International Journal of Farmacia

Journal Home page: www.ijfjournal.com

Vegelite Protein powder – Helps repair muscles by aiding in the production of muscle-building creatine.

Govind Shukla, C. Subrahmanyam, Dipashree yajnick, Mantipally Yamuna, C.J Sampath Kumar

Sports Nutrition Research centre Hyderabad
A Unit of Lactonova Nutripharm (P) Ltd, 81/3, IDA Mallapur, Hyderabad, Telangana, India-500 076.

ABSTRACT

Vegelite Protein powder, A great-tasting blend of rice and pea proteins for vegetarians, vegans, or those intolerant to dairy products.Vegan Protein can promote post-workout recovery, help maintain lean muscle mass, and support immune function in people sensitive to dairy or those following a vegetarian or vegan diet. Pea protein, derived from yellow peas, is high in arginine, an amino acid that helps repair muscles by aiding in the production of muscle-building creatine. This review summarises the current available scientific literature regarding the effect of Vegelite Protein powder - A great-tasting blend of rice and pea proteins for vegetarians, vegans, or those intolerant to dairy products that helps repair muscles by aiding in the production of muscle-building creatine.

Keywords: Vegelite Protein powder, tasting blend of rice and pea proteins ,vegetarians, vegans, helps repair muscles, muscle-building creatine.

INTRODUCTION

Pea seeds contain about 22-23% proteins. The majority of pea proteins are globulins andalbumins, which represent about 80% of total seed protein content. Albumins represent 18-25% and globulins 55-65% of total proteins (21). All globulins and some of albumins arestorage proteins, which are used as nitrogen sources for the new embryos after seed germination(22). Major pea storage proteins, legumin, vicilin and convicilin are globulins and represent65-85% of total proteins (23). According to sedimentation properties these proteins areclassified into two fractions, 7S (vicilin, convicilin) and 11S fraction (legumin). Pea proteinsare becoming a viable alternative to soy protein because of techno-functionaland nutritive characteristics (1), which can be as good as those of soybeans. Furthermore, pea seed have a lower content of anti-nutritive components, such as proteinase inhibitorsand phytic acid (2) and caused less frequent allergic reactions in humans than soybean(3). In addition, they also contain good quality starch and fibers. The most promising alternative to soy protein products are pea protein isolates. As inthe case of soy protein isolates, techno-functional properties including solubility, emulsifying,foaming and gelling properties of pea isolates are well documented (4-10). Molecularforms of the three major proteins are presented in Fig 1.

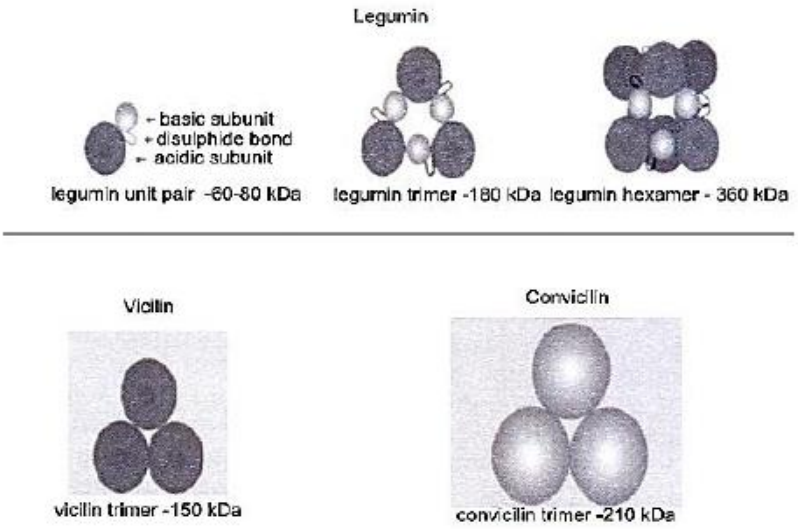

Figure 1. Molecular forms of legumin, vicilin and convicilin (22)

Legumin is a protein with compact quaternary structure stabilized via disulphide, electrostaticand hydrophobic interactions. It is a hexamer with a molecular weight (Mw) ~320to 380 kDa and with beta-sheet-rich structure (24). The mature proteins consist of six subunitpairs that interact non-covalently. Each of these subunit pairs consists of an acidic subunitof ~40 kDa and a basic subunit of ~20 kDa, linked by a single disulphide bond (25). Asthere are a number of legumin precursors originating from several gene families, differentlegumin polypeptides have been identified, e.g., 4-5 acidic (α) and 5-6 basic (β) polypeptides. The sizes of these polypeptides range from 38 to 40 kDa for the acidic polypeptideswith the isoelectric point (pI) 4.5-5.8, and from 19 to 22 kDa for the basic polypeptides withthe pIs of up to 8.8 (26). According to Gueguen et al. (25), more hydrophobic basic polypeptidesare placed in the interior of the legumin molecule, whereas acidic polypeptides areoriented towards the outside of the molecule.Due to its compact quaternary structure, legumin is a heat-stable protein. Thermal transitionpoint of legumin is above 90oC. On the other hand, the quaternary structure of the leguminis more sensitive to pH and salt concentration. Pea legumin is present as a hexamerat the pH 7.0 and high ionic strength (0.1 M), but dissociates at, e.g., the pH 3.35 and 10.0,and, depending on the ionic strength, into a mixture of trimers, dimers, and monomers. Acidicconditions seem to be more drastic than alkaline ones, thus the native legumin is completelydissociated to monomers at the pH 2.4 (25).As a food protein, legumin is recognized for its sulphur containing amino acid residues.It has been reported to contain approximately two cysteine and three methionine residuesper 60-kDa subunit (27).

Vicilin

Vicilin is a trimeric protein of 150-170 kDa that lacks cysteine residues and hencecannot form disulphide bonds (27). The composition of vacilin subunits varies mostly becauseof post-translation processing. Mainly, vicilin consists of ~47 kDa, ~50 kDa, ~34 kDaand ~30 kDa subunits (28). Pea vicilin heterogeneity is more complex than the heterogeneityof legumin. Its heterogeneity derives from a combination of factors, including productionof vicilin polypeptides from several small gene families encoding different primarysequences, differential proteolytic processing, and differential glycosylation (29). Thermaldenaturation temperature of vicilin depends on ionic strength conditions. At low ionicstrength conditions (μ =0.08) the thermal denaturation temperature is 71.7, whereas athigher (μ =0.5), it is 82.7oC (30).

Convicilin

A third major storage protein, distinct from legumin and vicilin, is convicilin. This proteinhas a distinctively different amino acid profile and unlike the 7S vicilin, contains verylittle carbohydrate and has a subunit molecular weight of 71,000 Da. The molecular weightof its native form is 290,000 Da including an N-terminal extension (8). Convicilin is notknown to undergo any post-/co-translational modifications other than removal of the signalpeptide, and it is not glycosylated. In opposite to vicilin, the residues of sulphur-amino acids are presented in primary structure of convicilin. However, O'Kane et al. denotedthis protein as α-subunits of vicilin. According to these authors, convicilin has an extensivehomology with vicilin along the core of its protein, yet is distinguished by the presence of ahighly charged, hydrophilic N-terminal extension region consisting of 122 or 166 residues.The homologies of convicilin and vicilin are shown schematically in Figure 2. Pea protein content and composition vary among genotypes. Also, these parametersare influenced by environmental factors . As a result of genotype and environment-induced variations, the ratio of vicilin to legumin varies and may range from 0.5 to1.7, with a mean of 1.1. Barac et al (6) investigated protein composition of six differentgenotypes and showed that the ratio of the sum of vicilin and convicilin to legumin contentranged from 1.30 to 1.78.The differences in content, composition and structure between vicilin and legumin areexhibited in both nutritional and techno-functional properties. Legumin contains more sulphurcontaining amino acids than vicilin per unit of protein (27), and its more availablefraction from a nutritional point.

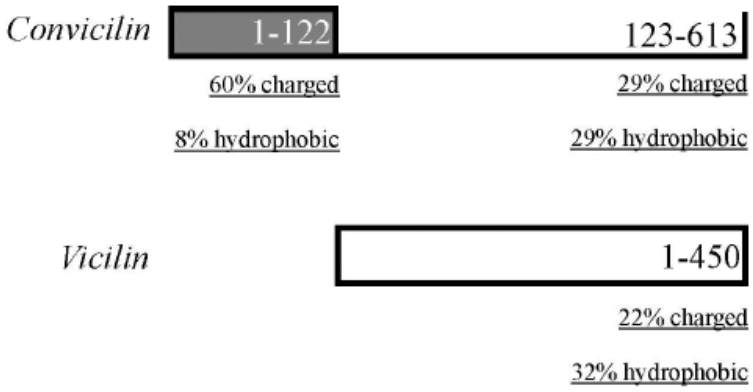

Fig 2: Schematic diagram of the highly charged N-terminal extension region (residues 1-122) present in convicilin molecules.

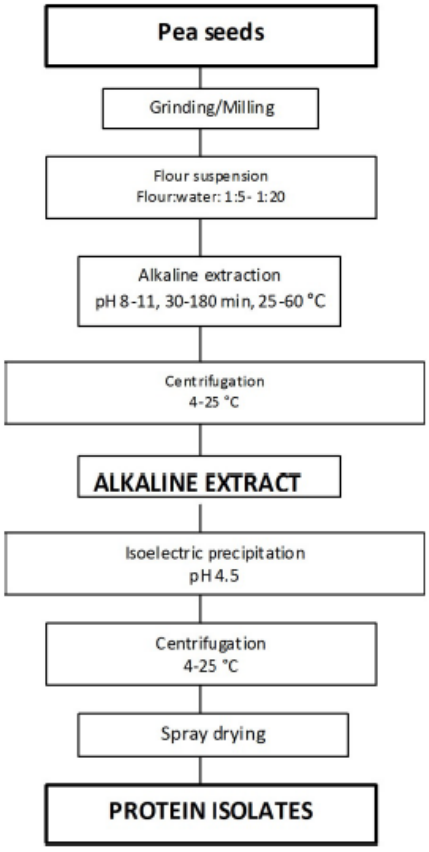

Figure 3. Schematic diagram of alkaline extraction and isoelectric precipitation process for production of pea protein isolates (8)

Vegelite Protein powder, A great-tasting blend of rice and pea proteins for vegetarians, vegans, or those intolerant to dairy products. A blend of pea and rice proteins designed to help to meet protein needs.

Composition of vegelite protein powder

- Pea Protein Isolate: 22 grms
- Rice Protein 2 grams
- Iron -1 mg
- Sodium-100 mg
- Potassium-80 mg
- Calcium-80 mg
- Maize Extract-1 grm
- Sugar- 1 grm

Supplement Facts

Presentation: protein powder

Usage: A blend of pea and rice proteins designed to help to meet protein needs *that* helps repair muscles by aiding in the production of muscle-building creatine. Vegan Protein can promote post-workout recovery, help maintain lean muscle mass, and support immune function in people sensitive to dairy or those following a vegetarian or vegan diet. Pea protein, derived from yellow peas, is high in

arginine, an amino acid that helps repair muscles by aiding in the production of muscle-building creatine.

Contra-indications: Product is contra-indicated in persons with Known hypersensitivity to any component of the product hypersensitivity to any component of the product.

Suggested Use: Mix 1 level scoop of powder with at least 10 ounces of water, juice, or preferred beverage daily or as recommended by your health-care or performance professional.

Warnings:
ALLERGYWARNING: This product is contraindicated in an individual with a history of hypersensitivity to any of its ingredients.

PREGNANCY: If pregnant, consult your health-care practitioner before using this product.

INTERACTIONS: There are no known adverse interactions or contraindications at publication date

FAQs
Why is the powder fluffy?

Our Vegelite Protein is fluffier because we don't add lecithin. Lecithin makes powders more moist, less messy, and easier to mix, but doesn't add any nutrients. This fluffier consistency also makes Vegelite Protein ideal for making brownies and other snacks.

What's the breakdown of pea and rice protein in this product?

It's about 95 percent pea protein and 5 percent rice protein.

Storage: Store in a cool, dry and dark place.

CONCLUSION

Vegelite Protein powder,A great-tasting blend of rice and pea proteins for vegetarians, vegans, or those intolerant to dairy products.A blend of pea and rice proteins designed to helps repair muscles by aiding in the production of muscle-building creatine.Vegan Protein can promote post-workout recovery, help maintain lean muscle mass, and support immune function in people sensitive to dairy or those following a vegetarian or vegan diet. Pea protein, derived from yellow peas, is high in arginine, an amino acid that helps repair muscles by aiding in the production of muscle-building creatine.

Funding

This work was supported in part by grants from lactonova nutritional research foundation hyderabad and funds from pugos products pvt ltd bangalore.

Conflicts of interest statement

The authors declare that there is no conflict of interest.

REFERENCES

1. O'Kane FE, Vereijken JM, Gruppen H. Van Boekel M.A.J.S. Gelation behavior of protein isolates extracted from 5 cultivars of Pisum sativum L. J Food Sci. 2005;70:132-7.
2. Gwiazda S, Rutkowski A, Kocoń J. Some functional properties of pea and soy bean protein preparations. Nahrung. 1979;23(7):681-6. doi: 10.1002/food.19790230704.
3. San Ireneo M, Ibáñez Sandín MD, Fernández-Caldas E, Marañón Lizana F. Rosales Fletes, M.J., Laso Borrego, M.T. Specific IgE levels to Cicer arietinum (Chick pea) in tolerant and nontolerant children: evaluation of boiled and raw extracts. Int.*Arch. Allergy Imm*. 2000;121:137-43.
4. Karaca AC, Low N, Nickerson M. Emulsifying properties of chickpea, faba bean, lentil and pea proteins produced by isoelectric precipitation and salt extraction. Food Res Int. 2011;44(9):2742-50. doi: 10.1016/j.foodres.2011.06.012.
5. Aluko RE, Mofolasayo OA, Watts BM. Emulsifying and foaming properties of commercial yellow pea (*Pisum sativum* L.) seed flours. J Agric Food Chem. 2009;57(20):9793-800. doi: 10.1021/jf902199x, PMID 20560631.
6. Barac M, Cabrilo S, Pesic M, Stanojevic S, Zilic S, Macej O, Ristic N. Profile and functional properties of seed proteins from six pea (Pisum sativum) genotypes. Int J Mol Sci. 2010;11(12):4973-90. doi: 10.3390/ijms11124973, PMID 21614186.
7. Boye JI, Aksay S, Roufik S, Ribéreau S, Mondor M, Farnworth E, Rajamohamed SH. Comparison of the functional properties of pea, chickpea and lentil protein concentrates processed using ultrafiltration and isoelectric precipitation techniques. Food Res Int. 2010a;43(2):537-46. doi: 10.1016/j.foodres.2009.07.021.
8. Boye J, Zare F, Pletch A. Pulse proteins: processing, characterization, functional properties and applications in food and feed. Food Res Int. 2010b;43(2):414-31. doi: 10.1016/j.foodres.2009.09.003.
9. Adebiyi AP, Aluko RE. Functional properties of protein fractions obtained from commercial yellow field pea (Pisum sativum L.) seed protein isolate. Food Chem. 2011;128(4):902-8. doi: 10.1016/j.foodchem.2011.03.116.
10. Taherian AR, Mondor M, Labranche J, Drolet H, Ippersiel D, Lamarche F. Comparative study of functional properties of commercial and membrane processed yellow pea protein isolates. Food Res Int. 2011;44(8):2505-14. doi: 10.1016/j.foodres.2011.01.030.
11. Fernández-Quintela A, Macarulla MT, Del Barrio AS, Martínez JA. Composition and functional properties of protein isolates obtained from commercial legumes grown in northern Spain. Plant Foods Hum Nutr. 1997;51(4):331-42. doi: 10.1023/a:1007936930354, PMID 9650726.
12. Sun XD, Arntfield SD. Gelation properties of salt-extractedpea protein induced by heat treatment. Food Res Int. 2010;43(2):509-15. doi: 10.1016/j.foodres.2009.09.039.

13. Sumner AK, Nielsen MA, Youngs CG. Production and evaluation of pea protein isolate. J Food Sci. 1981;46(2):364-6. doi: 10.1111/j.1365-2621.1981.tb04862.x.
14. Sosulski FW, McCurdy AR. Functionality of flours, protein fractions and isolates from field peas and bean. J Food Sci. 1987;52(4):1010-4. doi: 10.1111/j.1365-2621.1987.tb14263.x.
15. Barac MB, Pesic MB, Stanojevic SP, Kostic AZ, Bivolarevic V. Comparative study of the functional properties of three legume seed isolates: adzuki, pea and soy bean. J Food Sci Technol. 2015;52(5):2779-87. doi: 10.1007/s13197-014-1298-6, PMID 25892775.
16. Maninder K, Sandhu KS, Singh N. Comparative study of the functional, thermal and pasting properties of flours from different field pea (*Pisum sativum* L.) and pigeon pea (*Cajanus cajan* L.) cultivars. Food Chem. 2007;104(1):259-67. doi: 10.1016/j.foodchem.2006.11.037.
17. Barać M, Cabrilo S, Pešić M, Stanojević S, Pavlićević M, Maćej O, Ristić N. Functional properties of pea (*Pisum sativum, L*) protein isolates modified with chymosin. Int J Mol Sci. 2011;12(12):8372-87. doi: 10.3390/ijms12128372, PMID 22272078.
18. Periago MJ, Vidal ML, Ros G, Rincón F, Martínez C, López G, Rodrigo J, Martínez I. Influence of enzymatic treatment on the nutritional and functional properties of pea flour. Food Chem. 1998;63(1):71-8. doi: 10.1016/S0308-8146(97)00199-4.
19. Fuhrmeister H, Meuser F. Impact of processing on functional properties of protein products from wrinkled peas. J Food Eng. 2003;56(2-3):119-29. doi: 10.1016/S0260-8774(02)00241-8.
20. Dua S, Mahajan A, Sandal Gagan M. Physico-chemical properties of defatted pea seed meal proteins with emphasis on salts and pH. J Food Sci Technol. 2009;46:251-4.
21. Tsoukala A, Papalamprou E, Makri E, Doxastakis G, Braudo EE. Adsorption at the air-water interface and emulsification properties of grain legume protein derivatives from pea and broad bean. Colloids Surf B Biointerfaces. 2006;53(2):203-8. doi: 10.1016/j.colsurfb.2006.08.019, PMID 17049437.
22. Tzitzikas EN, Vincken JP, De Groot J, Gruppen H, Visser RGF. Genetic variation in pea seed globulin composition. J Agric Food Chem. 2006;54(2):425-33. doi: 10.1021/jf0519008, PMID 16417300.
23. Owusu-Ansah YJ, McCurdy SM. Pea proteinS: a review of chemistry, technology of production, and utilization. Food Rev Int. 1991;7(1):103-34. doi: 10.1080/87559129109540903.
24. Schwenke KD, Henning T, Dudek S, Dautzenberg H, Danilenko AN, Kozhevnikov GO, Braudo EE. Limited tryptic hydrolysis of pea legumin: molecular mass and conformational stability of legumin-T. Int J Biol Macromol. 2001;28(2):175-82. doi: 10.1016/s0141-8130(00)00167-7, PMID 11164235.
25. Gueguen JCM, Barbot J, Schaeffer F. Dissociation and aggregation of pea legumin induced by pH and ionic strength. J Sci Food Agric. 1988;53:167-82.
26. Heng L, Van Koningsveld GA, Gruppen H, Van Boekel MAJS, Vincken J-P, Roozen JP, Voragen AGJ. Protein-flavour interactions in relation to development of novel protein foods. Trends Food Sci Technol. 2004;15(3-4):217-24. doi: 10.1016/j.tifs.2003.09.018.
27. Shewry PR, Napier JA, Tatham AS. Seed storage proteins: structures and biosynthesis. Plant Cell. 1995;7(7):945-56. doi: 10.1105/tpc.7.7.945, PMID 7640527.
28. Griga M, Horáček J, Klenotičová H. Protein patterns associated with *Pisum sativum* somatic embryogen*esi*s. Biol Plant. 2007;51(2):201-11. doi: 10.1007/s10535-007-0041-9.
29. Casey R, Domoney C. The biochemical genetics of pea seed storage proteins. Kulturpflanze. 1984;32:S99-S108.
30. Kimura A, Fukuda T, Zhang M, Motoyama S, Maruyama N, Utsumi S. Comparison of physicochemical properties of 7S and 11-S globulins from pea, fava bean, cowpea, and French Bean with those of Soybean. French Bean 7S globulin exhibits excellent properties. J Agric Food Chem. 2008;56(21):10273-9. doi: 10.1021/jf801721b, PMID 18828597.