



Shelf Life Extension Products for Fresh Produce

# AGENDA



- ▶ Introduction To Keep It Fresh
- ▶ Technology
  - ▶ Anti Microbial
  - ▶ Ethylene Adsorbers
- ▶ Products
- ▶ Trials
- ▶ Future Support on Trials
- ▶ FDA Status
- ▶ REACH

# ETHYLENE PROBLEM



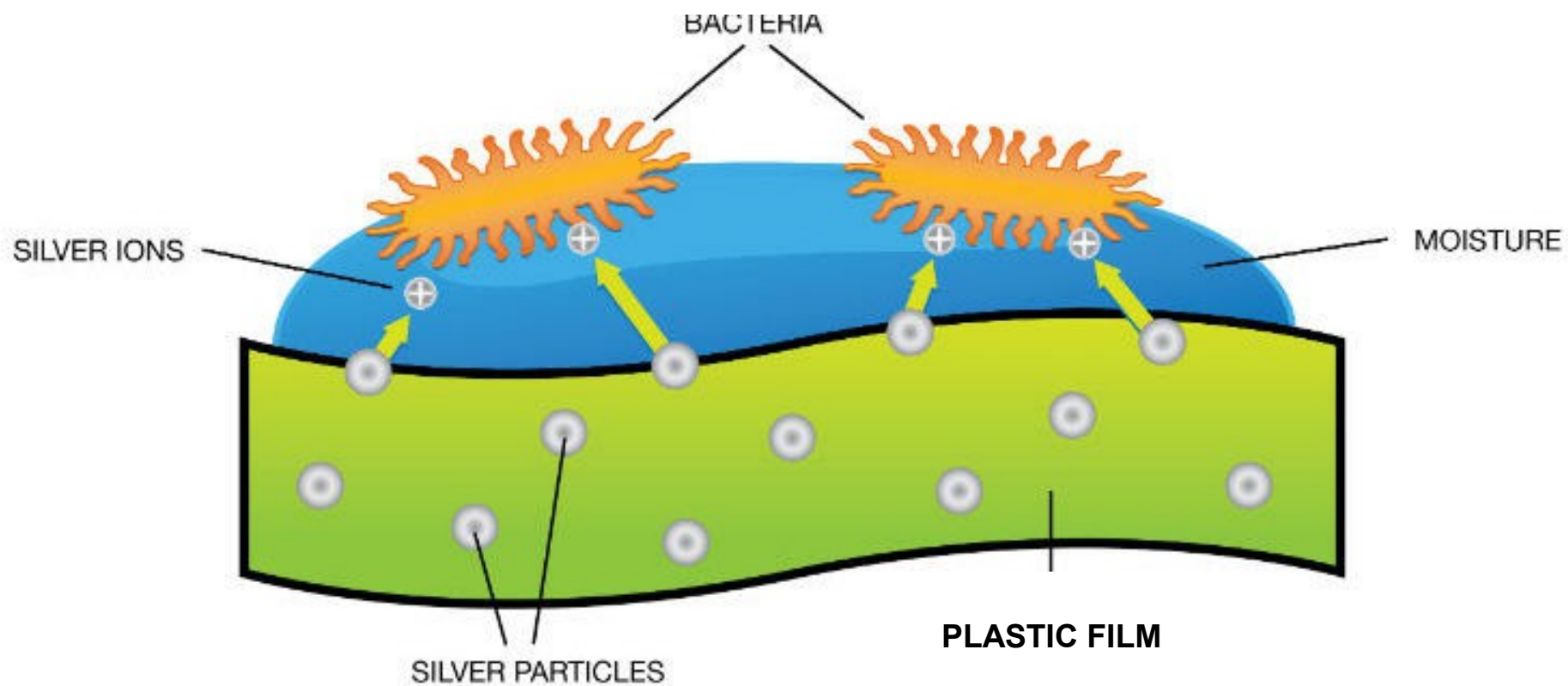
- ▶ Ethylene is a gas naturally produced by fruit as it ripens
- ▶ Ethylene works as an accelerator to the ripening process
- ▶ Ethylene increases ripening exponentially
- ▶ Ethylene adsorbers reduce the ripening rate by adsorbing the ethylene molecules.
- ▶ Ethylene molecules form a bond with the keep-it-fresh additives and are trapped



Technology

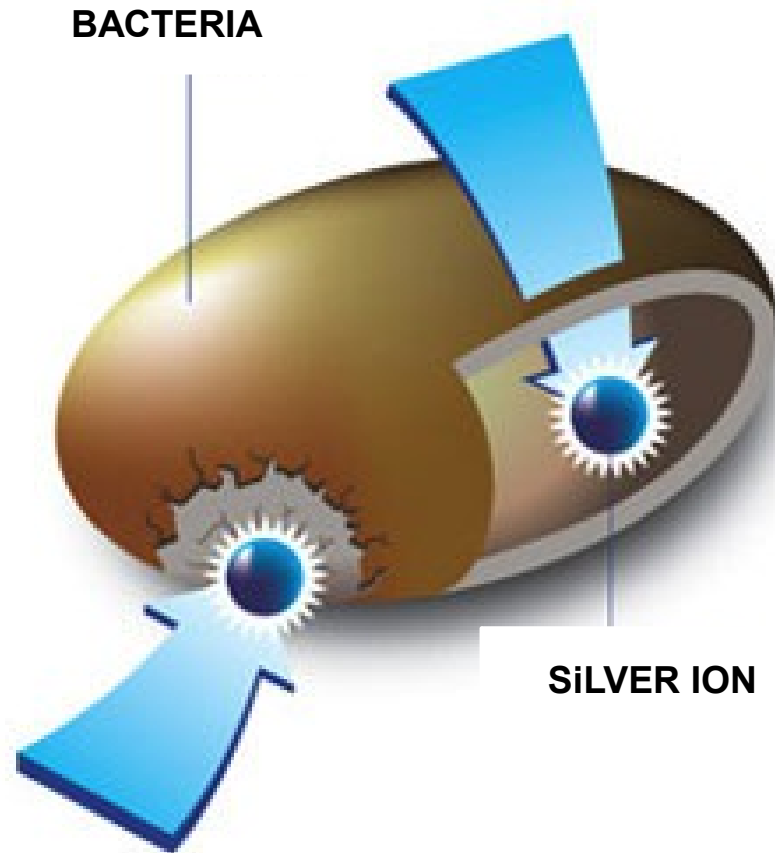
# **Anti-Microbial & Ethylene Adsorbers**

# Anti Microbials





# How Silver Ions Work?



1. Cell Membrane is de-stabilized
2. Respiration is prohibited
3. Food nutrition intake is impeded
4. Cell Division is inhibited

# ETHYLENE PROBLEM



## ETHYLENE PRODUCTION FROM DIFFERENT FRUITS & VEGETABLES

LOW <1.0 ml/kg/hr	MODERATE 1-10 ml/kg/hr	HIGH 10-100 ml/kg/hr	VERY HIGH >100 ml/kg/hr
Pineapple, artichoke, cauliflower, broccoli, date, orange, spinach, beet root, green asparagus, celery, lemon	Banana, mango, plum, tomato	Apricot, nectarine, pear, peach	Apple, Avocado, cherimoya, passion fruit

# Keep It Fresh Bags



- ▶ Made from food grade Polyethylene resins.
- ▶ Leave no harmful residues and are human safe.
- ▶ Preserve the freshness of perishables at room temperature as well as in refrigerator
- ▶ Certified and approved for food contact applications
- ▶ USFDA Tested by SGS Labs
- ▶ Recyclable





# USFDA Testing from SGS

Passes USFDA 21 CFR177.1520 (Olefin Polymers)



SGS

## TEST REPORT

Report No. : MAN:HL:7480003070

DATE : 18<sup>th</sup> February, 2016

HI TECH INTERNATIONAL  
PLOT NO-B 31,, BEANT COLONY JAMALPUR  
LUDHIANA-141010  
INDIA

CONTACT PERSON : MR. SIDHARTH SAREEN

THE FOLLOWING SAMPLE(S) WAS/WERE SUBMITTED AND IDENTIFIED BY/ON BEHALF OF THE CUSTOMER AS :

SAMPLE DESCRIPTION ROT NOT BAG  
COLOUR GREEN  
BUYER HI TECH INTERNATIONAL  
COUNTRY OF ORIGIN INDIA  
SAMPLE RECD ON 08/02/2016  
TEST PERFORMING DATE 09/02/2016 TO 18/02/2016

TEST REQUESTED PLS. REFER TO SUMMARY

TEST METHOD & RESULT(S) PLEASE REFER TO NEXT PAGE(S)

### SUMMARY OF TEST RESULTS:

TEST REQUESTED	CONCLUSION
US FDA 21 CFR 177.1520 (Olefin Polymers) Maximum Extractable fraction Maximum Soluble fraction	Pass

Per Pro SGS India Pvt Ltd.

Ashish  
Sr. Executive  
Email your Test Report Related Enquiries at Feedback.HLT@sgs.com

SGS

## TEST REPORT

Report No. : MAN:HL:7480003069

DATE : 17<sup>th</sup> February, 2016

HI TECH INTERNATIONAL  
PLOT NO-B 31,, BEANT COLONY JAMALPUR  
LUDHIANA-141010  
INDIA

CONTACT PERSON : MR. SIDHARTH SAREEN

THE FOLLOWING SAMPLE(S) WAS/WERE SUBMITTED AND IDENTIFIED BY/ON BEHALF OF THE CUSTOMER AS :

SAMPLE DESCRIPTION ROT NOT MASTERBATCH 3131  
COLOUR WHITE GRANULES  
BUYER HI TECH INTERNATIONAL  
COUNTRY OF DESTINATION NOT PROVIDED  
COUNTRY OF ORIGIN INDIA  
SAMPLE RECD ON 08/02/2016  
TEST PERFORMING DATE 09/02/2016 TO 17/02/2016

TEST REQUESTED PLS. REFER TO SUMMARY

TEST METHOD & RESULT(S) PLEASE REFER TO NEXT PAGE(S)

### SUMMARY OF TEST RESULTS:

TEST REQUESTED	CONCLUSION
US FDA 21 CFR 177.1520 (Olefin Polymers) Maximum Extractable fraction Maximum Soluble fraction	Pass

Per Pro SGS India Pvt Ltd.

Ashish  
Sr. Executive  
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# TESTING TOMATOES



# Tomatoes in open condition



Tomatoes Day 1



Tomatoes Day 7



## 7 DAY TESTING

### Plain Bags

Black spots  
observed on

3 tomatoes out  
of 4 in 7 days



## 7 DAY TESTING

Tomatoes  
packed in KIF  
6% film

0 spots observed on  
any tomato after 7  
days







HOLES / NO HOLES?

Tomatoes used  
KIF MB 3131 @  
6%

**without holes**

Developed  
Black Spots  
after 1 week



Tomatoes used  
SF MB @ 6%

**with holes**

No Black Spots  
after 1 week



# Results



Bag Type	Bag Type	Life
Plain Bags	KIF Bags	KIF MB Improves Life
Bags Without Holes	Bags with holes	Holes Improve Life
Conclusion: KIF MB @ 6% Plus Holes or No Sealing gives best results		

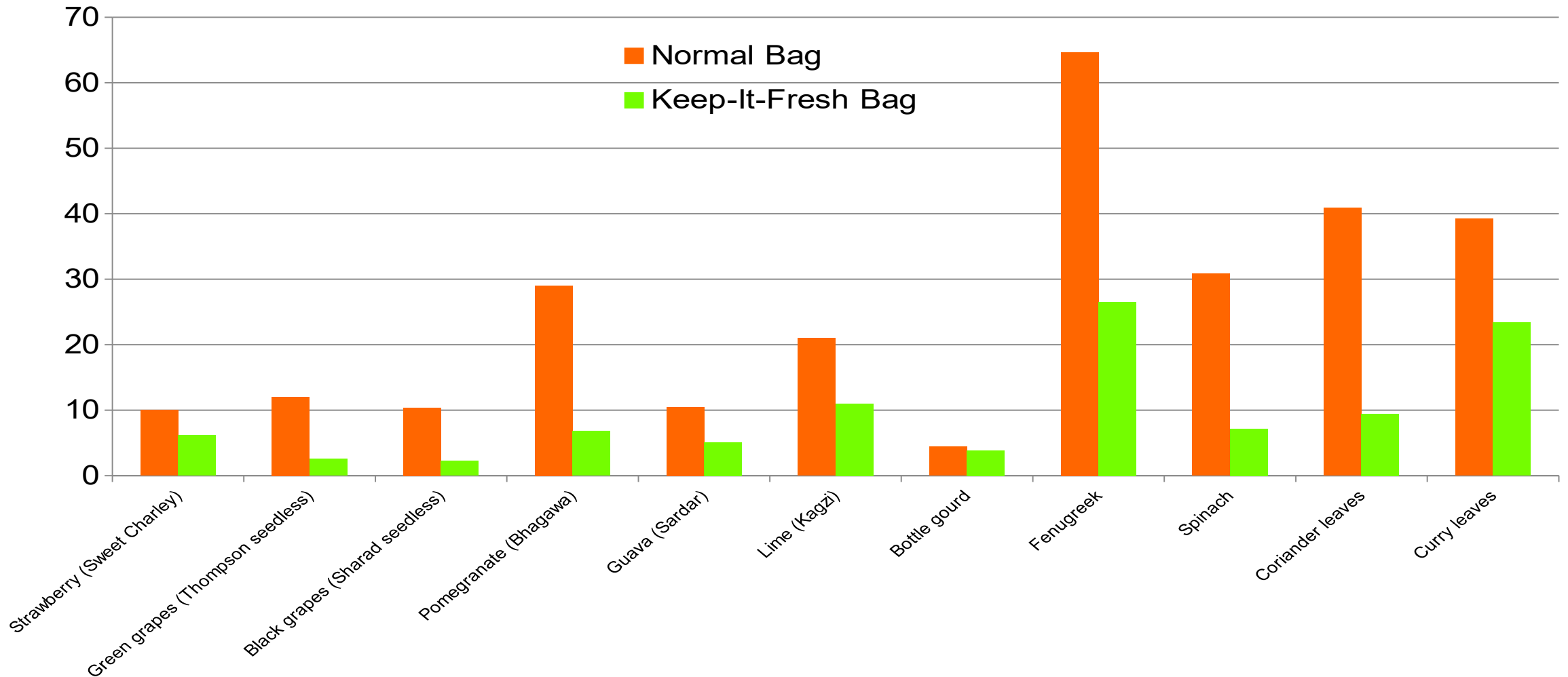
# Weight Loss over time



NO.	FOOD PRODUCT	Percentage Weight Loss (%) At Room Temperature		STORAGE DAYS At Room Temperature In Keep It Fresh
		Control bag	Keep It Fresh bag	
1.	Strawberry (Sweet Charley)	10.04	6.19	5
2.	Green grapes (Thompson seedless)	12.05	2.57	13
3.	Black grapes (Sharad seedless)	10.38	2.26	15
4.	Pomegranate (Bhagawa)	29.04	6.82	65
5.	Guava (Sardar)	10.50	5.12	8
6.	Lime (Kagzi)	21.02	10.99	13
7.	Bottle gourd	4.44	3.85	11
8.	Fenugreek	64.69	26.54	5
9.	Spinach	30.87	7.17	3
10	Coriander leaves	40.85	9.45	3
11.	Curry leaves	39.24	23.40	5



## Weight Loss % of different fruits and vegetables in Normal bag compared to Keep-It-Fresh Bag



# Products



- ▶ Ethylene Adsorber Paper
- ▶ Ethylene Adsorber Sachets
- ▶ Ethylene Adsorber Masterbatch 3131
- ▶ Ethylene Adsorber Bags
- ▶ Ethylene Adsorber Injection-molded Products
- ▶ Oxygen Adsorber Sachets



# Keep It Fresh Sachets



- ▶ Can be placed with the fresh fruit and vegetables
- ▶ Natural Clay Desiccant
- ▶ Natural Ethylene adsorbers
- ▶ 5 grams per cubic feet
- ▶ Packed in Tyvek by Dupont



# Keep-It-Fresh Capsules



- ▶ Plastic Capsules for 10 cubic feet
- ▶ Can be placed in refrigerators and with fresh produce
- ▶ Also available with adhesive backing



# Thanks!

SHELF LIFE EXTENSION FROM KEEP-IT-FRESH