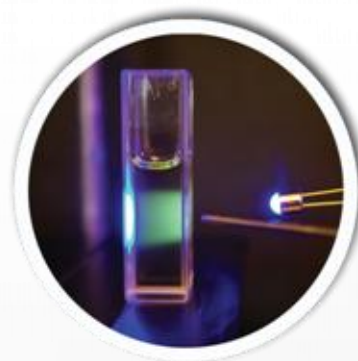




ISOPROPYL ALCOOL AND THE TUBING SYSTEM

OMSPA, JULY 2016.

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FINANCIAL SUPPORT



OTHER CONTRIBUTORS

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(CTMP)

CONSULTATION C.E.I. INC

MAPLE SYRUP PRODUCERS ET CLUB ACÉRICOLE DE L'EST
EQUIPMENT DEALERS

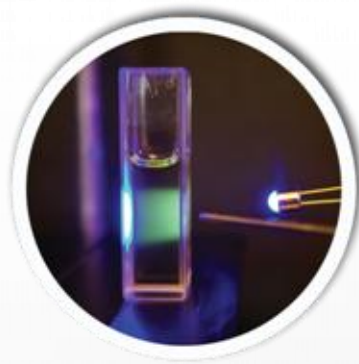




OUTLINE

- 1. RESEARCH OBJECTIVES
- 2. OVERVIEW
- 3. RESULTS OBTAINED :
 - A. EXTRACTIBLES, LABORATORY
 - B. LEACHABLES, IN THE SUGARBUSH
- 4. RECOMMENDATIONS
- 5. CONCLUSION



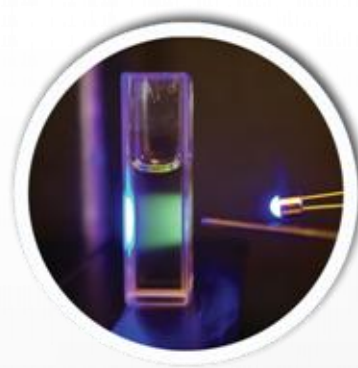


GOALS

1. IDENTIFY ISOPROPYL ALCOOL
EXTRACTIBLES FROM PLASTICS :
EXPERIMENT A
2. IDENTIFY THOSE SUSCEPTIBLES TO LEACH
IN THE SAP : EXPERIMENT B

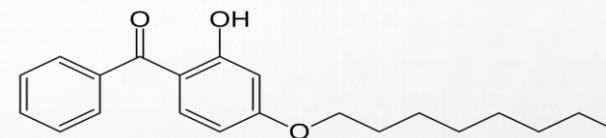
*In the
laboratory*
In the bush



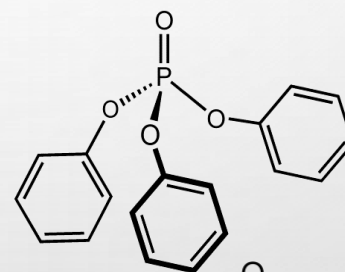


IN BRIEF: MOST FREQUENT PLASTIC ADDITIVES

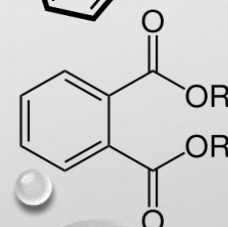
OCTABENZONE
(UV PROTECTION)



TRIPHENYL PHOSPHATE
(PLASTICIZER AND FIRE RETARDANT)

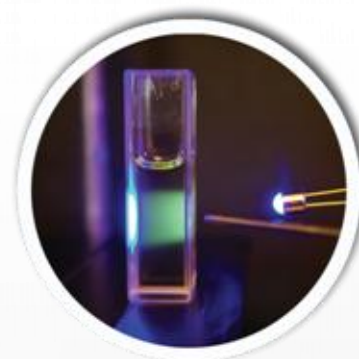


PHTHALATES
(PCV PLASTICIZER)



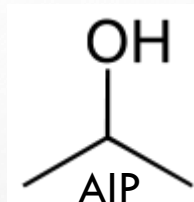
BISPHENOL
(POLYCARBONATE POLYMER)





IN BRIEF: WHAT IS ISO 70 %ALCOOL

- Molecule : C_3H_8O

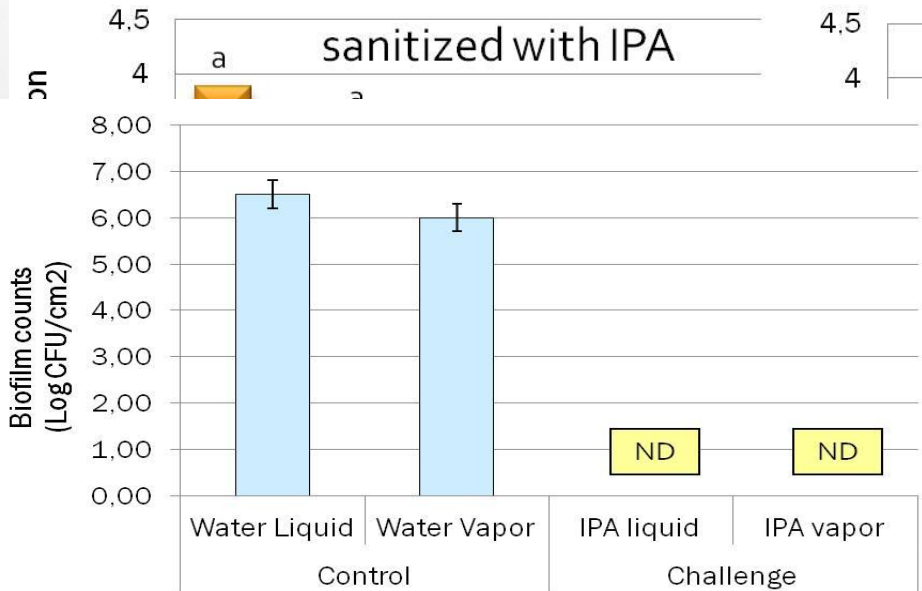


- HEALTH Canada: approved antimicrobial agent
- According to the Canadian standards: accepted for regular and organic production
- FDA : indirect additive accepted in the food production.
- EPA: has yet to be registered

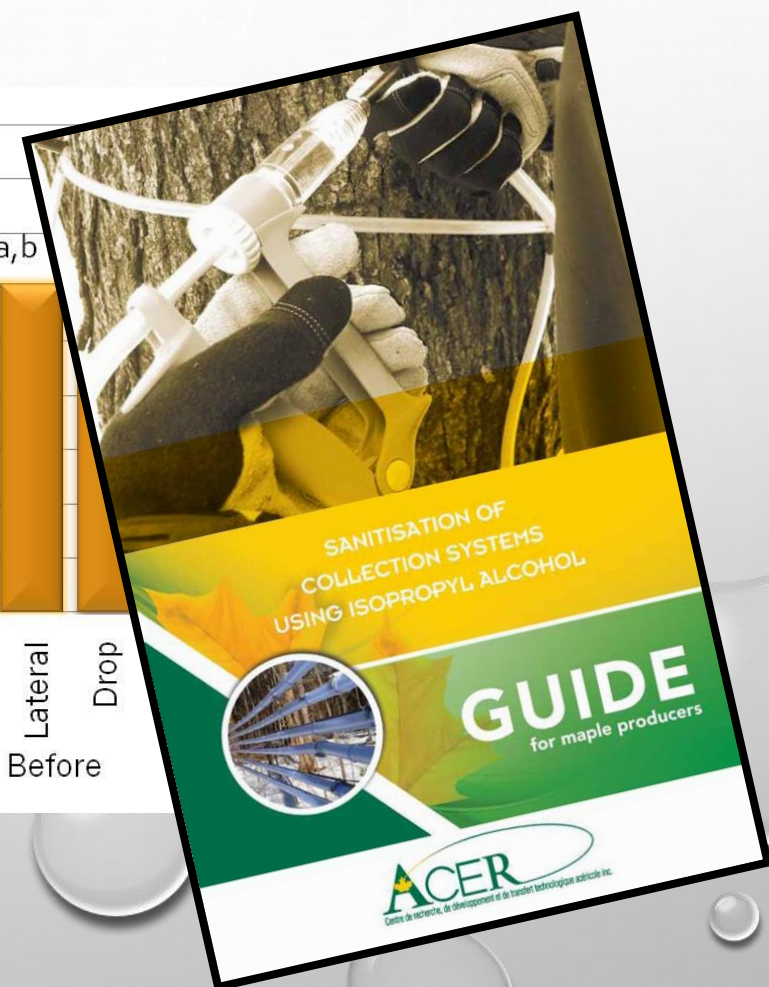
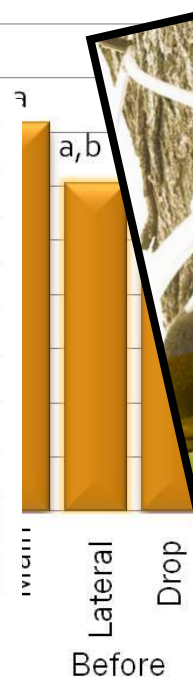


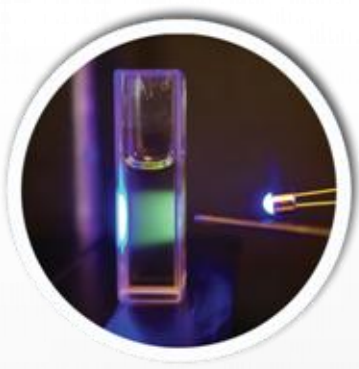


IN BRIEF: PUBLICATIONS

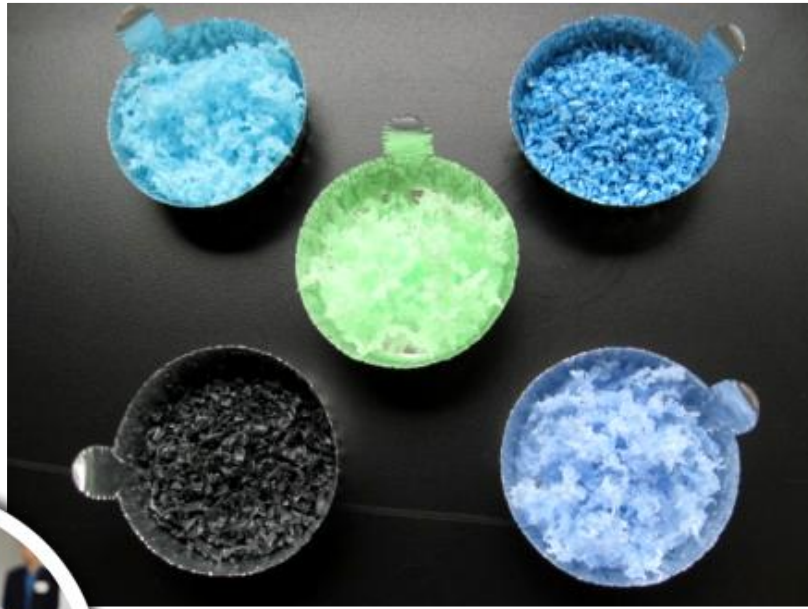


Average microbial counts on surfaces colonized with bacteria (biofilm) before and after challenge with IPA 70% liquid or vapor



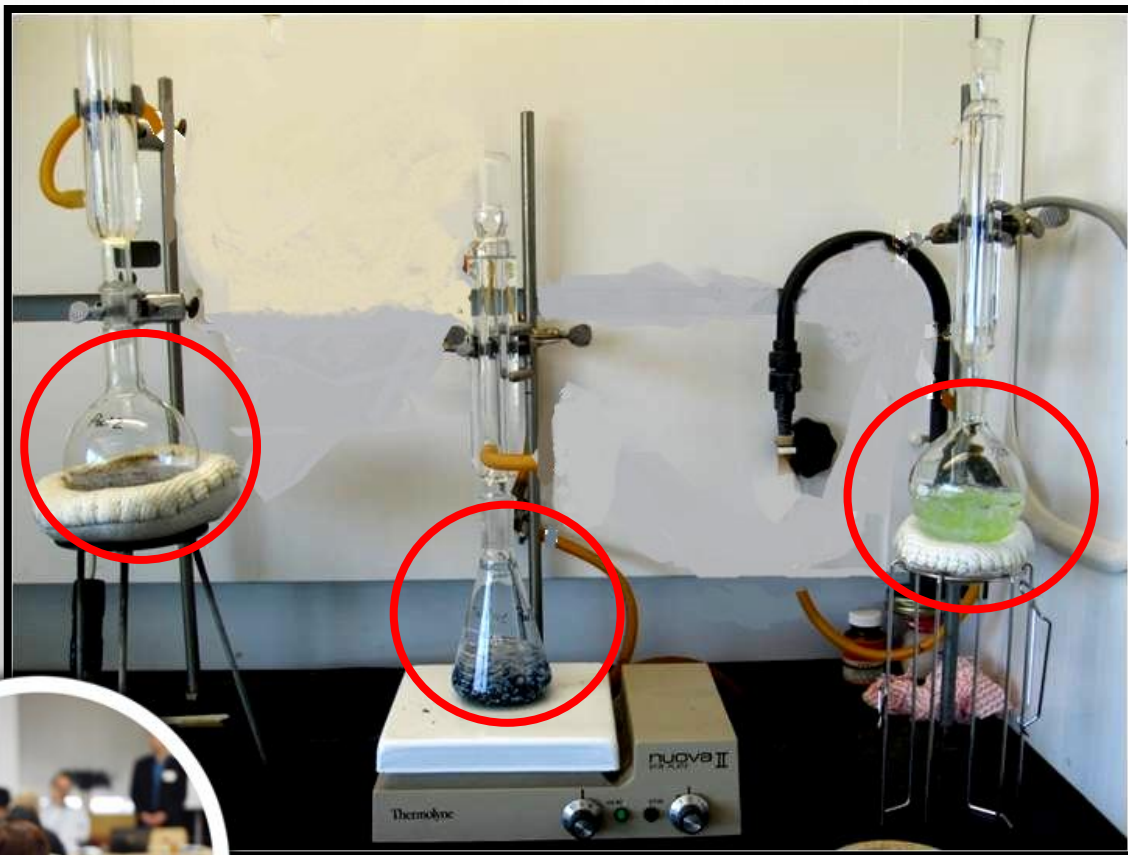


EXPERIMENT A. EXTRACTIBLES



- 27 plastic samples organized in homogeneous lots
- Supplied by 4 major equipment dealers
- Different types of equipment
- 1.spouts 2.main line 3. laterals
- Different colors
- Different composition

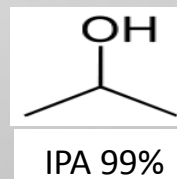




Reflux system, Centre ACER

PROTOCOL

- Plastic samples ground to 3mm by CTMP (CEGEP THM)
- 5 g of plastic per sample
- 100 ml ISO at 99%
- Heated at 82°C (boiling point of ISO) for 24 hours

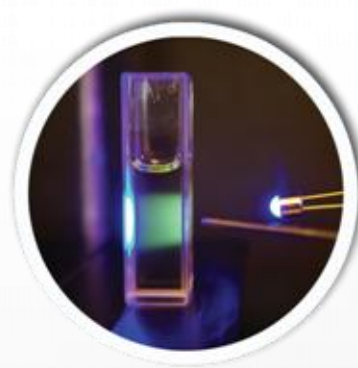




Centre de recherche, de développement et de transfert technologique acéricole inc.



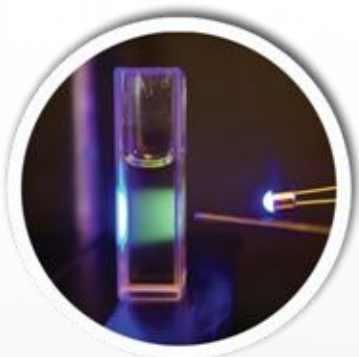
Fédération des producteurs
acéricoles du Québec
Agriculture and
Agri-Food Canada
Canada



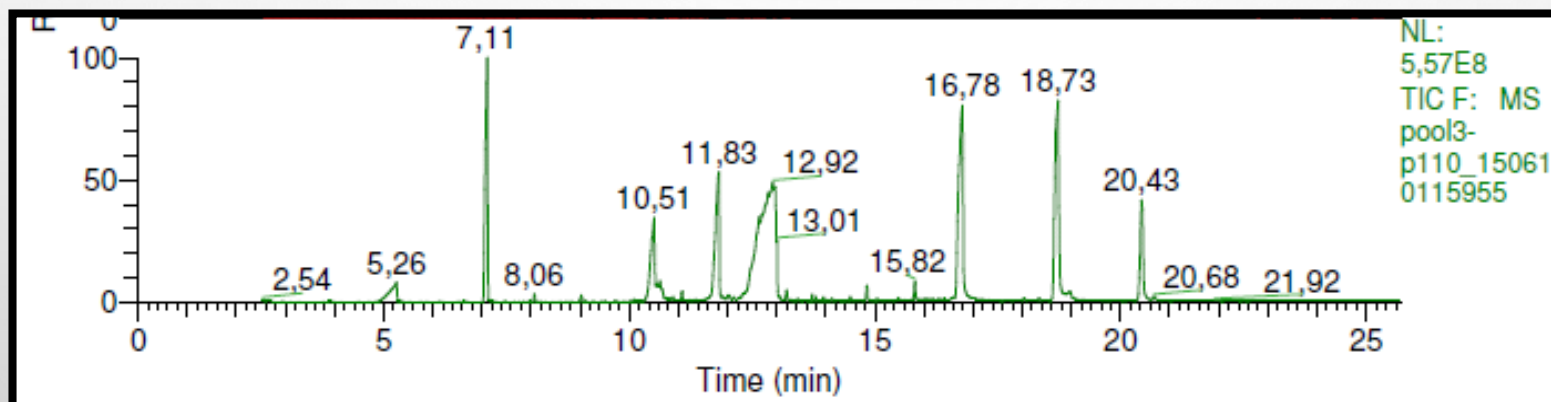
PROTOCOL

- Samples analysed by GC-MS
- Well recognised equipment
- Expected concentrations in ppb's (1000 X smaller than ppm. One ppb is the equivalent of 1mm over 1000 km)





EXAMPLE OF THE INFORMATION OBTAINED

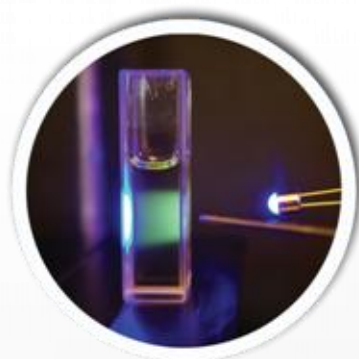




RESULTS : EXTRACTIBLES

- 41 compounds extracted in the laboratory using this « radical » approach
- One substance found in every plastic:
 « **2,4-Di-tert-butylphenol** » DTB
- An antioxidant





EXPERIMENT B : LEACHABLES

SELECTED COLLECTING SYSTEMS

Systems	Not IPA Sanitized	Sanitized using IPA
Number of producers	4	15
Average tap number	0 - 2000	10 000 – 68 000
Plastic colors	5 : black, blue, white, green, grey	
Types of components	3 : laterals, mains, spouts (connectors)	
Age of the systems	from 0 to 15 years	
Number of suppliers	4 to 6	





PROTOCOL



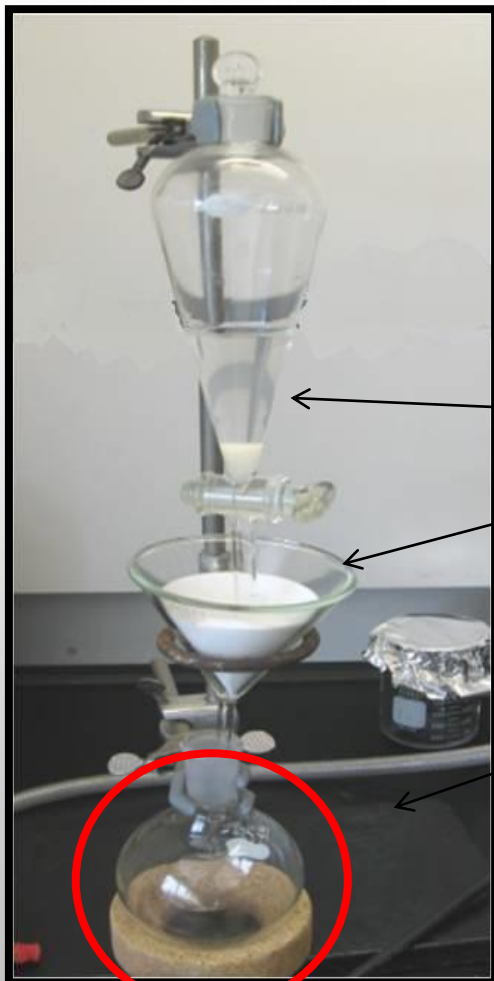
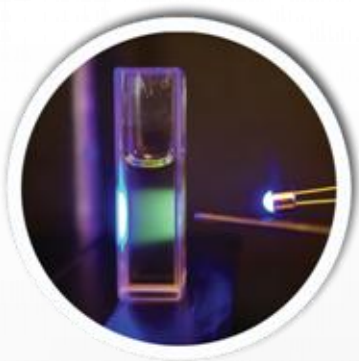
EPA approved sampling bottle

Sap Collection schedule			
1 st run	2 nd run	3 rd run	Mid-season
Rince liquid		Sap analysis	
Preliminary analysis		Maple syrup analysis	



Results presented today

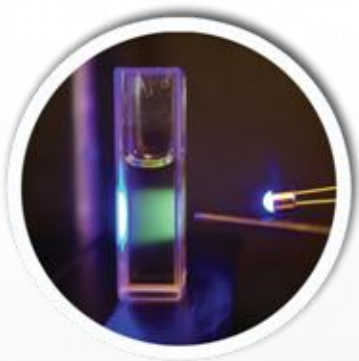




PROTOCOL

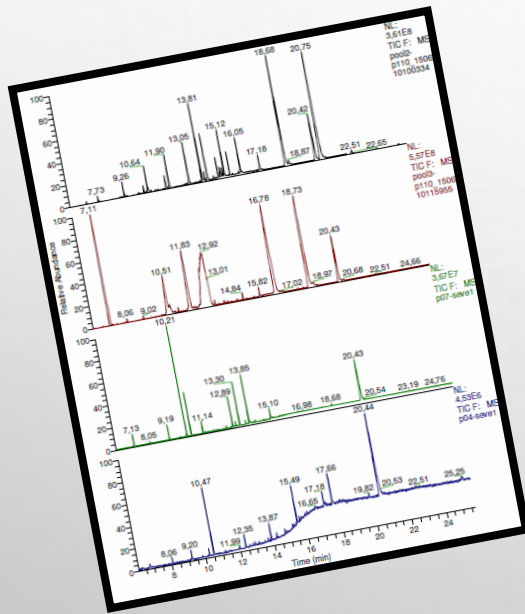
- Liquid – liquid Extraction
- 50 ml of sap with
Dichloromethane
- Filtration and sodium sulfate
- Concentration
- GC-MS analysis





RESULTS AND COMPARISON

- Comparison of the extractibles obtained in the laboratory with those obtained in the bush.

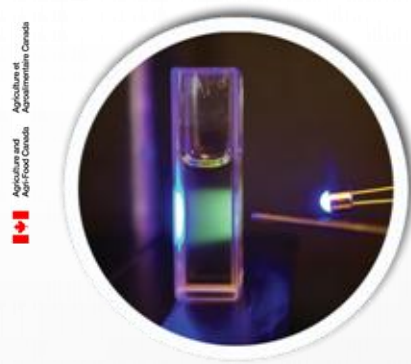




LEACHABLE COMPOUNDS IDENTIFIED

	Sap		Syrup	
Systems	WITH IPA	NO IPA	WITH IPA	NO IPA
Plastic components	• Phenol,2,4-bis(1,1-dimethylethyl) (BPA)- CAS : 96-76-4 • Di-n-butyl phthalate (DBP) – CAS : 84-74-2 • Di(2-ethylhexyl) phthalate (DEHP) – CAS : 117-81-7			
Concentration	• Less then1 ppb (example 1 sec./32 years)			
Acceptable limits	• The maple industry has no established limit. • EPA ; 6 ppb DEHP in bottled water			





CONCLUSIONS

- A very low number of substances found either in the sap or in the maple syrup
- Compounds are commonly observed in food
- Their presence is not associated with ISO





SAFE STORAGE OF IPA

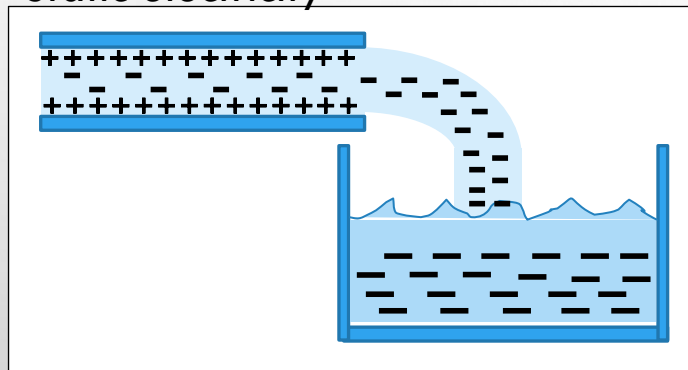
- Employer must follow WHMIS and clearly label IPA containers in conformity with existing laws and regulations.
- Employer must provide workers with MSDS
- Quantity and storage duration should be limited
- IPA should be stored separately from other chemicals and sodium hypochlorite
- IPA should be kept away from heat sources, sparks etc. (electrical engine, gasoline, chainsaw etc.)
- IPA should be stored in a well vented building or in an approved safety cabinet
- For more important volume IPA should preferably be stored in a dedicated building away from the others.
- Same recommendations applies to empty IPA containers.



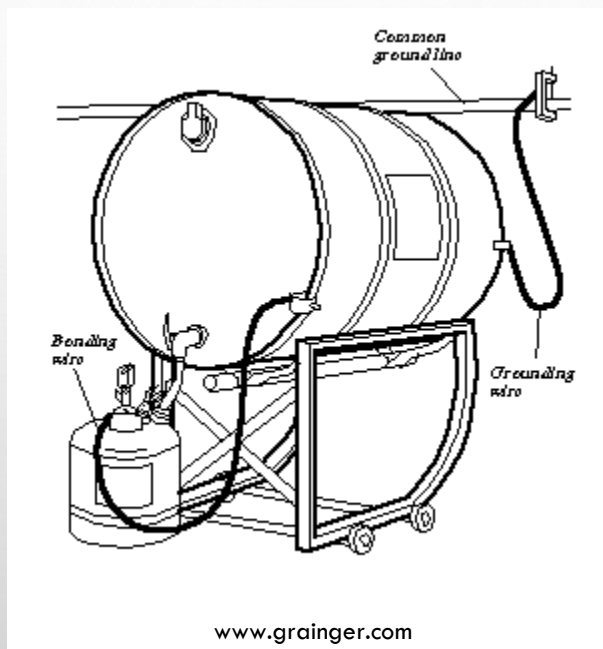


GROUNDING

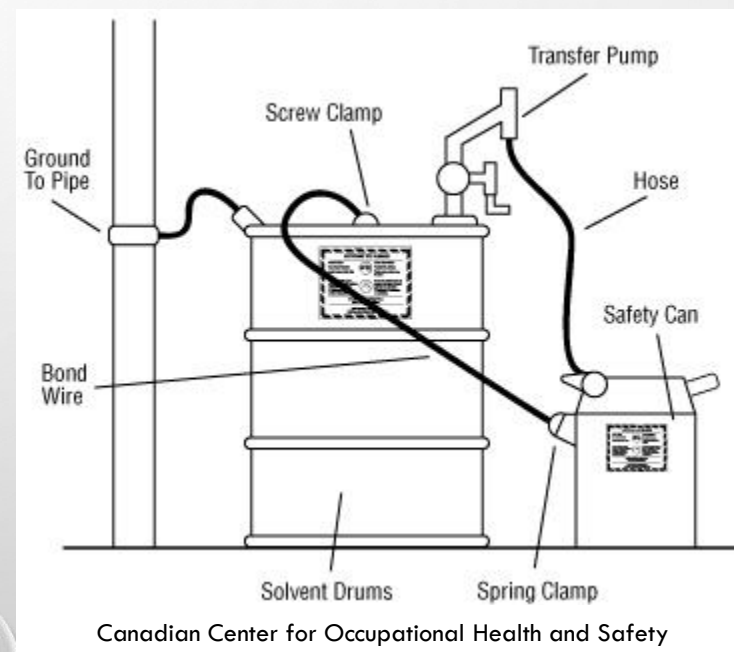
Static electricity



Flow generated electrostatic potential



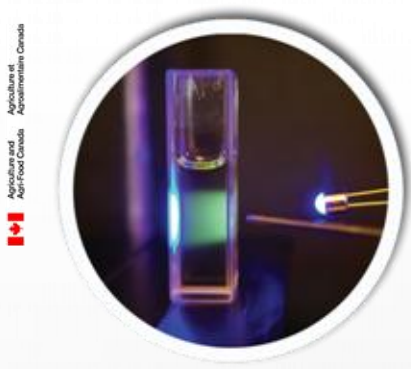
www.grainger.com



Canadian Center for Occupational Health and Safety

- USE ONLY COMMERCIAL 70% IPA – **FOOD GRADE**
- 20 L (5 GAL) RECOMMENDED CONTAINER VOLUME





CONCLUSION

- First study of this nature
- Work was completed and data will be updated
- A scientific article is in the writing
- We will reissue the guide with updated safety recommendation

