

## SPRAY-DRIED PLASMA FOR PETFOOD

COMPANION



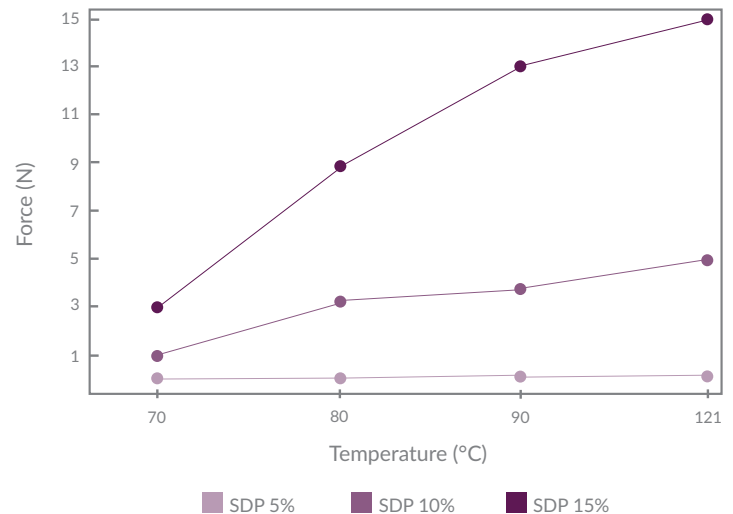
Spray-Dried Plasma (SDP) is a soluble concentrated protein product that is used as a binding agent in canned petfoods due to its high functional properties (texture, water retention and emulsifying capacity). SDP can replace most of the binding agents used in wet pet food at a similar cost, providing better technological properties to the final chunk.

### GEL STRENGTH CAPACITY (GSC)

The gelling capacity is the property of a product dissolved in water to form a thermoplastic gel when it is submitted to high temperatures or other denaturing conditions (pH, salt concentration).

When SDP is heated, an irreversible and stable gel is obtained by protein denaturation. Blood plasma is widely used in several common meat products in Europe for this purpose. A heat-induced gelling capacity offers a potential interest for food applications since gels give texture and consistency, improve water holding capacity, retain flavors and nutrients and reduce fat losses. Plasma albumin has also excellent emulsifying and foaming properties. As observed in Figure 1, the multivariate analysis showed a significant effect ( $P < 0.001$ ) of both factors, temperature and percentage of inclusion and its interaction on gel strength. Results were obtained from the analysis of 10 different batches of SDP.

Figure 1. Gel strength of SDP (mean  $\pm$  S.D.) diluted in water at different cooking temperatures & concentrations



## SPRAY-DRIED PLASMA OFFERS EXTRAORDINARY TECHNOLOGICAL PROPERTIES FOR PETFOOD PRODUCTION

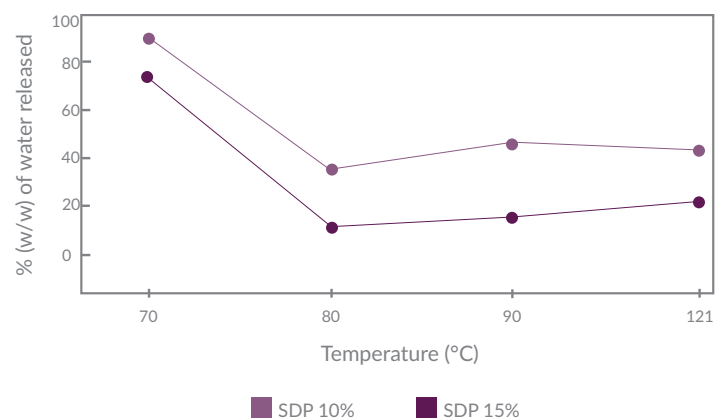


### WATER HOLDING CAPACITY (WHC)

This method evaluates the capacity of a powder, such as SDP, to absorb and retain water after gelling. To test this capacity, a gel of SDP is dissolved in water at either 10 or 15% and heated at different temperatures from 70 to 121°C and then centrifuged at 15000 rpm for 30 minutes, analyzing the amount of water release from the gels.

As can be observed in Figure 2, a very good water retention activity of SDP is obtained when heated at 80°C and increases this property when heated at higher temperatures.

Figure 2. Water retention capacity of SDP (mean  $\pm$  S.D.) in isolated conditions at different temperatures and solution concentrations



## FAT EMULSIFYING CAPACITY (FEC)

This is the capacity of one product to maintain a homogeneous mixture of water and fat (oil). The method determines, in specific conditions, the maximum quantity of oil that can be added to an aqueous solution before the emulsion breaks down.

SDP has an excellent fat emulsion capacity compared with other binders (Table 1). This is very important because it helps pet food manufacturers to avoid fat exudation in their final products and helps to reduce small differences in fat contents of the different raw materials used in the recipes.

Table 1. Physicochemical and functional properties of different ingredients that can be used in canned petfood as binding or gelling agents

	Dry Protein (g/kg)	Dry Ash (g/kg)	Solubility (g/kg)	GSC <sup>a</sup> (force, N)	WHC (g water released/100g 10% gel)	FEC (g oil/g)
SDP <sup>b</sup>	820	157.0	965	7.0 ± 0.10 <sup>c</sup>	41.7 ± 0.64 <sup>a</sup>	428 ± 11.7 <sup>b</sup>
Wheat Gluten (WG) <sup>c</sup>	860	6.0	247	2.1 ± 0.82 <sup>a</sup>	78.0 ± 0.18 <sup>b</sup>	248 ± 14.8 <sup>a</sup>
Egg Albumin (EA) <sup>c</sup>	920	69.0	985	3.5 ± 0.08 <sup>b</sup>	42.4 ± 0.53 <sup>a</sup>	418 ± 8.0 <sup>b</sup>
Porcine Products (PP) <sup>c</sup>	990	10.0	0	— <sup>d</sup>	— <sup>d</sup>	— <sup>d</sup>
Carrageenan (CM) <sup>c</sup>	26	451.0	nd	27.9 ± 1.0 <sup>d</sup>	0	nd

Results of GSC, WHC and FEC are expressed as mean ± S.E.M. A different letter in the same column means a significant difference, P<0.05. nd = not determined, CM is completely insoluble in cold water. <sup>a</sup>The GSC was analyzed at the concentration of 100 g/kg and heated at 121 °C during 1hour. <sup>b</sup>Results given for SDP correspond to the average of more than 200 batches of SDP (AP-820). <sup>c</sup>Analytical specifications for dry protein, dry ash and solubility from the technical sheet of each product. PP does not produce a gel after heat treatment; therefore, the GSC and WHC of the gel cannot be analyzed.

## SDP CREATES FORMULATING FLEXIBILITY AND COST SAVINGS

When comparing the hardness (texture) of SDP to other binders (Figure 3) we can see that 2% SDP can replace 6% Wheat gluten and still provide higher texture. SDP also provides more texture than Alginate, Guar gum, Caseinate, Wheat Gluten and Egg White. Wheat gluten can be replaced 4 to 1 by SDP.

Figure 3. Comparison of the hardness of the chunk with SDP and with other binders

