

سورة التوبة

# REVIEW ON PROSPECTS OF SUGARCANE RIPENERS

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# ***Background Information***

- **Sugarcane ripening:** Physiological-synthesis of sugars in the leaves and its translocation in the stalks.
- **Types:** Botanical- Physiological- Economic.
- **Factors:** Genotype X Environment X Management
- **Natural ripening:** Temperature & reduced rainfall.
- **Flowering-Pith:** Losses in productivity

## ***Background Information***

- **Chemical ripening:** Artificially achieved by the application of herbicide based chemicals.
- **Importance:** Profitable sugar production.
- **Countries:** USA, Brazil and S. Africa.
- **Window for harvesting:** Limited – Flowering- Risk of freezing temperature.

## ***Background Information***

Ripeners potential evaluated at USDA-ARS CP/Ho Sugarcane research lab since 1948.

- ✓ First chemical Glycine registered in 1975.
- ✓ Glyphosate is only registered sugarcane ripener now, that was registered in 1980.

# ***Functions of Ripeners***

- ✓ Inhibit growth of apical meristem
- ✓ To speed the ripening process
- ✓ Promote improvement in quality
- ✓ Promote harvest window of the crop
- ✓ Aid in planning of the harvest, as natural ripening in early season can be deficient, even in early varieties.
- ✓ Widely used in final ratoon.

# ***Registered Ripeners***

***Sugarcane ripener used in sugar world:***

- 1. Glyphosate***
- 2. Ethephon***
- 3. 2-4-D***
- 4. Paraquat***
- 5. Trinexapac-ethyl***
- 6. Modus***

# Field Trial on Sugarcane



# Application



# Sampling



- 10 stalk samples crushed, and juice was analyzed for Brix and apparent sucrose
- Theoretical yields were calculated

# Comparison of Ripeners

Product	Ethephon	Glyphosate
Mode of action	Liberates Ethylene	Inhibits enzyme PS
Dosage (L or kg ha <sup>-1</sup> )	0.67 – 2	0.3 – 1.8
Harvest (Days after application.)	45 – 90	25 - 35
Stopped growth	Yes	Yes
Varietal response	Most varieties	All varieties
Germination / Tillering	Favorable	Unfavorable
Sprouting of ratoon	Favorable	Unfavorable

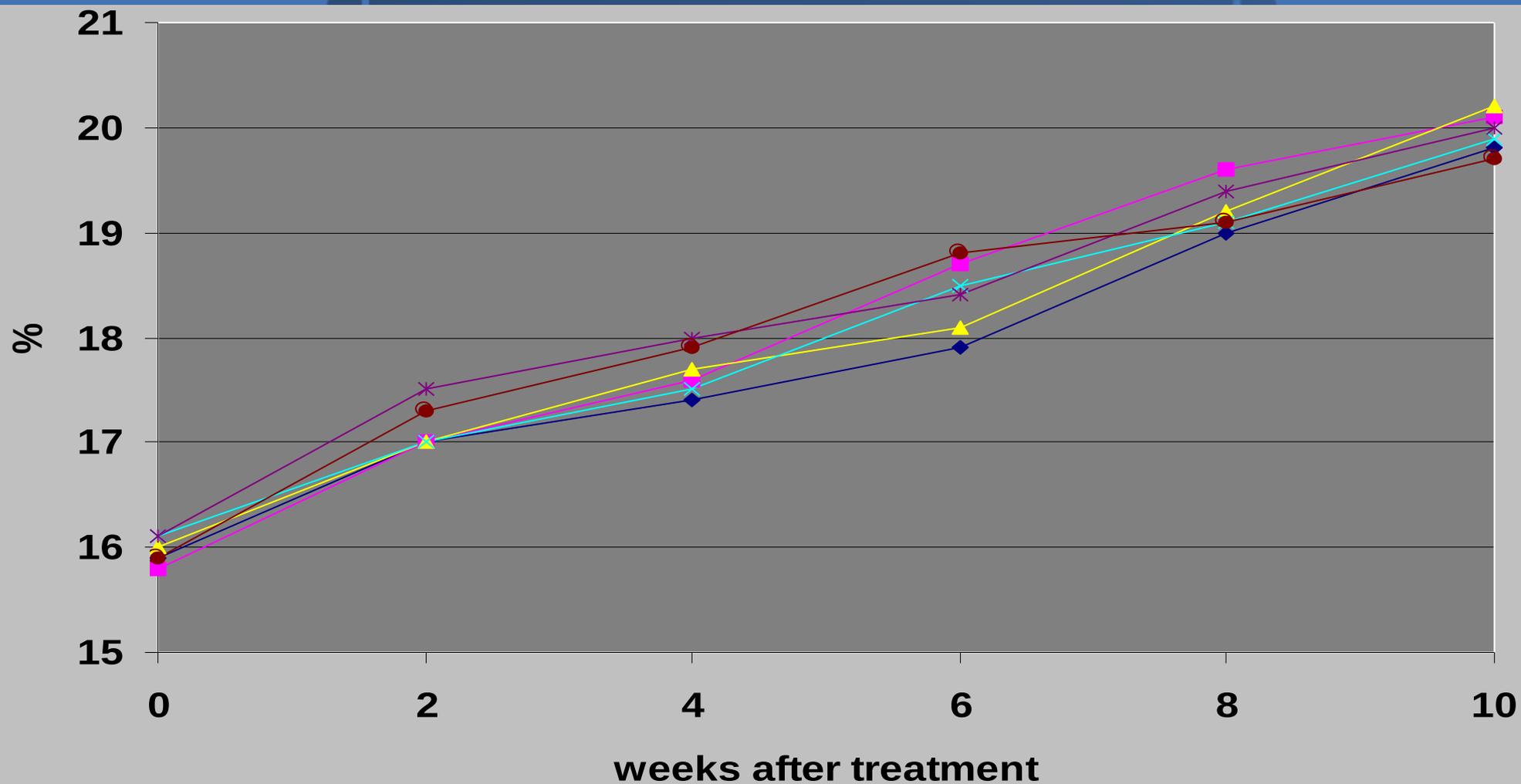
## *Impact on Cane Crop*

Ripeners	Stalk weight (kg)	Fiber (%)	S. Cane yield (t/ha)	TRS (g/kg)	Sugar yield (t/ha)
Non-treated	1.07 a	11.6 a	108.1 a	113 b	12.2 a
Glyphosate	0.98 b	11.0 b	89.9 b	124 a	11.2 a
Trinexapac-ethyle	1.00 b	10.8 c	61.1 c	110 c	6.52 c

# Cultivars Response to Glyphosate

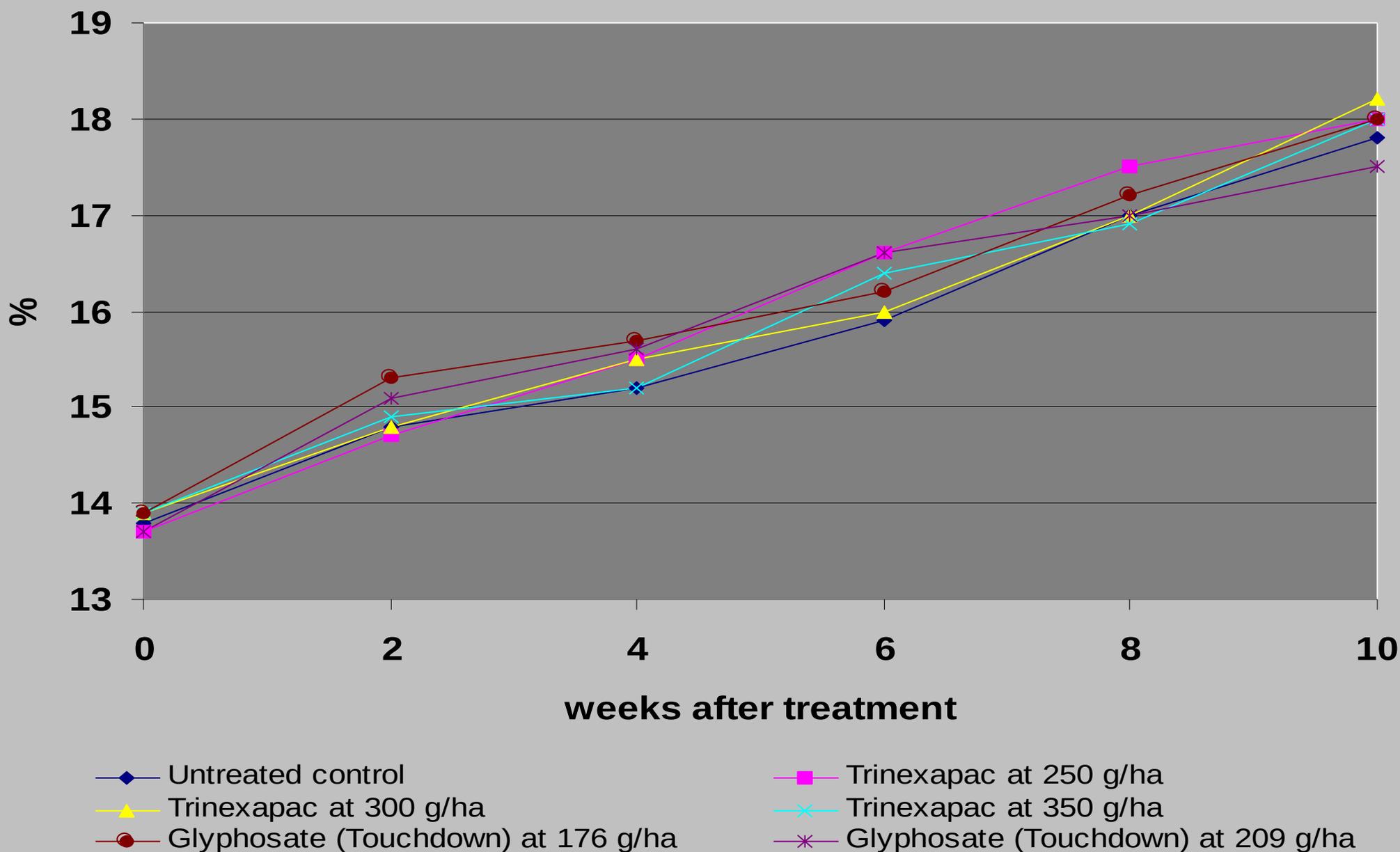
Cultivars	Fiber (%)	S. Cane Yield (t/ha)	TRS (g/kg)	Sugar Yield (t/ha)
HoCP 96-540	11.5 bcd	106.8 ab	117 bcd	12.4 ab
L 99-226	11.4 bc	108.9 a	125 a	13.5 a
L 99-233	12.8 a	96.7 cd	113 d	10.8 cd
HoCP 00-950	10.7 d	98.6 bcd	122 ab	11.9 bc

# Brix % Cane

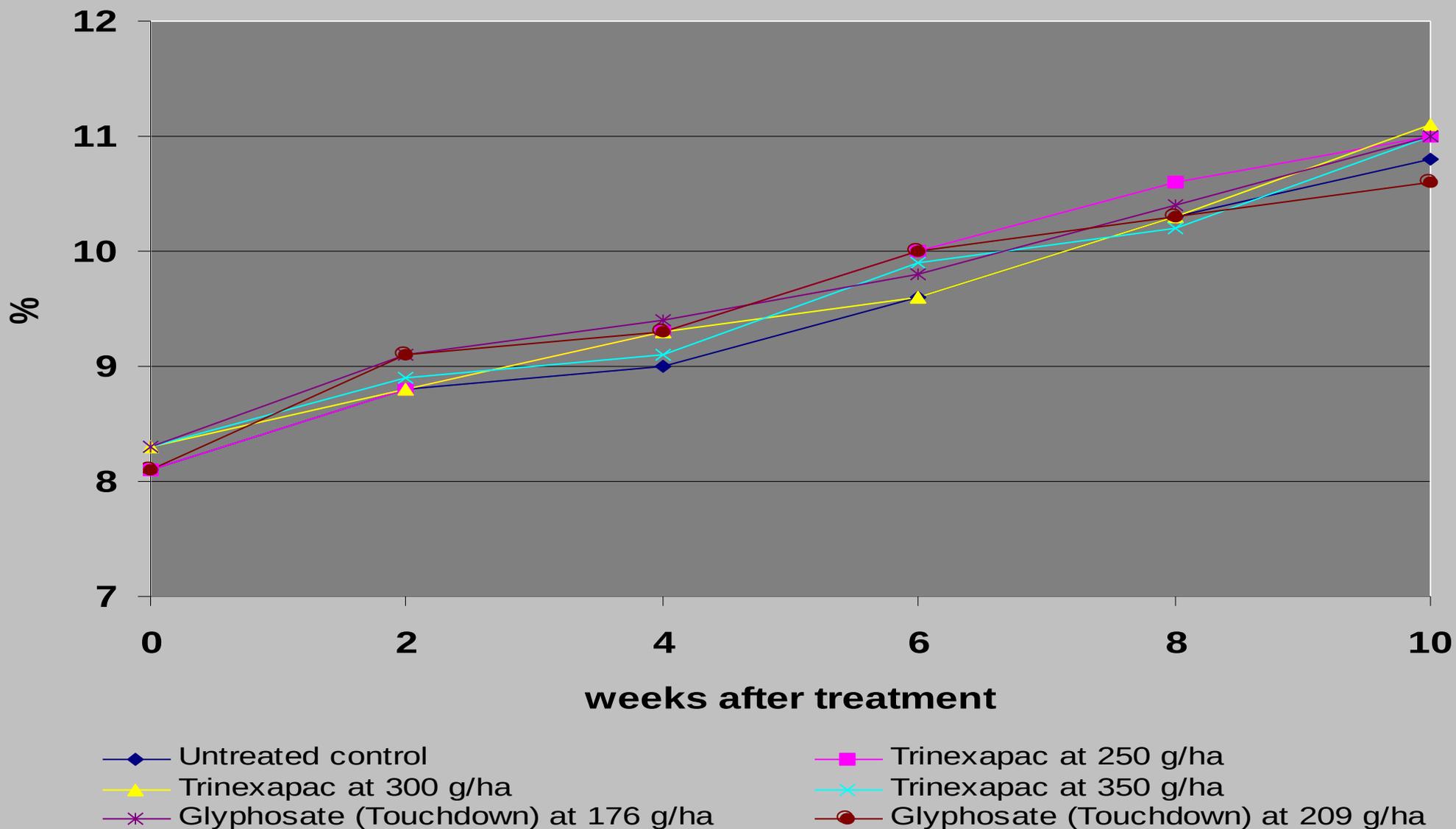


- ◆ Untreated control
- ▲ Trinexapac at 300 g/ha
- ◆ Glyphosate (Touchdown) at 176 g/ha
- Trinexapac at 250 g/ha
- × Trinexapac at 350 g/ha
- Glyphosate (Touchdown) at 209 g/ha

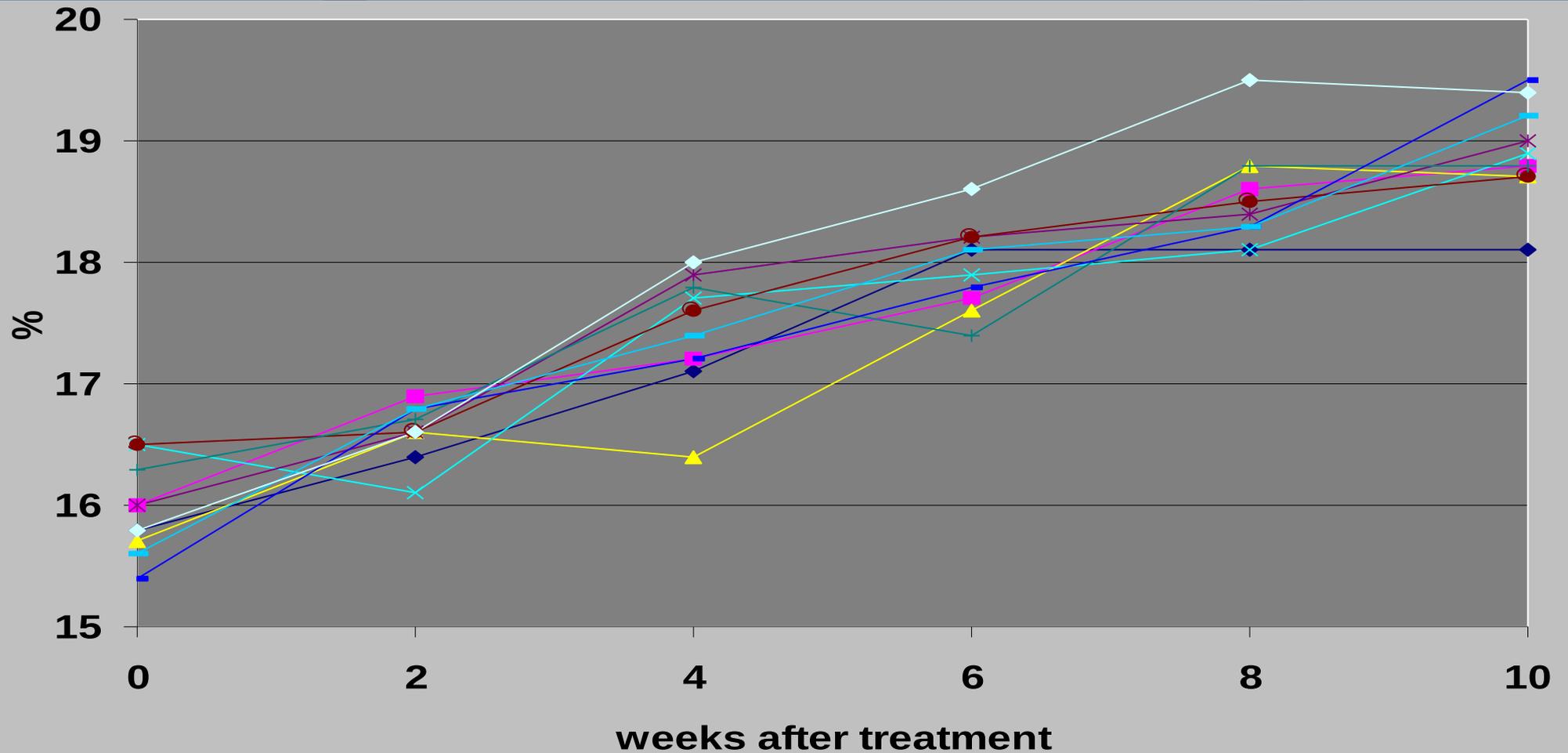
# Apparent Sucrose



# Theoretical Yield

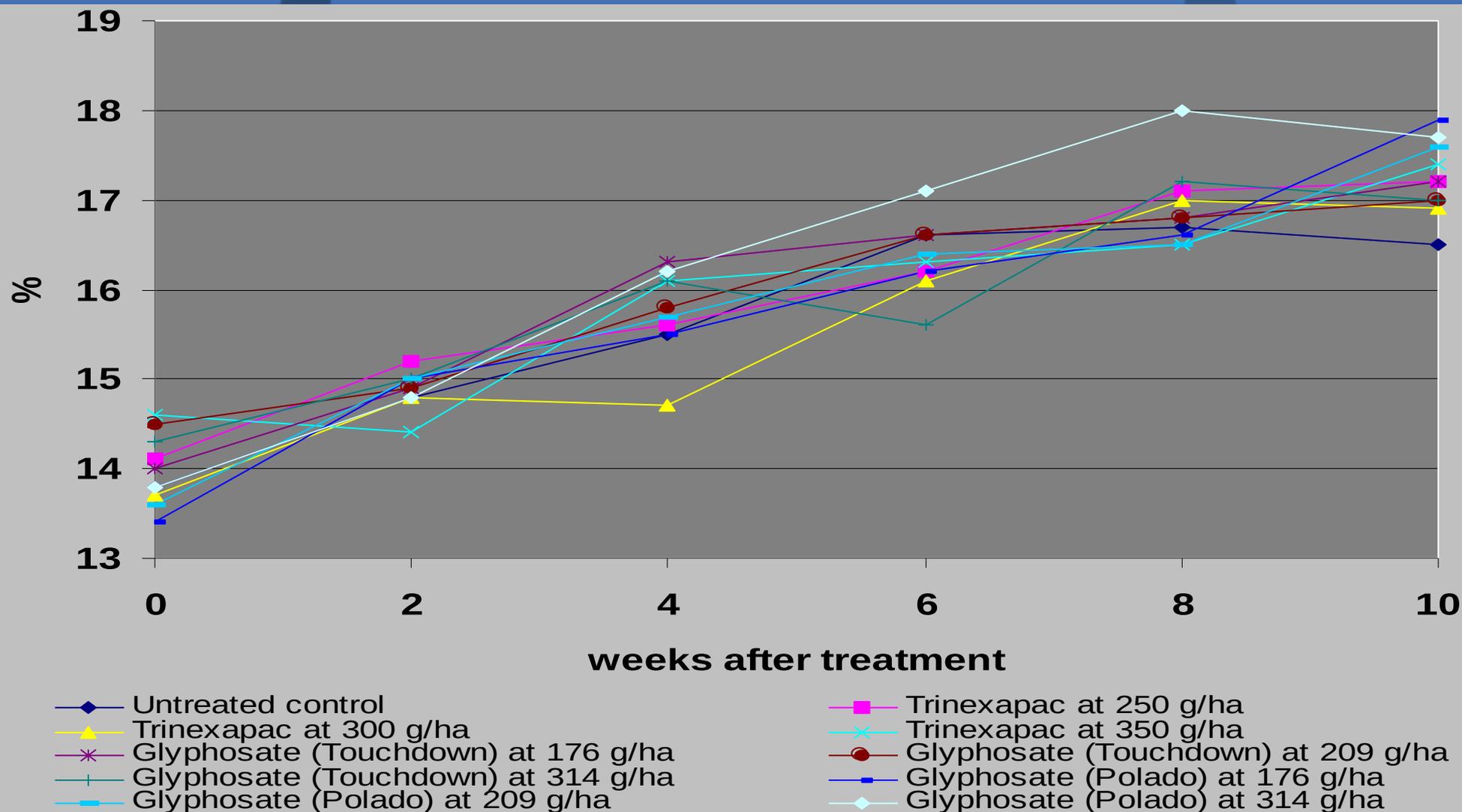


# Brix % Cane

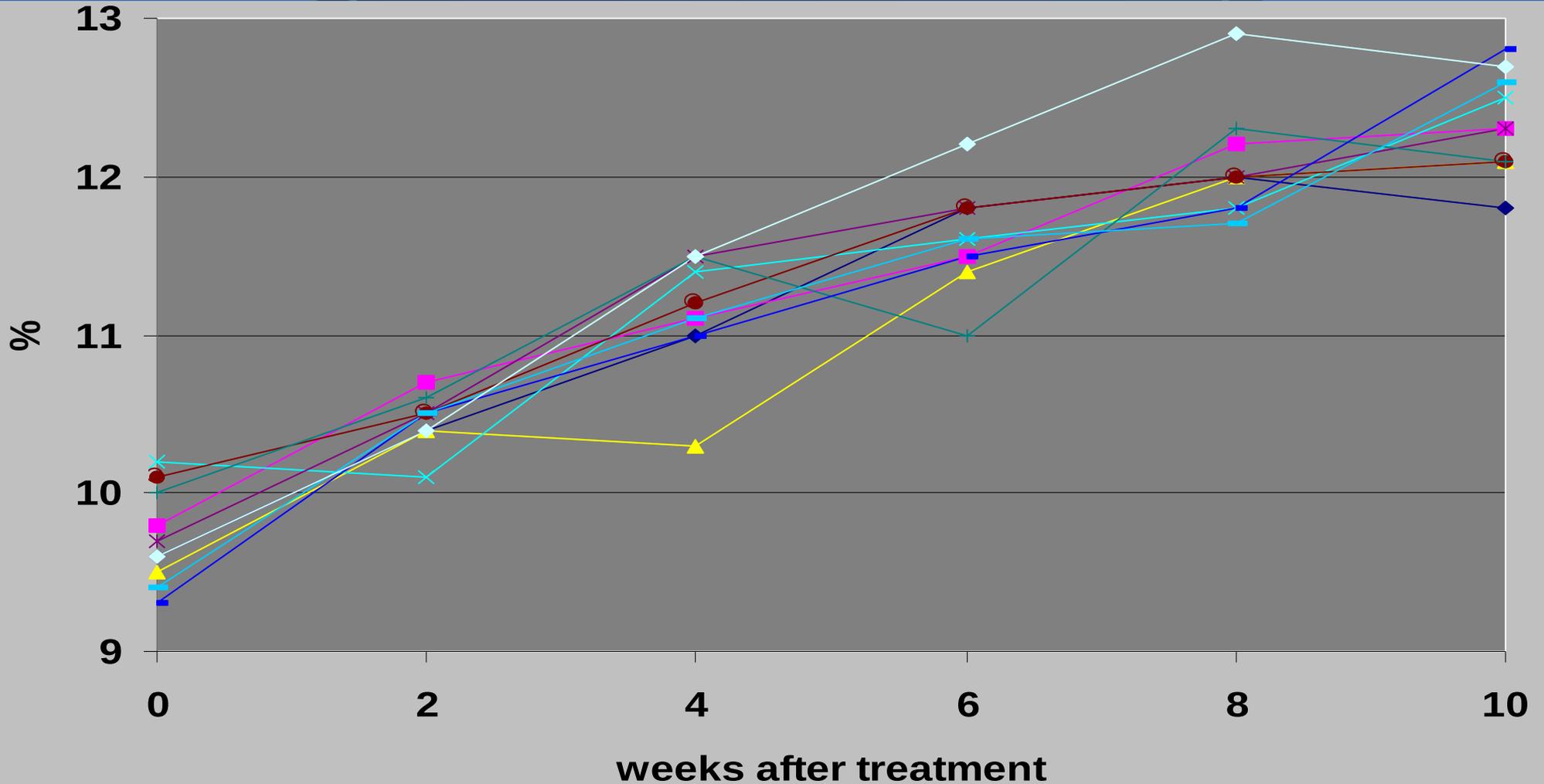


- ◆ Untreated control
- ▲ Trinexapac at 300 g/ha
- \* Glyphosate (Touchdown) at 176 g/ha
- + Glyphosate (Touchdown) at 314 g/ha
- Glyphosate (Polado) at 209 g/ha
- Trinexapac at 250 g/ha
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# Pot Experiment



# Application of Ripener



# *Inhibit Flowering*



# Cause Lateral Sprouting



# Promote Pithiness



# Detrimental effect on sprouting ratoons







# Agricultural Aircraft



# Application of Ripener



# Application of Ripener





Conventional  
High Volume

Spectrum  
Electrostatic Sprayer



A person wearing a white protective suit, a white cap, and a white face mask is using a backpack conversion sprayer. The sprayer is a white tank with a red cap on the back, connected to a black hose and a spray wand. The person is holding the spray wand and spraying a fine mist of liquid onto a field of green plants. The background shows a dense field of green plants under a bright sky.

# Backpack Conversion Systems Sprayers



# Aerial Spray of Ripener

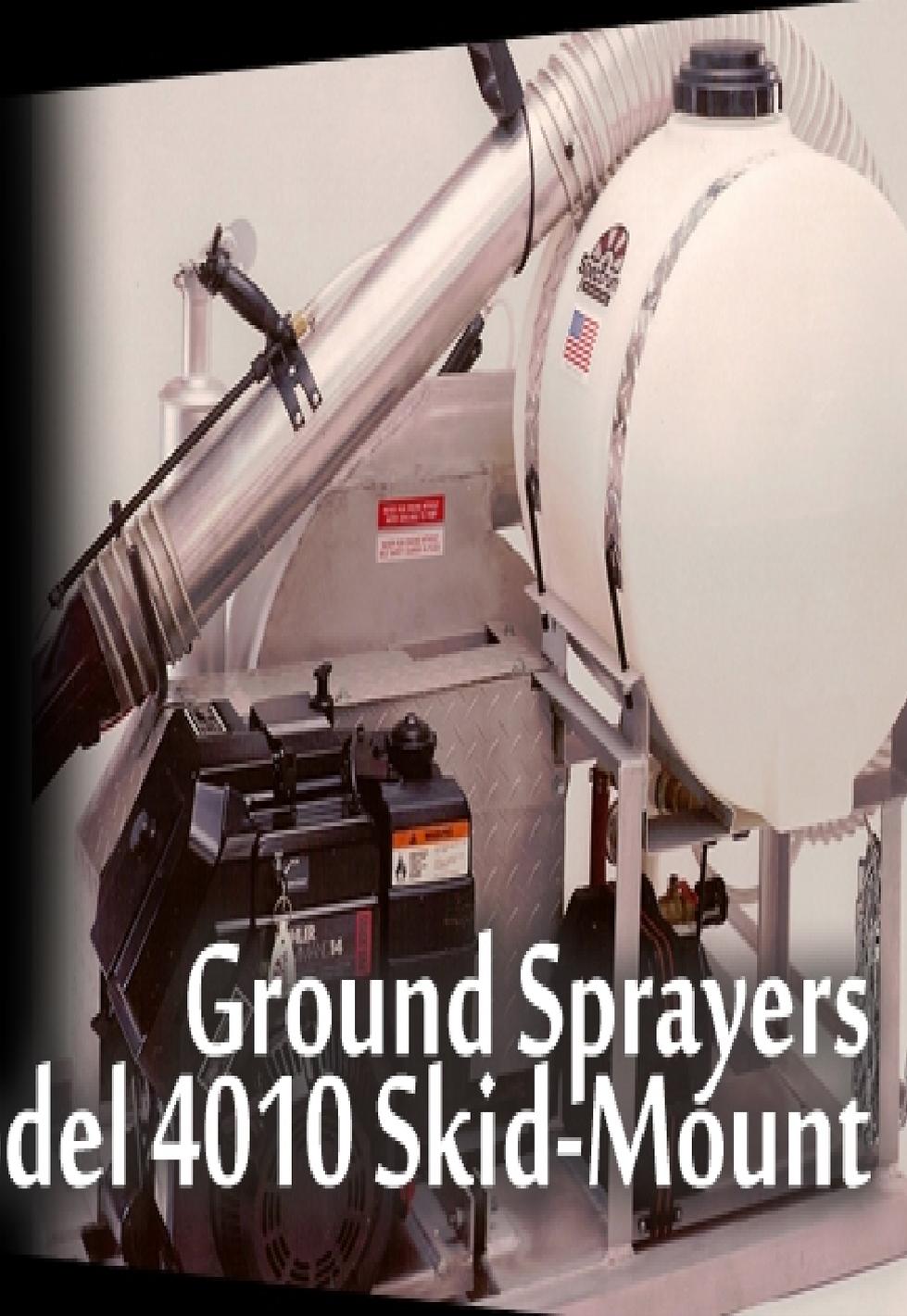


# Ground Sprayers



# Surface Area Measurement





# Ground Sprayers Model 4010 Skid-Mount

# ***Conclusions***

- ***Ripeners application technologically enhance quality of the raw material.***
- ***Feasibility of using ripeners depends on many factors.***
  - ✓ ***Climatic.***
  - ✓ ***Technical and economic variables.***
  - ✓ ***Varietal response to ripeners.***
  - ✓ ***Agricultural, industrial and economic yield.***

# ***Recommendations***

***Results are promising, but more work is needed.***

***Potential for extending harvest window.***

***Used to ripen non-take out fields that need to be harvested but are not naturally mature.***



## ***Recommendations***

***Ripeners may be used to start early crushing.***

***Use of ripeners may prevent the crop from flowering, inhibit growth and induce forced maturity.***

***Comprehensive studies should be started to evaluate significance of ripeners under different agro-climatic conditions in Pakistan.***

# *Questions???*



# THANKS

