PORO*Check* Application Note   No. 02

Quality Testing for Blood Adsorber Cartridges

Blood treatment to remove undesired proteins, cholesterol, polysaccharides, etc has become vital for many patients. Traditional methods separate the blood and chemically remove the undesired compound from the blood plasma. Then the blood has to be redispersed which is time consuming and often leads to infections. Modern pharmaceutical technology uses adsorber cartridges packed with a porous material which selectively adsorbs the unwanted compound from the blood.

It is important that the adsorber's pore structure does not hinder the access of the compound to its binding site or interfere otherwise. Adsorber quality depends on accessibility of binding sites, average pore size, pore size distribution and pore volume (as a measure of capacity).

PORO*Check* easily determines the pore related parameters. Fig. 1 shows that two average pore sizes are present. The small pores carry the binding sites, the big pores allow access to those (transport pores). The cumulative distribution in Fig. 1 shows the number-fraction of small and large pores.

Equipment & Experimental Conditions:

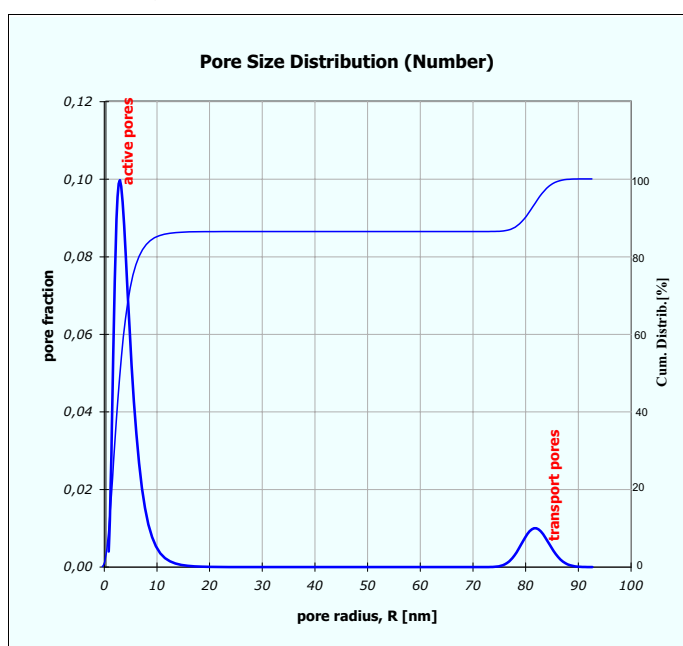|	
Instrument:	PSS AT-System
Eluent:	aq.dest.
Standards:	PSS Pullulan Kit
Detection:	RI
Processing:	PSS WINGPC (Acq.)
	PSS PORO*Check*

Fig. 1: *Differential and cumulative pore size distribution; large pores allow mass flow, small ones carry the binding sites for the blood compounds*

PORO*Check* calculates the results of both populations automatically and calculates the ratio of small and large pores.

The overall pore size is 14.8 nm, whereas 75% (by volume) have a pore size of 81.9 nm. These pores all have the same size. In contrast the small pores are only 4.3 nm wide. The high pore volume of this blood adsorber packing (53%) allows for a high adsorption capacity.

Another important parameter in this application is the optimal size of a guest molecule which must bind to the receptor in the adsorber pore. This adsorber has pores which adsorp molecules with 1.5 nm best. The compound to be removed from the blood should not be substantially bigger or smaller than 1.5 nm to ensure optimal results.