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(54) Title: CHARGED NUTRITIVE PROTEINS AND METHODS

(57) Abstract: Charged nutritive proteins are provided. In some embodiments the nutritive proteins an aqueous solubility of at least 12.5 g/L at pH 7. In some embodiments the nutritive proteins an aqueous solubility of at least 50 g/L at pH 7. In some embodiments the nutritive proteins an aqueous solubility of at least 100 g/L at pH 7. In some embodiments the nutritive proteins comprise at least one of a level of a) a ratio of branch chain amino acid residues to total amino acid residues present in the nutritive protein equal to or greater than the ratio of branch chain amino acid residues to total amino acid residues present in a benchmark protein; b) a ratio of leucine residues to total amino acid residues present in the nutritive protein equal to or greater than the ratio of leucine residues to total amino acid residues present in a benchmark protein; and c) a ratio of essential amino acid residues to total amino acid residues present in the nutritive protein equal to or greater than the ratio of essential amino acid residues to total amino acid residues present in a benchmark protein. Also provided are nucleic acids encoding the proteins, recombinant microorganisms that make the proteins, methods of making the proteins using recombinant microorganisms, compositions that comprise the proteins, and methods of using the proteins, among other things.

