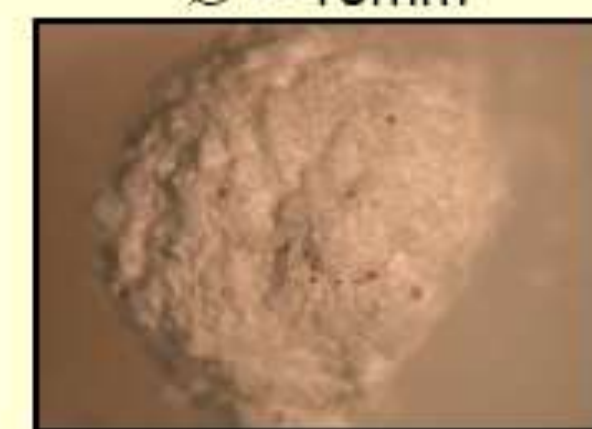
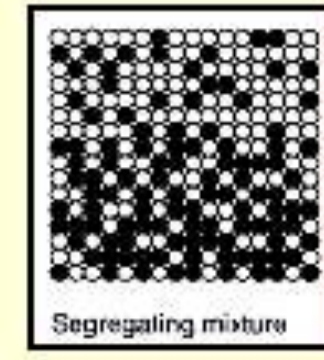


## The EF during Solids Mixing

### Mixing uniformity problems

- Segregation
- Agglomeration



### Not sufficient information available on the subject

- Need to develop general thumb rules and empirical models to help the industry implement trouble-free operation and troubleshoot process

# Insight on the role of electrostatic forces on the behavior of dry pharmaceutical particulate systems

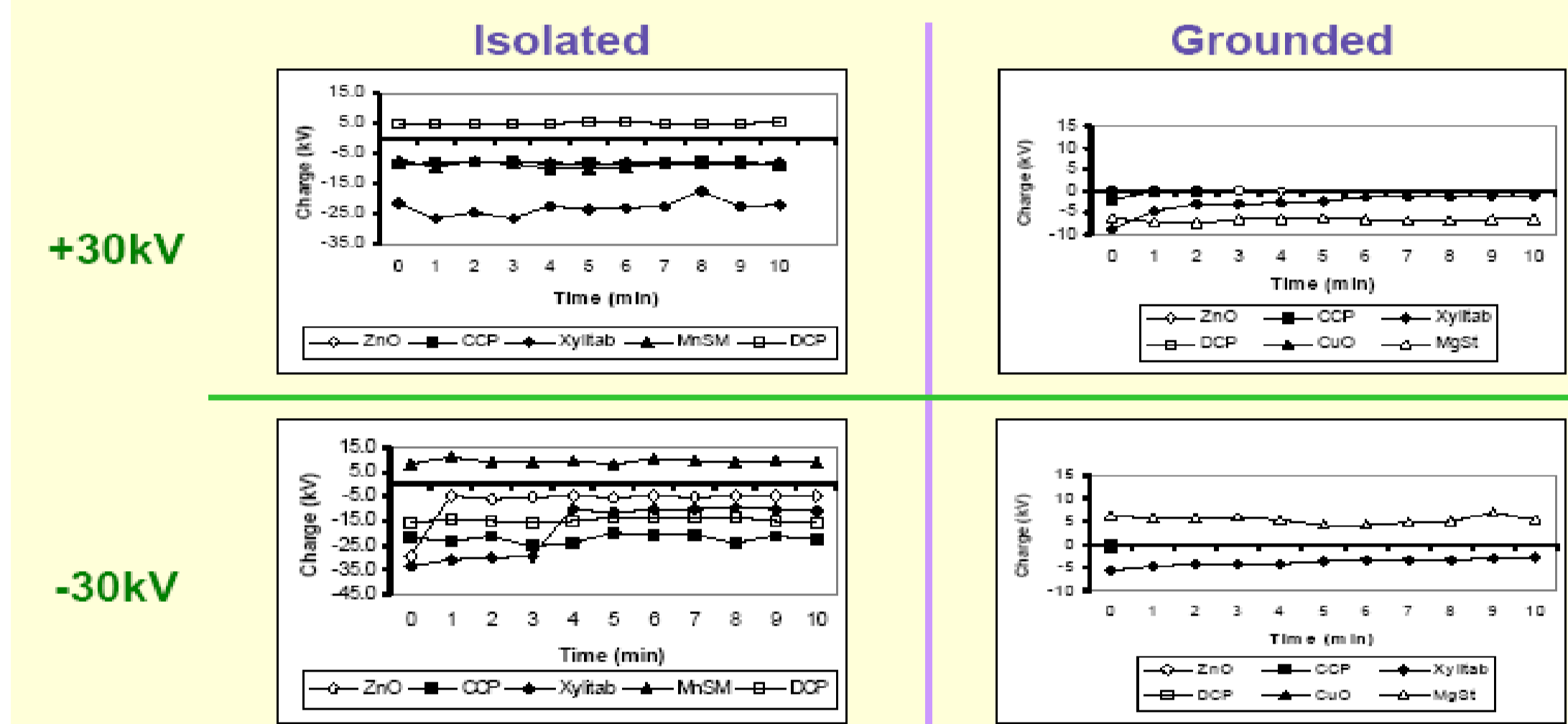
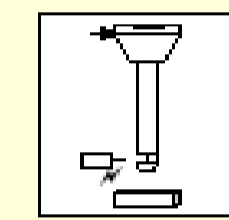
Emilie D. Lachiver, Wyeth & Univ. de Sherbrooke  
Jean-Sébastien Simard, Wyeth  
Louis Cartilier, Univ. de Montréal and  
Nicolas Abatzoglou, Univ. de Sherbrooke

PPPI, Montreal, June 29, 2005

## Goals of this study

- A First set of experiments to answer the following questions
  - How can material be charged?
  - Can material retain charge if charged & dropped in isolated container?
  - Can material retain charge if charged & dropped in conductive container?
- A Second set of experiments to answer the following question
  - Do powders agglomerate due to EF?

## Results Imposed charge



## Experimental set-up

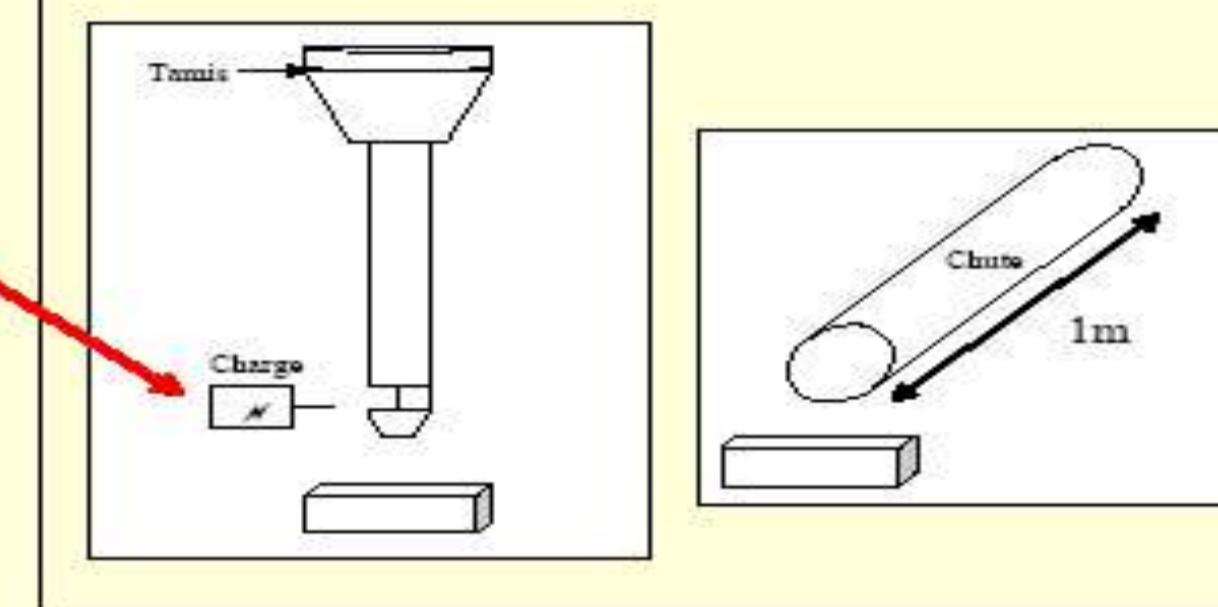
### Equipments

- Chargemaster BP50
- Pinner bars

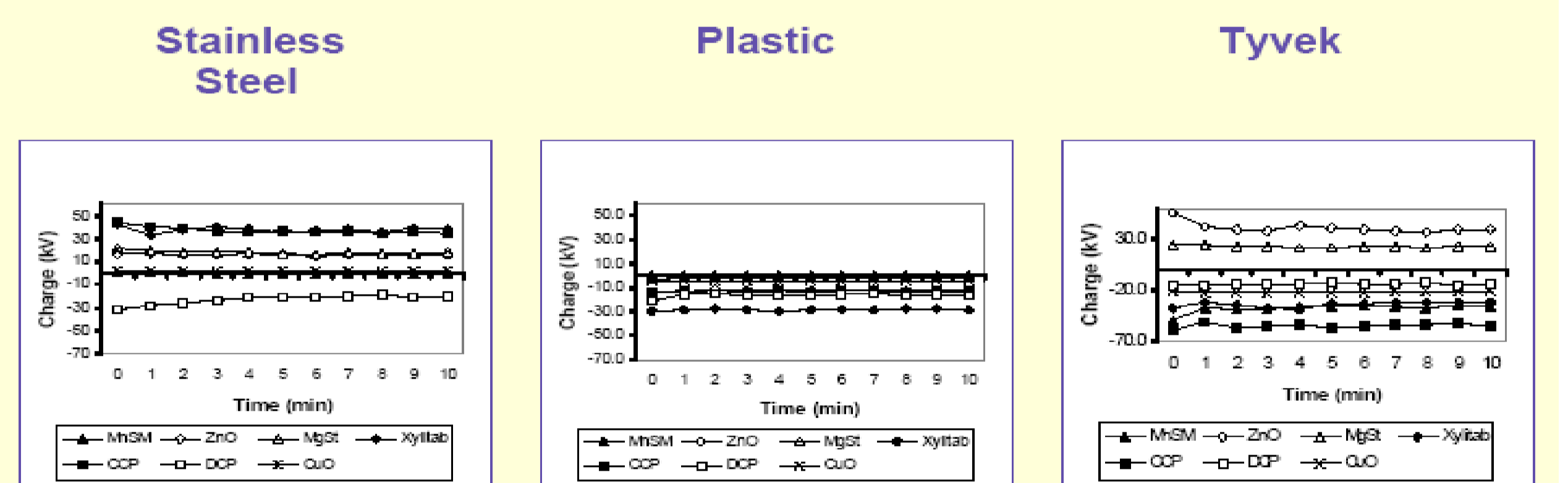
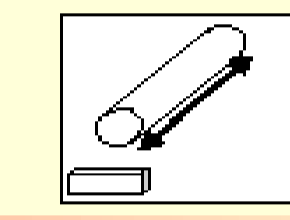


### Set-up

- Imposed charge
- Natural charge



## Results Natural charge (Chute)



## Experimental plan DOE

### Do powders agglomerate due to EF?

#### Protocol

- Screen 1/2 excipient
- Charge 1/2 excipient
- Screen lubricant
- Charge lubricant
- Screen 1/2 excipient
- Charge 1/2 excipient
- Blend 1 min

#### Material

- Xylitab
- DCP
- MgSt

### Design 2<sup>2</sup>: Xylitab & MgSt

Std	Run	Factor 2	
		Charge Xylitab	Charge MgSt
2	1	-30	-30
10	2	0	0
7	3	30	30
9	4	0	0
4	5	30	-30
8	6	30	30
3	7	30	-30
5	8	-30	30
6	9	-30	30
1	10	-30	-30

## Conclusion

- Each raw material develop electrostatic charge of different polarity and magnitude
  - Their behavior is attributed to their physical characteristics, conductivity and ionic affinities
  - Their charge varies according to the contact material
- EF influence agglomeration tendency in dry pharmaceutical powder blend
- Neutralizing raw materials reduce but do not eliminate the agglomeration phenomena

Insight on the role of electrostatic forces on the behavior of dry pharmaceutical particulate system submitted to Pharmaceutical Research

## Results Binary mixture

- Design 2<sup>2</sup> DCP & MgSt
  - Not significant
  - DCP does not retain charge
- Design 2<sup>2</sup> Xylitab & MgSt
  - Model is significant

⇒ Powders agglomerates when charged

