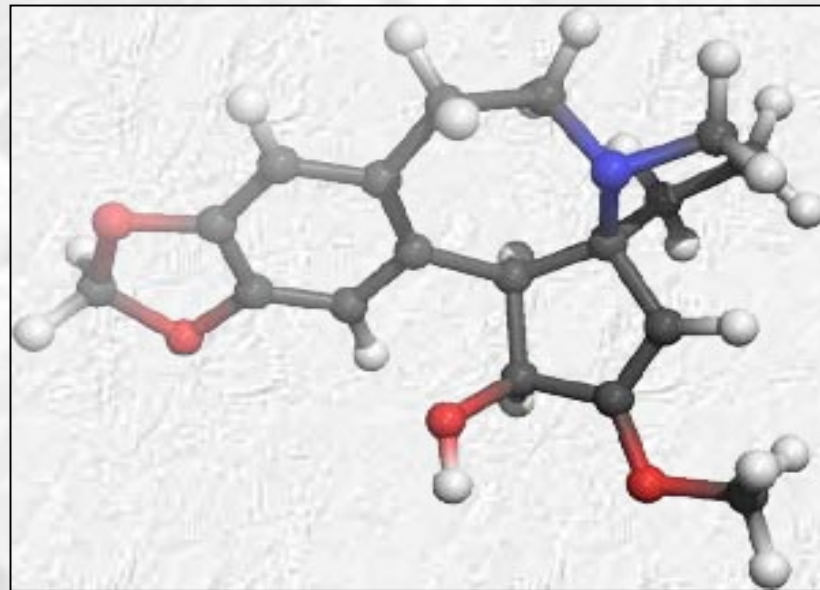




Theory of Water Activity (a_w)



Sorption Isotherm



AGENDA

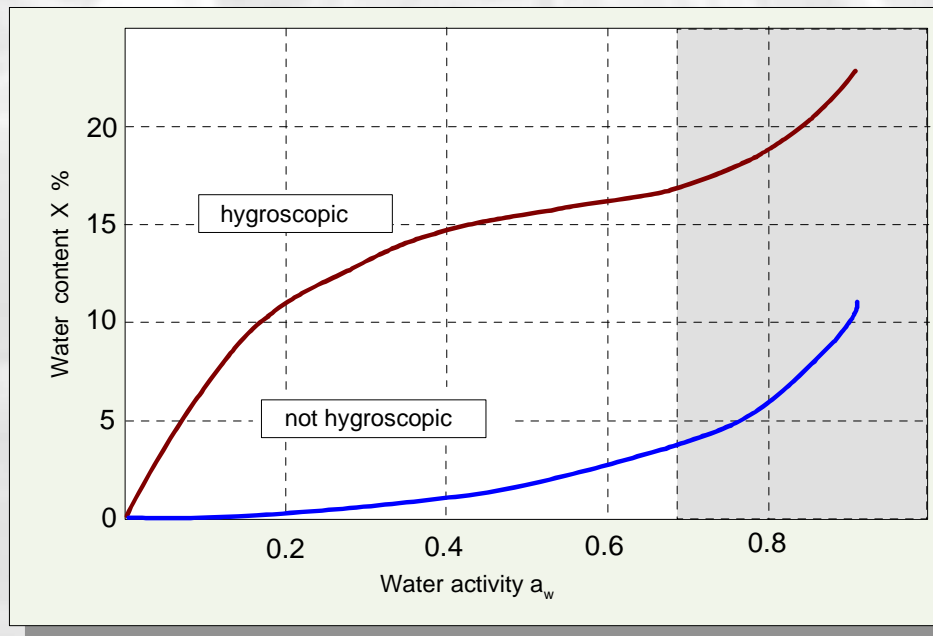
1. Sorption isotherms

2. Novasina product range



Sorption Isotherm

The sorption isotherm (SI) is the relation between a_w and X and characterise the sorption behaviour of a product at constant temperature!



a_w : water activity

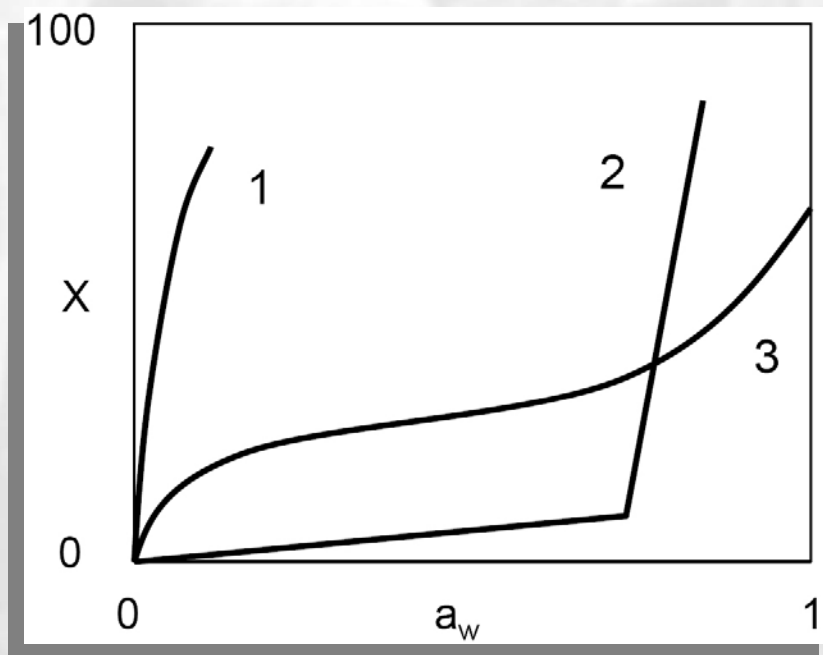
X : water content

g water / 100g total weight

The sorption isotherm describes an equilibrium and is specific for one product

Hygroscopicity

The hygroscopicity is characterised through the form of the sorption isotherm: degree of ability of a product to sorb water during the lowering of the vapour pressure



Examples:

- 1 Silicagel
- 2 Saccharose
- 3 normal „sigmoid“ form

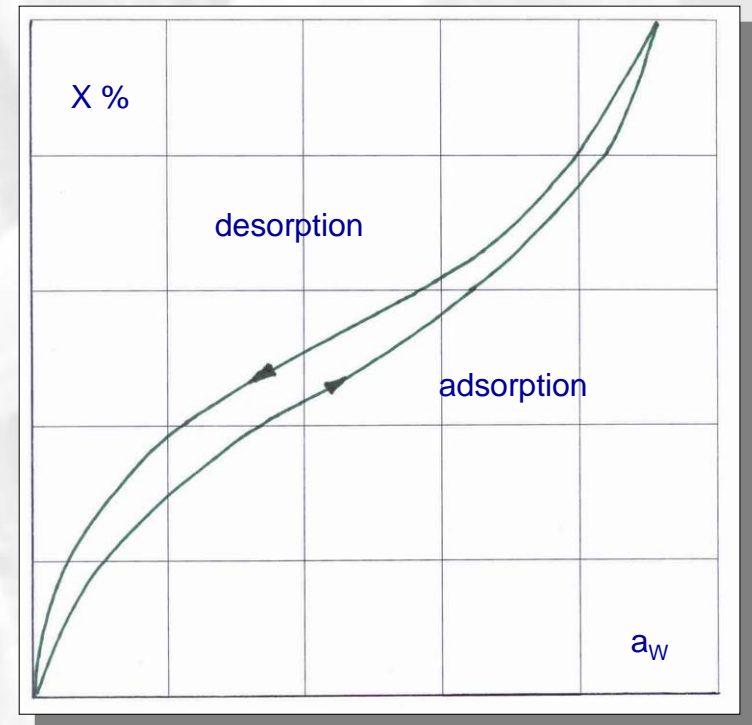
Sorption and desorption

- The desorption isotherm is located superior than the adsorption isotherm

➡ hysteresis

- The difference is mostly small

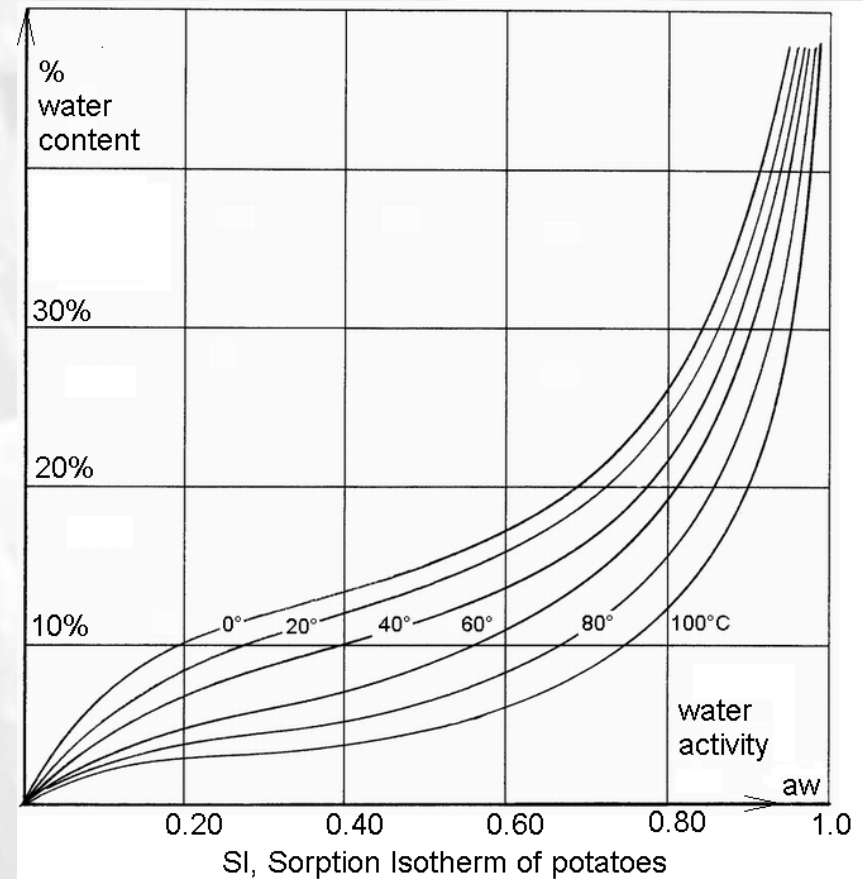
In practice normally the adsorption isotherm is detected. The most products will adsorb humidity during storage.



Influence of temperature on the SI curve

The change of the temperature will vary the aw-value at each humidity point. This changing is significant specially for dry products.

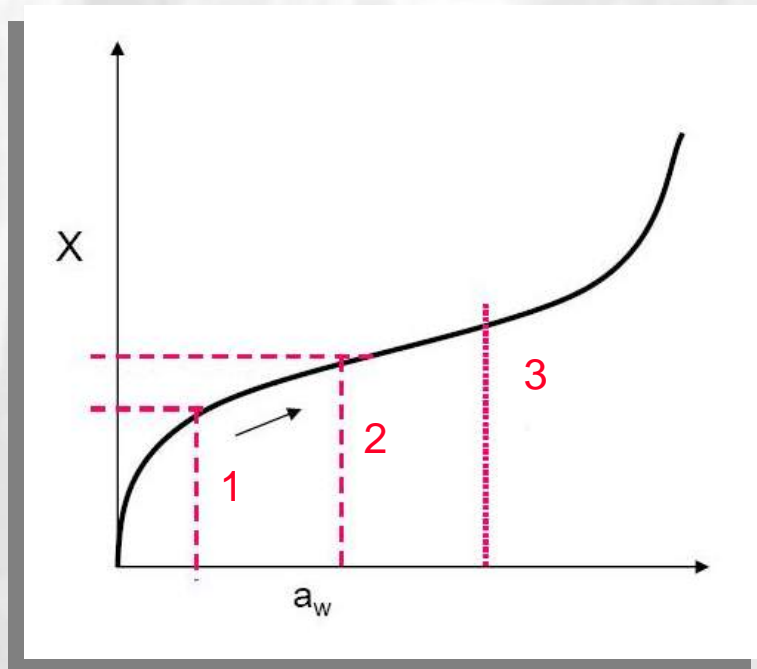
The characteristic developing of a desorption isotherm during a drying process is normally a little higher than the adsorption isotherm.



Application

Storage stability – packaging of moisture susceptible food

All microbial, chemical and physical changes in food are influenced by the moisture content and the water activity.



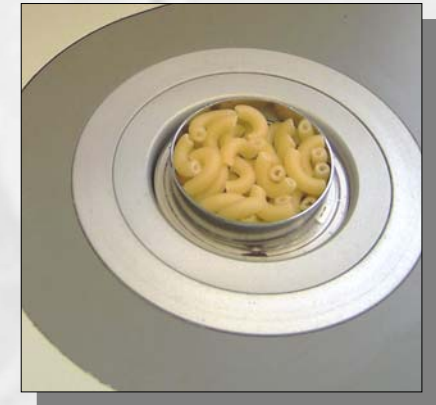
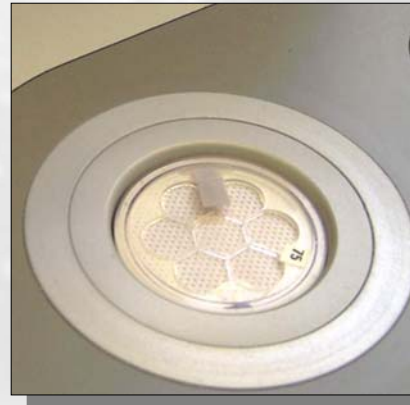
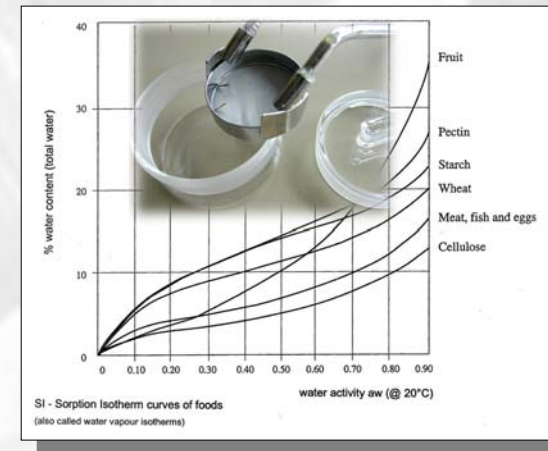
With the help of the sorption isotherm the right packaging material can be found that the conditions during storage will not exceed the critical boarder (2) and the stability of the product can be guaranteed during storage.

- 1 start condition
- 2 critical boarder of X and a_w for the stability
- 3 environment conditions

Record of the sorption isotherm

It is possible to record a sorption isotherm (SI curve) with the new water activity instrument **LabMaster-aw** thanks to:

- temperature controlled measuring chamber +/- 0.2K
- temperature range 0°C ... 50°C
- 7 Novasina humidity standards



AGENDA

1. Sorption isotherms

2. Novasina product range



LabMaster-aw



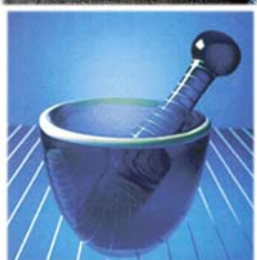
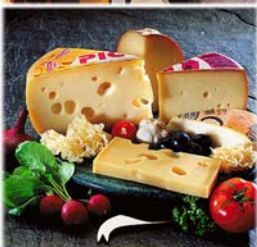
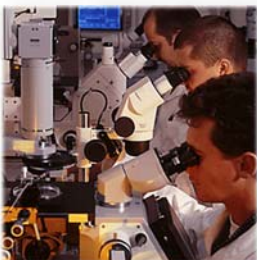
- Best accuracy ($\pm 0.003 a_w$)
- High precision temperature controlled chamber
- Wide measurement range $0.03a_w$ up to $1.00 a_w$
- Single or multi chamber version (1 LabMaster and max. 9 LabPartner)
- Precondition chamber for sample
- Large, back-lighted LC display
- Simple to maintain and service
- 6 to 7 point calibration available (with Novasina SC standards)
- High temperature range ($0 \dots 50^\circ\text{C}$ and accuracy : $\pm 0.2^\circ\text{C}$)
- SI set to measure the sorption isotherm available

Measurement of the water activity on a probe
in the food, pharmaceutical and cosmetic industry

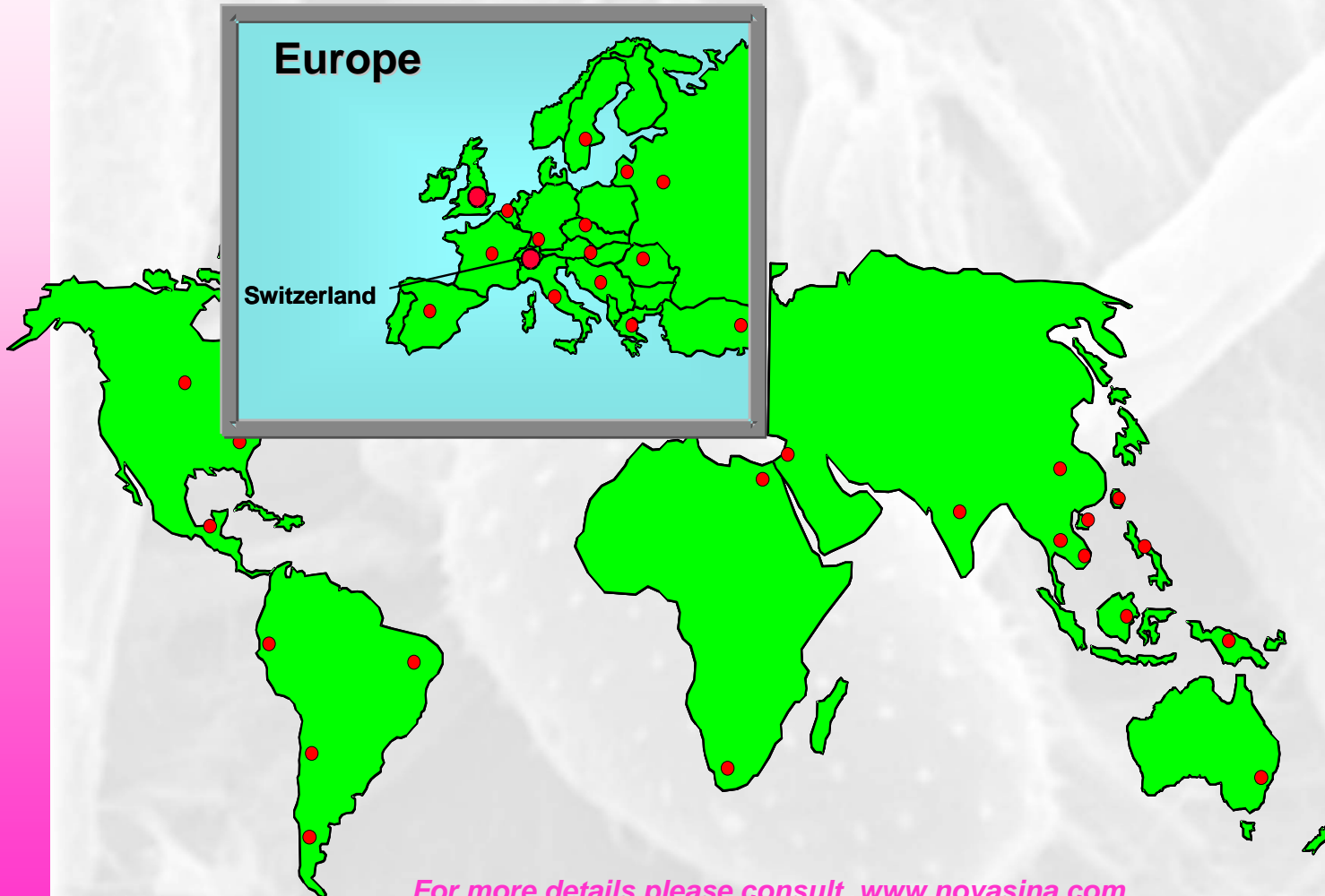
aW

Products:

- **LabMaster-aw / LabPartner-aw**
- **AW LAB set H / F**
- **LabSwift-aw**



International representatives :



worldwide

- | | |
|------------|--------------|
| Argentina | Israel |
| Australia | Italy |
| Austria | Japan |
| Belgium | Korea |
| Brazil | Malaysia |
| Canada | Mexico |
| Chile | New Zealand |
| China | Norway |
| Columbia | Philippines |
| Czech Rep. | Poland |
| Denmark | Singapore |
| Egypt | Slovakia |
| England | South Africa |
| Finland | Spain |
| France | Sweden |
| Germany | Switzerland |
| Greece | Taiwan |
| Holland | Thailand |
| Hong Kong | Turkey |
| Hungary | USA |
| India | Vietnam |
| Indonesia | |
| Iran | |

For more details please consult www.novasina.com

International references :

