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Plant Protein Isolate Primer

In no particular order or priority of info

- Per FDA definition, a plant protein isolate is 90% or greater purity
- To our knowledge, no one in the country produces a true plant protein isolate.
 - Closest are those who produce plant protein *concentrates*, which are largely 60-89% purity;
 - These proteins have the added features of largely having been damaged during their processing, extraction, and recovery as these proteins have been exposed to high heat and/or chemical separation and extraction techniques
 - These proteins have already commenced the putrefaction process as the result of heat/chemical exposure
 - Resulting use of such proteins require masking agents to be added to any product they are used in to cover up the nasty odors and flavors from the putrefaction.
- CBR's pure plant proteins are 90%+ in purity
 - **1)** Have not been exposed to heat or chemicals and are, therefore, in their natural/pristine state - undamaged and not affected by putrefaction; **2)** Can be extracted from most any feedstock with plant protein present; **3)** With the exception of the USDA's Heart Healthy non-GMO corn hybrid, plant proteins typically do not possess all the essential amino acids. **4)** As such, CBR can blend different plant proteins to create a "pure food" plant-based protein with all the essential amino acids. EX: Corn Protein Isolate (CPI) and Soy Protein Isolate (SPI) blended.
 - **NOTE:** CBR has garnered an exclusive license from the USDA to process USDA's Heart Healthy Corn; the USDA determined that CBR (formerly EnerGenetics) was the only company that has the demonstrated capability to extract, isolate, and recover this corn's components intact and undamaged. The proposal to grant this exclusive license sat on the floor of Congress for 30 days for comment and/or challenge; no challenge was brought, so the license was finalized.
- **Anecdotal feature:** PPP demonstrated an unforeseen feature/benefit as a natural antioxidant/preservative. A batch of off-the-shelf chocolate cookie mix was mixed with ¼ cup of corn PPP added into it. The cookies came out as expected with normal smell and taste. These cookies remained fresh for over 9 months with no special storage treatment (they were on a plate covered with plastic wrap). After several conferences with USDA-ARS, we collectively concluded that the PPP inhibited the oxidation of the oil ingredient, but also retarded dehydration of the cookies.

SPECIFICATION SHEET (example only); Prepared 30 March 2015 **PERFECT PLANT PROTEIN (PPP) PRODUCTS**

PPPs are *nutraceuticals** (medical foods that act like natural medicines in prevention of diseases), are mixtures of all natural, whole, intact protein mixtures of all natural, whole, organic (non-Genetically Modified) intact protein *isolates* at 90%+ protein purities isolated using cold temperature technologies that avoids cooking and harsh acid precipitations in order to yield the highest intact amino acid chains which can be used in medical food (nutraceutical) applications in protein nutritional therapies (proteohomeostasis) to combat many diseases, such as *cachexia* (muscle wasting), *sarcopenia* (old age muscle loss), and *kwashiorkor* (malnutrition from starvation). PPP will be provided in finished food products, ranging from powdered shake mixes, to extruded cereals, pastas, cookies, crackers, as well as in imitation dairy products, such as imitation cheeses, yogurts, spreads in various natural flavors.

* NOTE: PPP enhances healing as the human body can absorb plant nutrients more efficiently than animal proteins.

Daily Nutritional Balance – Ideal Target Amounts

1. Serving size in grams—3 servings per day— <i>example only</i>		(151.3 grams/meal; 454 grams/day)
PPP Products available in two sizes (adult and child)		
2. Proteins	20%	90.8 grams/day 30.3 grams/meal
3. Resistant starches	63%	286.0 grams/day 95.3 grams/meal
4. Vitamins	0.1%	0.454 grams/day 0.2 grams/meal
5. Emulsifiers	0.2%	0.908 grams/day 0.3 grams/meal
6. Fibers (barley beta glucan)	7%	31.8 grams/day 10.6 grams/meal
7. Essential Omega oils	10%	45.4 grams/day 15.1 grams/meal

Mixed Protein Isolate Amino Acid Content

This product will be a mixture of protein isolates having a 90%+ protein purity from Corn, New USDA Heart Healthy Corn, Barley, Potato Peel Protein, and other botanical proteins that will yield approximate amino acid levels shown that will yield the highest nutritional content that will provide nutrition at the cellular level to help in combatting kwashiorkor (starvation from malnutrition), and afflictions of AIDS/HIV, cachexia.

PERFECT PLANT PROTEIN (PPP) FOOD PRODUCTS

Powdered shake mix product: Packaged in biodegradable plastic pouches with Ziplock top for addition of water or juice for mixing or shaking--with straw for consumption. Expected product shelf-life--12 months from manufacture. Price per lb. = \$15.00, or \$5.00 per serving pouch.

Other PPP Extruded Food Products: Cereals, pastas, cheese curls, imitation cheese, peanut butter spreads, cookies, yogurts, will be supplied in subsequent orders with natural flavorings.

Perfect Plant Proteins	Amino Acids	FAO-WHO	% Milk Protein Equivalency Standard
<u>Protein Isolate Mixtures</u>			
- Leucine	11.57%	4.5%	
- Isoleucine	4.94%	4.2%	
- Valine	6.82%	4.2%	
Total BCAA*	23.33%	12.9%	181%
- Lysine	5.6%	4.2%	
- Tryptophan	1.4%	1.4%	
- Phenylalanine	5.03%	2.8%	
- Methionine	2.54%	2.2%	
- Cystine	1.5%	1.5%	
- Histidine	3.66%	2.7%	
- Arginine	7.47%	3.4%	
- Threonine	4.3%	2.8%	
Total BCAA*	31.5%	21.0%	150%
- Glutamic	15.0%	12.1%	124%

***BCAA** – ‘Branch Chain Amino Acids’ critical for muscle recovery and combatting cachexia (muscle wasting disease**) and Kwashiorkor (malnutrition from starvation). This example of Community BioRefineries’ PPPs represents 181% greater concentrations of BCAA over milk proteins and the UN’s World Health Organization (WHO) and Food and Agriculture Organization of the United Nations (FAO) established patter. (**Also, an aging disease called Sarcopenia.)

Essential Amino Acids that meet or exceed the UN’s WHO-FAO Food pattern for a whole food are present or maintaining proper protein and body weight health.

Glutamic acid is the most important amino acid for body maintenance and growth; e.g., 60% of amino acids in spinal fluid as Glutamic acid.

Resistant Starches

Resistant starches are prebiotics which are nutraceuticals beneficial to digestion and help to avoid the surge in insulin which normally leads to diabetes, cachexia, and kwashiorkor (malnutrition from starvation). Resistant starch provides the energy necessary for daily activities without “empty” calories. Barley starch will be converted to resistant starch in PPP.

Vitamins: Necessary for daily maintenance of body functions.

Natural Emulsifiers: Only natural emulsifiers will be used in the PPP formulations. Shelf-life becomes a critical consideration.

Fibers: PPP contains a higher % of delignified fibers which assist in combatting diabetes.

Essential Oils: High in Omega-9 High Oleic Oils with longer shelf-life stability. PPP essential oils are produced from special grains and botanicals and contain higher levels of intact oil particles that establish much longer shelf-life and are known to help in combatting cachexia and kwashiorkor.

Why Are Perfect Protein Products Important?

Since science was finally able to identify the source of the Acquired Immune Deficiency Syndrome (AIDS) as the Human Immunodeficiency Virus (HIV), its spread world-wide became alarming. Not only is this a high priority for the Center for Disease Control, but has become a significant political issue as well. World leaders recognized the threat AIDS poses to the well-being of all nations and the peace a healthy population fosters. There are numerous organizations working to eradicate HIV, provide education to help prevent further infection, and provide comfort to those afflicted. A major contributing factor to the mortality of HIV patients is, that while the anti-virus treatments seek to attack the virus, these same treatments have an unintended side effect of diminishing or destroying various amino acids (proteins) necessary to enable the human body to thrive.

These proteins are responsible for controlling appetite; for enabling the body to assimilate nutrients from food; for contributing to the health of the immune system, and many other functions. When a person loses many of these proteins as the result of HIV treatments, they no longer wish to eat; consequently, they no longer receive the full benefit from their food. Eventually, we see significant weight loss, along with their ability to fend off other viruses and bacteria, and a downward spiral ensues. Similarly, many cancer treatment patients suffer from the same malady whose cancer treatments create the same side effects. Too many HIV and cancer treatment patients die - from disease before their HIV or cancer treatments can be effective – because of this condition, called cachexia.

Community BioRefineries, LLC (CBR) seeks to provide the means to reverse and/or avoid these effects through its Perfect Protein Products by giving the patient a better chance of survival and eventual recovery. Similarly, many among our elderly population experience sarcopenia, when the body can no longer sufficiently produce these naturally occurring proteins as the result of aging.

The same opportunity exists from those afflicted by malnutrition from starvation (kwashiorkor). The Perfect Protein Products that CBR plans to make available will bring much more to these Third World populations, including not only a higher level of a complete balance of amino acids, but higher levels of “branch-chain amino acids” known to be able to be absorbed into the human tissue at the cellular level. These Perfect Protein Products will contain 180%+ higher levels of branch chain amino acids over conventional food products and about 100% greater protein content over deficient amino acid products, such as cereals filled with sugar. Since food products cannot consist of just 100% protein, they must contain other food ingredients for energy and other ingredients, including essential oils and resistant starches, as well as higher levels of soluble and insoluble fibers, all of which will contribute to the higher nutritional levels of the Perfect Protein Products.

Resistant Starch

Carbohydrates used with the Perfect Protein Products are known as “resistant starch”. This special starch is not normally digested in the upper digestive track and does not contribute to a spike in insulin, but rather is fermented in the lower intestines as a *fiber* to propagate the good flora of bacteria (and therefore acts as a natural “probiotic”). These resistant starches, therefore, impart energy to the rest of the body throughout the day *without causing a high spike in insulin due to a mass influx of calories in the digestive tract*. This mass calorie influx of carbohydrates (from high levels of sugars and starches normally contained in food products) contribute to the high incidence of obesity and diabetes as a result of our Western diets.

High Oleic Oil

The Heart Friendly Corn, developed by the USDA (and other specialty grains and botanicals, including barley which contains a high level of beta-glucans), also contains high levels of essential omega 3/6/9 fatty acid oils, which, in the correct ratios, can also contribute to combating the muscle wasting disease due to cachexia and sarcopenia. HIV patients treated with antiretroviral medications usually experience higher cholesterol levels resulting in fat accumulation in the neck and abdominal areas. Foods containing higher levels of saturated fats only exacerbate these conditions. Consuming foods having proper plant-based omega 3/6/9 can help in reducing cholesterol and help in maintaining proper brain functions, bone health, and help regulate metabolism, and stimulate hair and skin growth. Omega-6 fatty acids are shown to reduce ADHD, allergies, high blood pressure, diabetic neuropathy, rheumatoid arthritis, osteoporosis, and other maladies.

The Perfect Protein Products will contain these plant-based essential ingredients as well as other ingredients such as lycopene (that will also be produced through CBR technologies), that can provide healthful benefits to HIV sufferers. The Perfect Protein Products will also help maintain the correct ratios of LDL/HDL cholesterol in the bloodstream.

Each of these ingredients (Perfect Proteins, omega 3/6/9 essential oils, resistant starches, and fibers) will be breakthroughs in and of themselves, and by combining these unique ingredients in the right ratios in the various Perfect Protein Products, nutritional and nutraceutical benefits will be realized that cannot be achieved by other similar products. We believe these Perfect Protein Products could even lead to other major health breakthroughs in the medical and even dental fields. We anticipate these very same products will also be made available to the general public through CBR technologies--see www.communitybiorefineries.com for examples of such technologies.

Finally, there will be two significant advantages offered by the Perfect Protein Products:

First, these Perfect Protein Products, from the field to the supper table, will be completely natural and without GMO (genetically altered microorganisms) manipulation. Only organic processing will be used in the production of these Perfect Protein Products. (Note: Usually these types of products are much more expensive in the retail food and pharmaceutical markets. This will not be the case with the Perfect Protein Products.);

Second, (and most important), most medical foods* are made up of foul tasting, synthetic blends and usually list dozens of exotic “junk chemicals” on their labels – a person almost needs a PhD in organic chemistry to know what they are. In addition, “junk chemical” ingredients are often produced using harsh chemical procedures that impart putrid off-tastes and impart parts per million of left-over toxic dangerous chemicals (for example hexane - a highly toxic petrochemical used by the food industry to remove fat from food products) that haven't been thoroughly studied to determine the potential toxic ill-effects that they may exert on the human body. No wonder our incidence of cancer and leukemia have skyrocketed beyond belief. None of these processes or chemicals will be used in the production of Perfect Protein Products. CBR will produce PPPs from natural, non-genetically modified, feedstocks and processed using organic procedures only which are safe to the human body.

*This same reality applies to plant protein extracts, up to and including ‘concentrates’. These proteins are exposed to heat and harsh chemicals as they are processed; therefore, food products which have these proteins included as a functional ingredient must now also have numerous “masking agents” added to cover up the nasty taste and smells that these now-putrefying proteins are experiencing as the result of their exposure to heat/chemicals. CBR uses zero heat or chemicals in its extraction, isolation, and recovery of its PPPs.

The Perfect Proteins used in the Perfect Protein Products will also be tasteless and odorless, unlike other medical foods. One of the greatest complaints about these synthetic concoctions used in HIV/AIDS patient clinical trials is that they taste horrible. This has led to having to feed these horribly tasting concoctions through external tube feeding directly into the stomach in order to gather the proper data from the trials. Perfect Protein Products will taste good (or, at most, will be tasteless) and will be good for the human body; patients will look forward to participating in our clinical trials.

It is important to keep in mind how expensive these synthetic "pharmaceutical concoctions" usually are, sometimes costing into the hundreds of dollars *per meal*. Now imagine these Perfect Protein Products being made available in all of our everyday meals without having to pay such exorbitant "organic food" prices!

A Comparison of Perfect Protein Products to Other Food Products

Some of the food products that we anticipate to make available containing the Perfect Protein ingredients include:

- Cereals, breads, cookies, cheeses, snacks, milk shake mixes, ice-creams, yogurts, cooking oils, spreads, pastas, gluten-free products, flavored beverages;
- Breakfast cereals are today very low in nutrition. Our children might as well be eating the box. Their protein is not well-balanced and is really suitable for animal feed only, let alone for humans, especially our children in their most formative years. Protein levels in these cereals are typically at about 9-11% concentration and have a PER (protein efficiency ratio) of usually around 1-1.5 (a 2.5 PER is comparable to milk, meat or egg and considered to be a completely balanced protein). Further, it is appalling to see the high level of sugars in almost all of these cereals, ranging from 50%--70% levels, mostly added to make them taste good in order to disguise the taste (or lack of taste) of these low nutritional products. No wonder our children are experiencing such a high level of obesity and diabetes at such young ages; and this may even account for the high incidence of ADD - attention deficit disorder - as they are so high on sugar fixes, they can't begin to think and learn.

Now picture the above products made from Perfect Protein products ingredients that are used as foods to combat muscle wasting. Then picture these products being used to feed the starving peoples of our world. And finally, picture these products being consumed by those suffering from obesity and diabetes that will cost tens of billions of dollars in medical treatments, but if Perfect Protein Products are used as normal foods in everyday diets, they can help treat or even prevent these diseases in the first place...

For more in-depth information please see our website. [Community BioRefineries](#)