

Pros & Cons of Plant Proteins in Various Applications

Plant Protein	PDCAAS	Functionality Pros	Functionality Cons	Applications
Soy Flour (50-65%) Concentrate (65-90%) Isolate (>90%) Textured Vegetable Protein (TVPs)	0.9-1.0	<ul style="list-style-type: none"> • Good thickener (limited solubility depending on protein) • Good film forming • Good gelation • Largest plant-based protein source 	<ul style="list-style-type: none"> • Allergenicity • Slight off-flavor (grassy/bitter) • Often unstable to heat and acids 	Beverages, Nutrition bars, Meat applications, Meat substitutes, Bakery, Snacks, Cereals, Pasta, Soups, Sauces, Desserts
Wheat (Gliadin & Glutenin)	0.40 Whole wheat 0.25 Wheat gluten Low, because protein is limited in lysine	<ul style="list-style-type: none"> • Excellent viscoelastic, thermosetting & water-holding properties • Good flavor profile • Lower cost/Combine w/higher cost proteins to reduce overall cost 	<ul style="list-style-type: none"> • Allergenicity • Poor water solubility • Poor foaming • Poor emulsification 	Bakery, Cereals, Bars, Meat substitutes, Textural meat analogs when combined with soy protein
Pulses^{1,2} Pea Chickpea Lentil Pinto Bean Faba Bean	At 0.5-0.6 Low, because protein is limited in sulphur-containing amino acids	<ul style="list-style-type: none"> • Gelling • Structure • Set characteristics • Emulsification • Encapsulation • Extrusion stability 	<ul style="list-style-type: none"> • Beany off-flavors • Bitterness 	Egg replacers (faba & pea protein), Baking, Deep-frying, Pasta, Soups, Snacks, Meat Products, Meat substitutes
Hemp³ (Industrial) <i>Cannabis sativa</i> L Flour Seed Protein isolate	0.48 (flour) 0.51 (seed) 0.44 (isolate) Oil (3:1 Omega 6: Omega 3 fatty acids) High protein w/complete amino acid profile	<ul style="list-style-type: none"> • Easily digestible • Good fiber & minerals • Gelling • Set characteristics • Emulsification • Encapsulation • Egg replacer 	<ul style="list-style-type: none"> • Disassociating it with the drug Cannabis • Selling consumers on its health benefits 	Soups, Protein shakes, Energy drinks, Desserts, Salad dressings

¹ PROPERTIES OF PULSE PROTEINS ARE DEPENDENT ON EXTRACTION/FRACTIONATION METHOD

² MOST PEA PROTEINS NO LONGER HAVE A BEANY, GRASSY FLAVOR, BUT A CLEAN TASTING PROFILE FOLLOWING WORK DONE BY INGREDIENT COMPANIES AND GROWERS

³ LEAVES & FLOWERING HEADS CONTAIN < 0.3% TETRAHYDROCANNABINOL (THC), THE PSYCHOACTIVE COMPOUND

SOURCE: ANUSHA SAMARANAYAKA, PH.D., POS BIO-SCIENCES /2018 PROTEIN TRENDS & TECHNOLOGIES