TECH NOTES

Spray-Dried Animal Plasma (SDAP) offers extraordinary technological properties for petfood production

Volume 2, Issue 25

Spray-Dried Animal Plasma (SDAP) 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). SDAP 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)

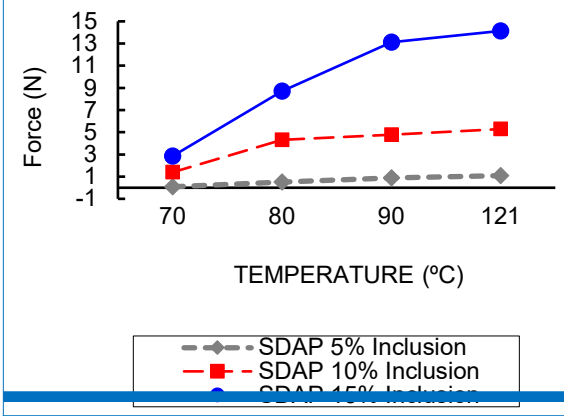
The gelling capacity is the property of a product dissolved in water to form a thermoplastic gel when it is submitted to high temperatures or other denaturing conditions (pH, salt concentration).

When SDAP 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 SDAP.

Figure 1. Gel strength of SDAP (mean ± S.D.) diluted in water at different cooking temperatures & concentrations

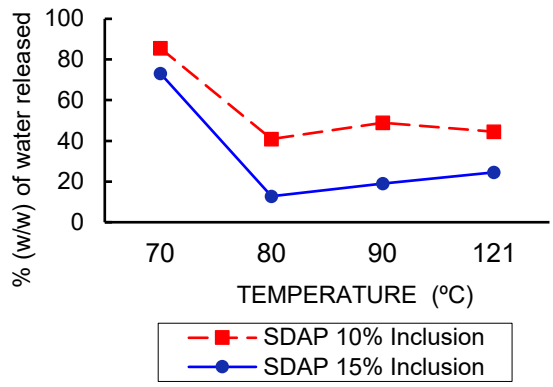


Water holding capacity (WHC)

This method evaluates the capacity of a powder, such as SDAP, to absorb and retain water after gelling. To test this capacity, a gel of SDAP is dissolved in water at either 10 or 15% and heated at different temperatures from 70 to 121ºC 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 SDAP is obtained when heated at 80ºC and increases this property when heated at higher temperatures.

Figure 2. Water retention capacity of SDAP (mean ± 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.

SDAP 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.

APC EUROPE
An LGI Company

TECH NOTES

Spray-Dried Animal Plasma (SDAP) offers extraordinary technological properties for petfood production

Volume 2, Issue 25

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

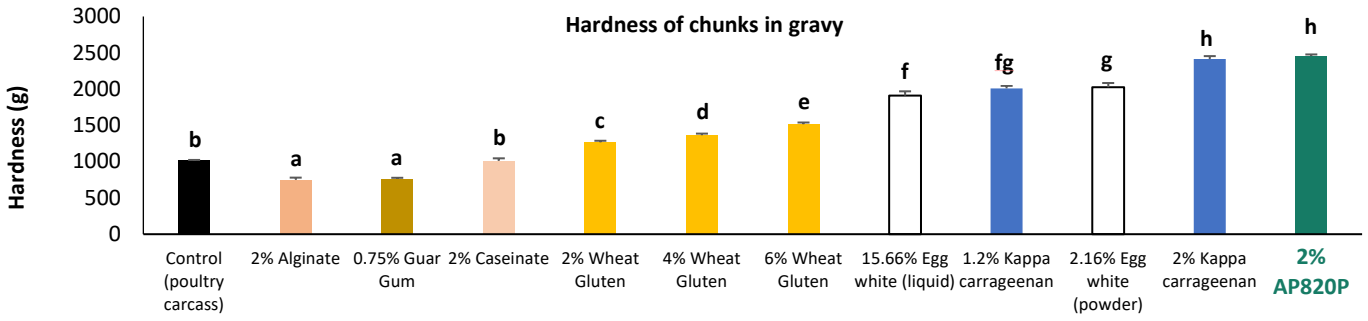
	Dry Protein (g/kg)	Dry Ash (g/kg)	Solubility (g/kg)	GSC[a] (force, N)	WHC (g water released/100g 10% gel)	FEC (g oil/g)
SDAP [b]	820	157.0	965	7.0 ± 0.10 c	41.7 ± 0.64 a	428 ± 11.7 b
Wheat Gluten (WG) [c]	860	6.0	247	2.1 ± 0.82 a	78.0 ± 0.18 b	248 ± 14.8 a
Egg Albumin (EA) [c]	920	69.0	985	3.5 ± 0.08 b	42.4 ± 0.53 a	418 ± 8.0 b
Porcine Products (PP) [c]	990	10.0	0	–[d]	–[d]	–[d]
Carrageenan (CM) [c]	26.0	451.0	nd	27.9 ± 1.0 d	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. [a] The GSC was analyzed at the concentration of 100 g/kg and heated at 121 ºC during 1hour. [b] Results given for SDAP correspond to the average of more than 200 batches of SDAP (AP-820). [c] Analytical specifications for dry protein, dry ash and solubility from the technical sheet of each product[d]. PP does not produce a gel after heat treatment; therefore, the GSC and WHC of the gel cannot be analyzed.

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

The inclusion of SDAP creates formulating flexibility and cost savings.

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



Bottom Line

GEL STRENGTH	WATER HOLDING	FAT EMULSIFYING
↑	↑	↑