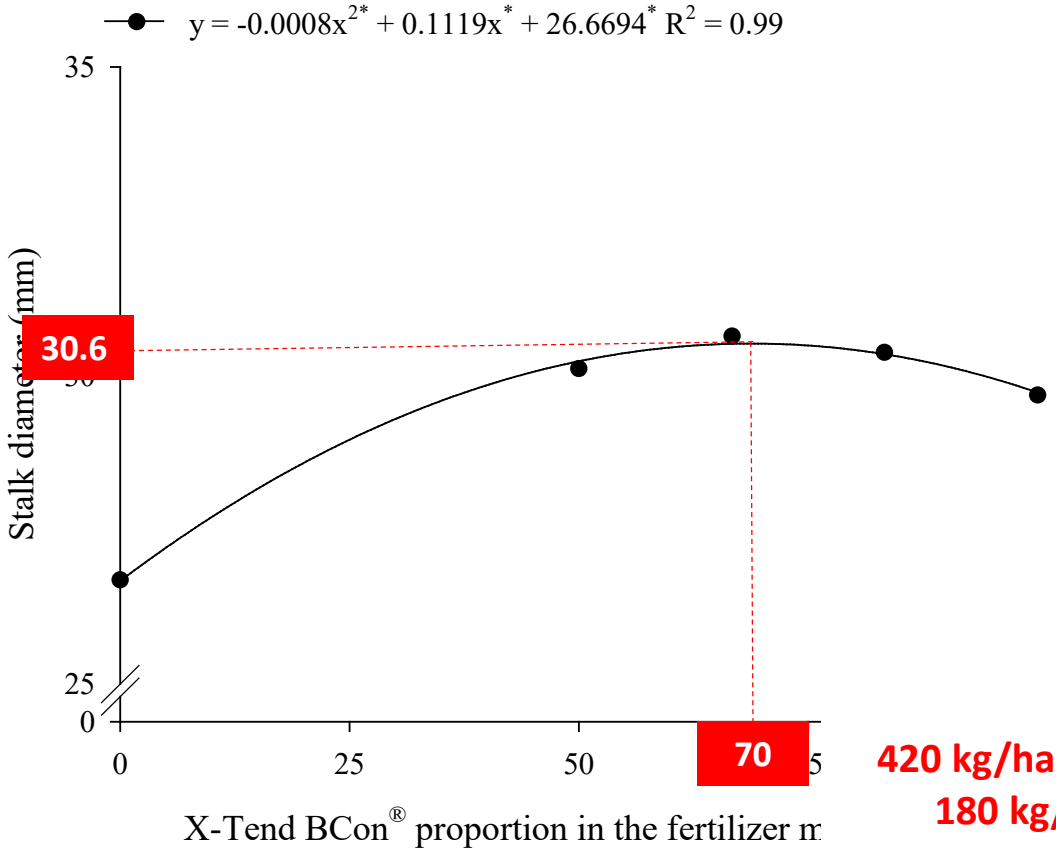
Rate of formulation with X Tend B Con®	**------- Lenght ----------**	**-------- Diameter --------**
%	---------- m ----------	---------- mm ----------
0	2.1 a	26.7 b
50	2.0 a	**30.1 a**
66.7	2.2 a	**30.6 a**
83.3	2.2 a	**30.4 a**
100	2.2 a	29.7 ab
Average	2.1	29.5

Lenght : CV (%): 5.1; DMS: 0.2. Diameter: CV (%): 5.8; DMS: 3.4.

Averages followed by different letter, in the column, are different by Tukey test at 10% of significance

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – Stalks diameter



420 kg/ha with X-Tend® B Con
180 kg/ha conventional

Stalks diameter in response to application of different rates of KPK formulation containing X-Tend B Con® added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 297 DAA)

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – TCH and TSH

Cane yield (TCH) and sugar yield (TSH) in response to application of different rates of KPK formulation containing X-Tend® B Con added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 297 DAA)

Rate of formulation with X Tend B Con®	**---------- TCH ----------**	**---------- TAH ----------**
%	----------t ha^{-1}----------	
0	117 b	20.8 b
50	**136 a**	**24.2 a**
66.7	**137 a**	**24.5 a**
83.3	**135 a**	**24.3 a**
100	124 ab	22.1 ab
Average	130	23.2

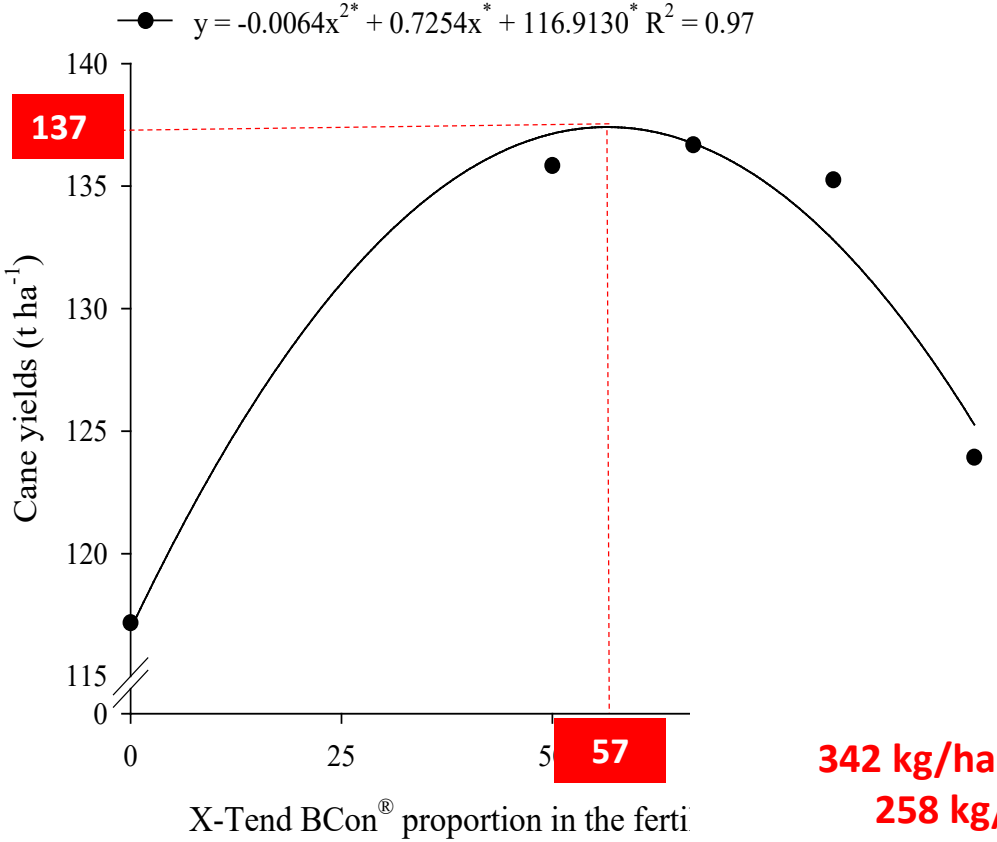
16%

TCH: CV (%): 5.7; DMS: 14.4. TSH: CV (%): 5.5; DMS: 2.5.

Averages followed by different letter, in the column, are different by Tukey test at 10% of significance

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – TCH

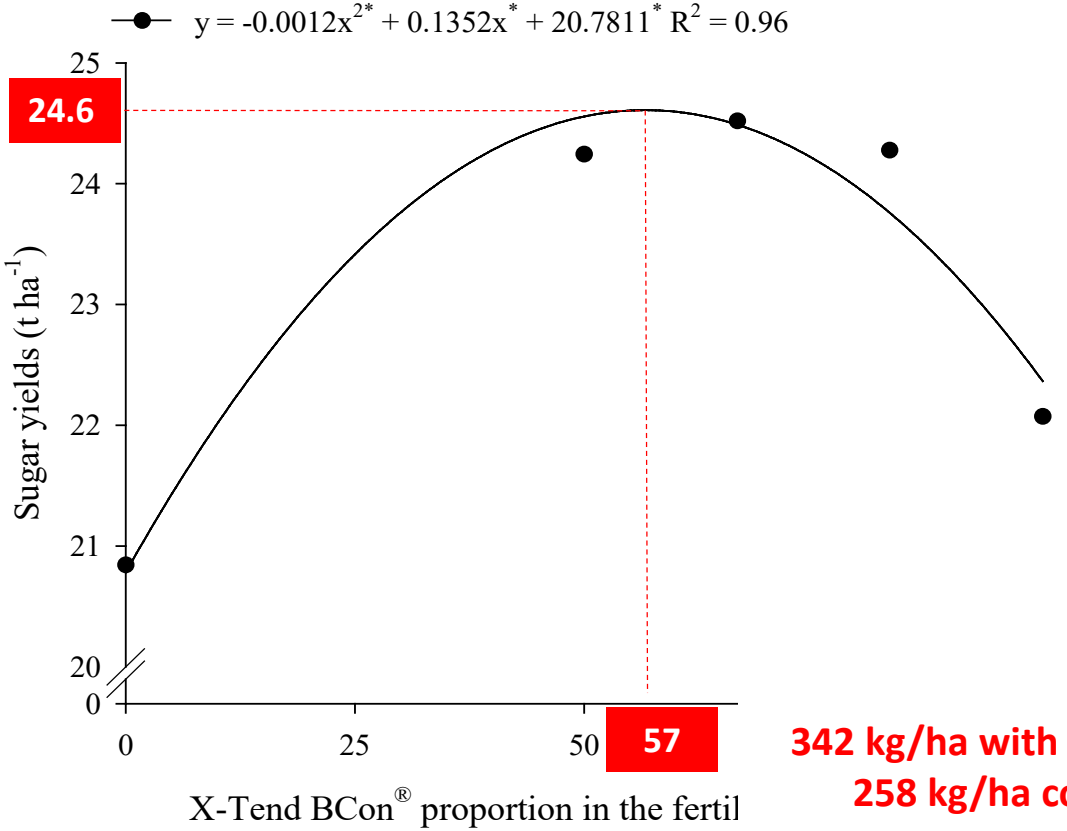


342 kg/ha with X-Tend® B Con
258 kg/ha conventional

Cane yield in response to application of different rates of KPK formulation containing X-Tend B Con® added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 297 DAA)

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – TSH



342 kg/ha with X-Tend ® B Con
258 kg/ha conventional

Sugar yield in response to application of different rates of KPK formulation containing X-Tend B Con® added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 297 DAA)

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Results – Quality parameters

TRS, fiber and sucrose content in response to application of different rates of KPK formulation containing X-Tend® B Con added at the mixture of conventional fertizer (4th ratoon, variety IAC-5000, 297 DAA)

Rate of formulation with X Tend B Con®	TRS	Fiber	Sucrose content
%	kg t^{-1}	---------- % ----------	
0	178 a	10.7 c	20.7 b
50	178 a	10.8 c	20.9 ab
66.7	179 a	**11.4 a**	**21.4 a**
83.3	180 a	**11.2 ab**	21.1 ab
100	178 a	**11.1 b**	20.8 ab
Average	179	11.1	21.0

TRS: CV (%): 1.1; DMS: 4.0.FIber: CV (%): 0.8; DMS: 0.2; Sucrose contente: CV (%): 1.4; DMS: 0.6

Averages followed by different letter, in the column, are different by Tukey test at 10% of significance

X-Tend® B Con added at **solid and granulated** NPK formulation for **ratoon cane**

- Conclusions

  - The **application of fertilizer containing X-Tend® B Con** resulted in **cane yield and sugar yield higher** than the obtained from control treatment, with increases of **19.5 and 3.7 tons** of cane and sugar, respectively;

  - Lower percentages of fiber and sucrose content were observed for conventional fertilizer application;

  - The presence of X-Tend® B Con in the fertilizer resulted in higher stalks diameter, regardless the proportion used in the mixture;

  - Lower foliar K contents were observed for the lower porportion (50%) of NPK formulation with X-Tend® B Con added to the mixture.

X-Tend® added at **liquid** NPK formulation for **ratoon cane**

- Objective
  - Evaluate the efficiency of a liquid NPK formulation containing X-Tend® B Con on development and yield of ratoon cane


Colombo Mill (Ariranha –SP)
Durval Tadei / Lagoa Bonita farm, block 03
Variety CTC 4, 1st ratoon
4/2/18

X-Tend® added at **liquid** NPK formulation for **ratoon cane**

- Materials and Methods
  - Treatments

Fertilizer	Fertilizer dose	X Tend® B Con dose
	---------- L ha^{-1} ----------	
10 – 3.3 -11.7 + 1.2 kg Mn + 0,6 kg Cu + 0.6 kg Zn + 0.3 kg B	1000	**0**
10 – 3.3 -11.7 + 1.2 kg Mn + 0,6 kg Cu + 0.6 kg Zn + 0.3 kg B	1000	**2.0**
10 – 3.3 -11.7 + 1.2 kg Mn + 0,6 kg Cu + 0.6 kg Zn + 0.3 kg B	1000	**4.0**
10 – 3.3 -11.7 + 1.2 kg Mn + 0,6 kg Cu + 0.6 kg Zn + 0.3 kg B	1000	**6.0**


20
19
18
17
16
15
LITRS


Rest: 48 hours
before
application

X-Tend® added at **liquid** NPK formulation for **ratoon cane**

- Materials and Methods
  - Statistical design (Randomized complete block design, 5 rep.)
  - Experimental plots: 5 rows wide, 10 m length – 75m^2
  - Manual application, 20 cm beside sugarcane row
  - **Number of tillers** (99 DAA, 3 central rows)

X-Tend® added at **liquid** NPK formulation for **ratoon cane**

- Results

Number of tiller per linear meter in response to application of different doses of X-Tend B Con® added at a liquid NPK formulation (2th ratoon, variety CTC 4, 99 DAA)

Formulation dose	**X Tend® B Con dose**	**Number of tillers**
---------- L ha^{-1} ----------		Tillers / m
1000	0	16.4
1000	2.0	17.3
1000	4.0	17.4
1000	6.0	17.7
Average		17.2

Increase of 0.9 to 1.3 tillers/m

X-Tend® added at **liquid** NPK formulation for **plant cane**

- Objective
  - Evaluate the efficiency of a liquid NPK formulation containing X-Tend® B Con on development and yield of plant cane


Colombo Mill (Ariranha –SP)
José Ferreira / Figueira, block 01
Variety RB 966928
3/27/18

X-Tend® added at **liquid** NPK formulation for **plant cane**

- Materials and Methods
  - Treatments

Fertilizer	Fertilizer dose	X Tend® B Con dose
	---------- L ha^{-1} ----------	
2,7-10 - 06 + 3 kg Zn + 1 Kg Mn + 0.5 Kg Cu	1200	**0**
2,7-10 - 06 + 3 kg Zn + 1 Kg Mn + 0.5 Kg Cu	1000	**2.0**
2,7-10 - 06 + 3 kg Zn + 1 Kg Mn + 0.5 Kg Cu	1000	**4.0**
2,7-10 - 06 + 3 kg Zn + 1 Kg Mn + 0.5 Kg Cu	1000	**6.0**

X-Tend® added at **liquid** NPK formulation for **plant cane**

- Materials and Methods
  - Statistical design (Randomized complete block design, 5 rep.)
  - Experimental plots: 6 rows wide, 10 m length – 90m^2
  - Manual application, at the bottom of the furrow
  - **Number of tillers** (105 DAA, 4 central rows)

X-Tend® added at **liquid** NPK formulation for **plant cane**

- Results

Number of tiller per linear meter in response to application of different doses of X-Tend® B Con added at a liquid NPK formulation (Plant cane, variety RB 966928, 105 DAA)

Formulation dose	**X-Tend® B Con dose**	**Number of tillers**
---------- L ha^{-1} ----------		Tillers / m
1200	0	27.5
1200	2.0	27.2
1200	4.0	27.9
1200	6.0	26.1
Average		27.2

Efficiency os Phos-Max® as a P source for plant cane

- Objectives
  - Evaluate the efficiency of a Phos-Max® as a P source for sugarcane;
  - Determine the dose of higher agronomic efficiency;
  - Determine Phos-Max® equivalence to MAP.

Efficiency of Phos-Max® as a P source for plant cane

- Materials and Methods
  - Treatments

Treatment	Fertilizer dose (kg or L ha^{-1})
Control	0
MAP	100
MAP	200
MAP	300
Phos-Max®	7
Phos-Max®	11
Phos-Max®	15

Restrictions: Low soil P availability (< 10 ppm), Clay soil

Acknowledgments

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HUMA GRO

THANK YOU VERY MUCH!

Dr. Gustavo Santos

asgustavo@yahoo.com.br