Roylan
DEVELOPMENTS

StoragePod Performance Data Highlights

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The Industry Problem – DMSO Water Absorption

- DMSO highly hydrophilic
- 20% plus moisture absorption in 24 hours
- ***A very small amount of water absorption will significantly degrade DMSO solubilising capabilities***

- Consequences:
  - Dilution of the compound concentration level
  - Depression of the DMSO freezing point
  - Precipitation of compounds out of solution, which can lead to neat DMSO (containing no compound) being screened
  - Significant negative impact on the quality of screening results

- Also, DMSO compound mixtures can react badly to freeze/thaw cycles, particularly when water is present

StoragePod Benefits for Compound Quality

- Dry nitrogen environment keeps compounds dry, in either powdered or liquid/DMSO states. BIG reduction in moisture absorption!
- Compound activity/potency is preserved
- Instances of compound precipitating out of solution is reduced
- Concentration levels of liquid DMSO/compound libraries is maintained
- Compound libraries last longer, with a reduced need to replace expensive compounds

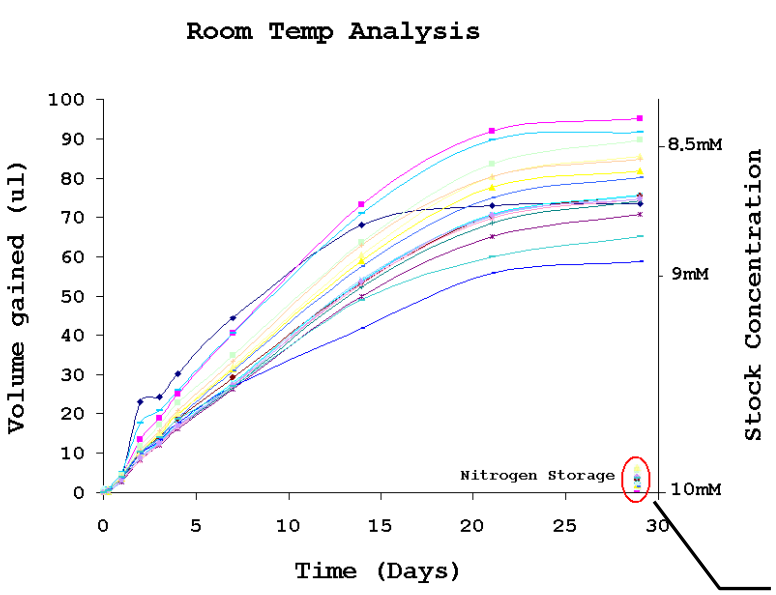
Ultimately, this all results in an improved quality of screening experiment results

StoragePod Performance Data – Astra Zeneca

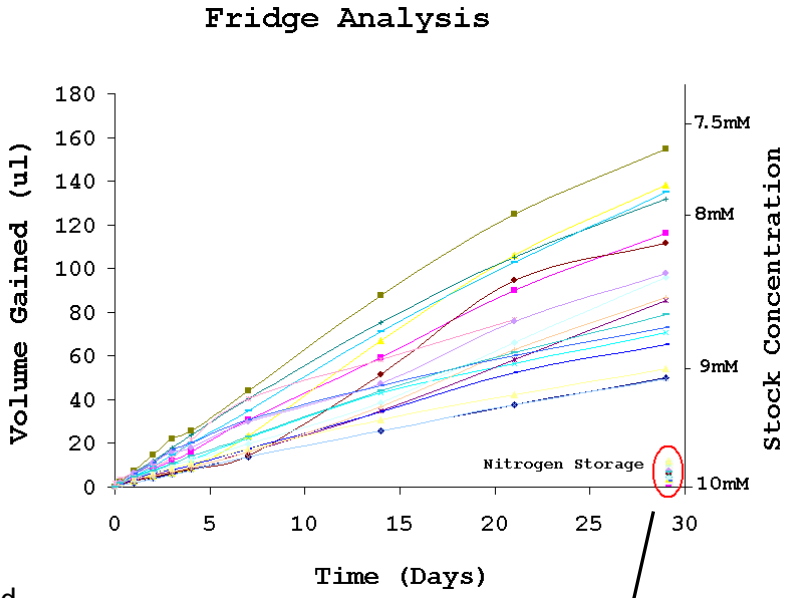
- The data on the next slide was generated by AstraZeneca in the UK, using our standard StoragePod Controller and ‘Dundee’ design StoragePod boxes
- AstraZeneca were experiencing big problems with the effects of moisture absorption. Their storage was poorly controlled, using basic cupboards and fridges
- This problem was affecting the quality of their screening results
- The StoragePod system solved their problems
- They now have a StoragePod Controller unit in every research lab and a couple of hundred ‘Dundee’ design StoragePod boxes for their compound storage

Astra Zeneca Performance data – Moisture Absorption

- 9 compounds tested in sealed tubes over 30 days
- Storage in cupboards (labelled as room temp) and fridges showed significant moisture absorption
- Storage in the StoragePod boxes with the nitrogen environment showed that no moisture absorption occurred



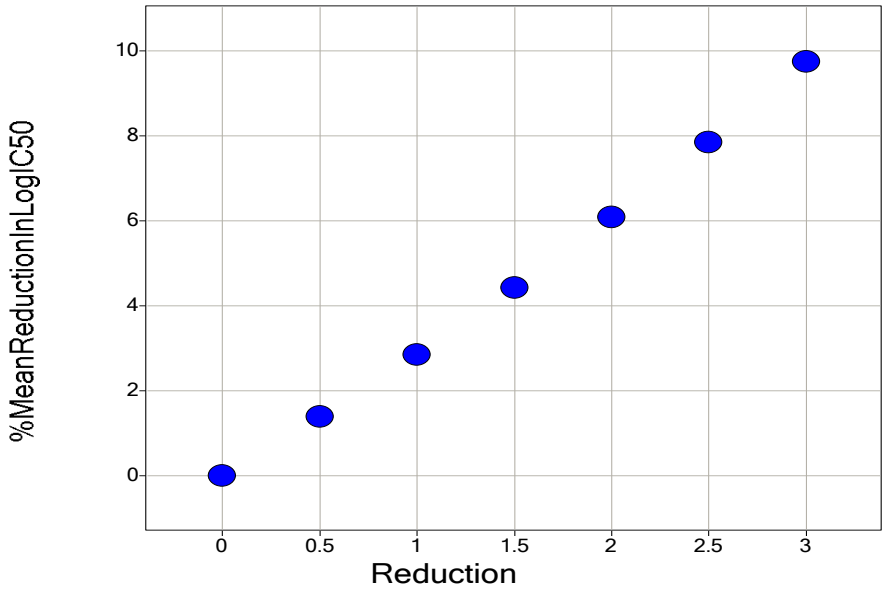
StoragePod Results



StoragePod Results

Astra Zeneca Performance data – IC50 Data

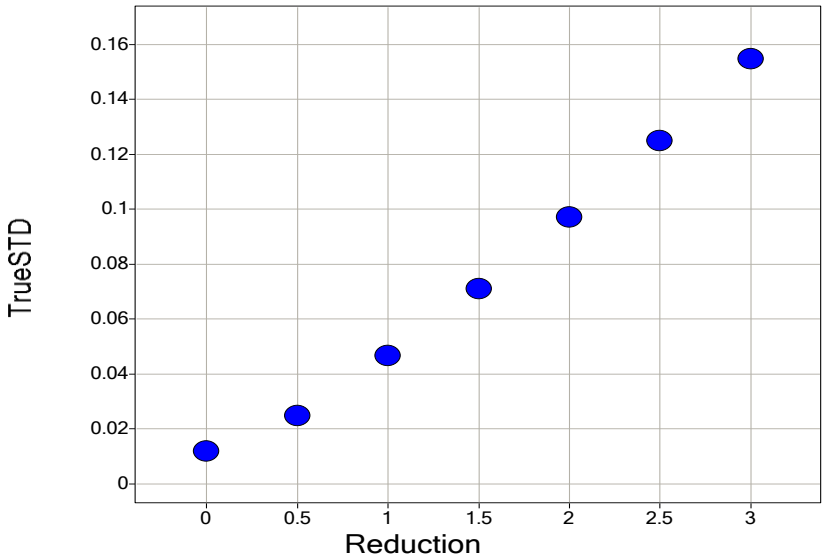
- The chart below shows the mean percentage change in of the LogIC50 when the stock concentration is reduced for a typical bioassay
- As concentration is reduced due to moisture absorption, the potency is increasingly underestimated
- This could affect the rank order of compounds and provide misleading results



This problem was avoided by using the StoragePod system for compound storage under nitrogen

Astra Zeneca Performance data – IC50 Data

- The chart below shows the mean standard deviation (SD) of the LogIC50 data
- As concentration is reduced due to moisture absorption, the SD values are also found to rapidly increase
- This could lead to under-estimation of variability, false perceptions of data quality and incorrect power analysis



This problem was avoided by using the StoragePod system for compound storage under nitrogen

Astra Zeneca Performance Conclusion

"It has been shown that no statistical analysis would be able to correctly analyse the data because the true concentrations tested would in general be unknown. It is not possible to apply a correcting factor, as the reduction in concentration follows no discernible pattern. Therefore, it is essential to ensure that the detrimental effect of the absorption of water by DMSO is reduced as much as possible.

To this end, we have purchased [StoragePod] equipment that will allow compounds to be stored under nitrogen and low relative humidity. These conditions are in line with best practice conditions and will ensure that solubilised compound stocks are maintained appropriately. Storing solubilised compounds in these conditions will help to minimise the risks highlighted in this document, leading to improved data quality and consequently, to better informed business decisions."

MultiPod Customer Performance Test

- The data on the next slide was generated by a customer using a MultiPod Controller and ‘San Francisco’ design StoragePod box
- 11 compounds were formulated in fresh DMSO (11mM), then plated into 96 well microplates and sealed with aluminium foil
- Stored over a month:
  - At room temperature (in a drawer)
  - In a -20 DegC freezer
  - In the StoragePod box under nitrogen

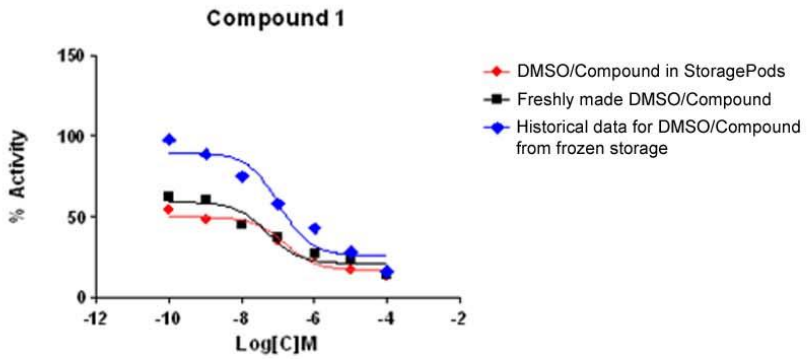
- Analyses by LCMS (at day1, day5 & day 30) showed:
  - No loss of compound observed through chemical degradation (i.e. purity stays the same)
  - No loss of compound observed through precipitation (i.e. same peak area = concentration stays the same)

MultiPod Customer Performance Data

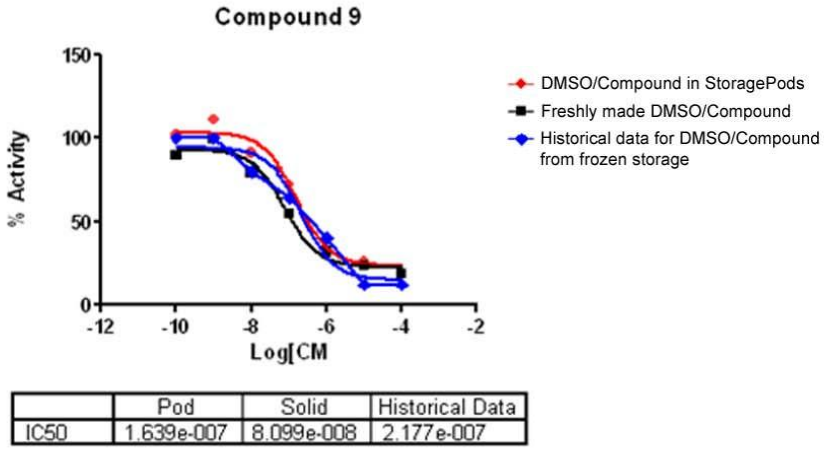
	Concentration at day 32 (mM)		
	POD	**Freezer**	**RT**
Compound 1	10.09	8.79	8.81
Compound 2	10.15	9.03	6.90
Compound 3	9.95	8.85	8.80
Compound 4	10.88	9.80	9.70
Compound 5	10.09	8.71	8.92
Compound 6	10.00	8.64	8.93
Compound 7	10.09	9.04	8.98
Compound 8	10.21	9.04	8.08
Compound 9	10.00	8.77	8.76
Compound 10	10.07	8.88	8.13
Compound 11	9.38	8.92	7.94
Caffeine	10.34	10.38	10.37

Concentration calculated at day 32 from peak area measurement compared to peak area at day 1.

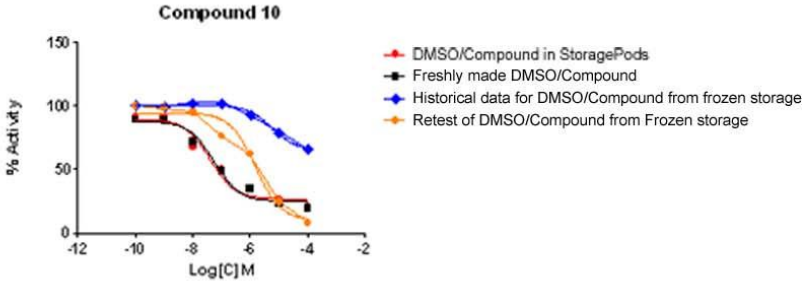
MultiPod Customer Performance Data



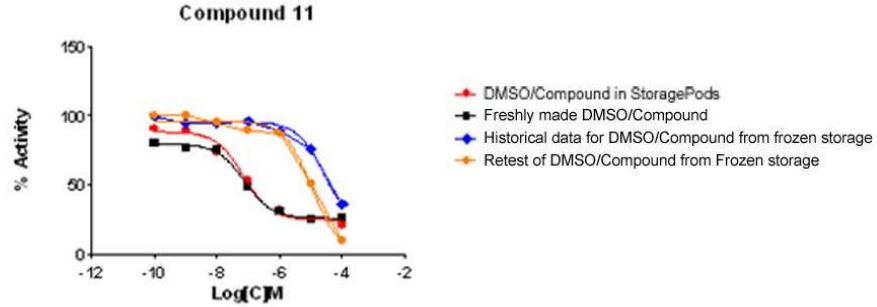
	Pod	Solid	Historical data
IC50	1.572e-007	5.115e-008	1.065e-007



	Pod	Solid	Historical Data
IC50	1.639e-007	8.099e-008	2.177e-007



	Pod	Solid	Original data from frozen	Retest from frozen stock
IC50	3.946e-008	5.558e-008	5.419e-006	1.499e-006



	Pod	Solid	Original data from frozen	Retest from Frozen
IC50	7.050e-008	7.658e-008	2.741e-005	1.084e-005

MultiPod Customer Test Conclusions

Their conclusions:

> "In summary, the StoragePod showed that the concentration of our stock solutions did stay constant throughout the 40 day trial period and that the purity of the material was preserved.
>
> From the biology side, we did previously experience for some compounds large variations of results depending on the handling history. The difference in IC50 between fresh stock and frozen stock could be 1000 fold even after 5 days in freezer (1 freeze-thaw cycle).
>
> The StoragePod showed that results were consistent between fresh stock and 40 days storage."

MultiPod Customer Additional Conclusions

Additional conclusions:

- Compound storage under nitrogen provides better results than freezing
- Compound activity after frozen storage is reduced
- Freezing is actually not a good storage method
- It is more important to keep compounds in DMSO dry (moisture free) than frozen