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Wheat Grass/Barley Grass

DESCRIPTION

Cereal grass is the young green plant that grows to produce the cereal grain. Grasses belong to the *Gramineae* family that provides all the world's cereals and most of the world's sugar. Wheat grass and barley grass are popular nutritional supplements. These cereal grasses, along with spirulina (see Spirulina), chlorella (see Chlorella), oat grass and alfalfa are sometimes referred to as "green foods." Wheat grass and barley grass are rich sources of chlorophyll (see Chlorophyll/

Chlorophyllin), which is believed to have some health-promoting activities.

ACTIONS AND PHARMACOLOGY

ACTIONS

Wheat grass and barley grass have putative anticarcinogenic activity.

MECHANISM OF ACTION

Wheat sprout extracts have demonstrated antimutagenic activity *in vitro*. The mechanism of the antimutagenic effect is unclear. Wheat sprouts and wheat grass are rich in chlorophyll, and the antimutagenic activity of wheat sprouts may be accounted for by the presence of this substance, which is known to have antimutagenic and anticarcinogenic activities (see Chlorophyll/Chlorophyllin). Other substances, including flavonoids, may also play a role in these possible activities. Barley grass extracts have been found to protect human fibroblasts against carcinogenic agents. Again, chlorophyll may, in part, account for this effect. Barley grass contains several substances other than chlorophyll that have antioxidant activity and that may contribute to its possible antimutagenic and anticarcinogenic activities.

PHARMACOKINETICS

The proteins, lipids and carbohydrates in wheat grass and barley grass are digested, absorbed and metabolized by normal physiological processes.

INDICATIONS AND USAGE

Wheat grass/barley grass supplements are promoted for multiple uses. Claims have been made that they help prevent and fight cancer, lower cholesterol, detoxify many pollutants, protect against solar and other forms of radiation, boost energy and immunity, enhance wound healing, help with digestion, fight tooth decay and bad breath, promote healthy skin, reverse graying of hair and lower blood pressure, among other things. There is no credible evidence to support any of these claims at this time.

RESEARCH SUMMARY

Research is lacking on the possible effects of wheat grass and barley grass. Given that they contain chlorophyll, it is possible that they might have some of the activities exhibited by that substance, including antimutagenic and anticarcinogenic activities. See Chlorophyll/Chlorophyllin.

CONTRAINDICATIONS, PRECAUTIONS, ADVERSE REACTIONS

CONTRAINDICATIONS

Wheat grass and barley grass are contraindicated in those who are hypersensitive to any component of a wheat grass- or barley grass-containing supplement.

PRECAUTIONS

Pregnant women and nursing mothers should avoid wheat grass- or barley grass-containing supplements.

Wheat grass supplements may contain high amounts of vitamin K. Those on warfarin should exercise caution in the use of wheat grass supplements.

ADVERSE REACTIONS

No reports of adverse reactions.

INTERACTIONS

Some wheat grass supplements may be rich in vitamin K and may affect the INR of those on warfarin.

DOSAGE AND ADMINISTRATION

There are various forms of wheat grass and barley grass supplements. Both are available as a powder, in tablets and as a juice. It is also available as a juice. Wheat grass and barley grass are also found in combination "green food" products with spirulina, chlorella, oat grass and alfalfa. Those who use wheat grass typically take 3.5 grams daily. The typical dose of barley grass is also about 3.5 grams daily.

LITERATURE

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Whey Proteins

DESCRIPTION

Whey proteins comprise one of the two major protein groups of bovine milk, the other group being the caseins. Caseins account for about 80% of the total protein in bovine milk, while whey proteins account for the remaining approximately 20%. Whey is derived as a natural byproduct of the cheese-making process. In addition to proteins, the raw form contains fat, lactose and other substances. The raw form is processed to produce protein-rich whey protein concentrates (WPC) and whey protein isolates (WPI), among other things.

Whey proteins are comprised of high-biological-value proteins and proteins that have different functions. The main

whey proteins are beta-lactoglobulin and alpha-lactoglobulin, two small globular proteins that account for about 70 to 80% of total whey protein. Proteins present in lesser amounts include the immunoglobulins IgG, IgA and IgM, but especially IgG, glycomacropeptides, bovine serum albumin, lactoferrin, lactoperoxidase and lysozyme. Whey proteins also contain smaller peptides derived from various proteins which are called biopeptides.

A few different types of whey proteins are marketed. Whey protein concentrates are rich in whey proteins and also contain fat and lactose. Some whey protein concentrates contain higher amounts of immunoglobulins than others. Whey protein isolates are low in fat and lactose.

There are various processes for preparing whey protein isolates. Ion-exchange whey protein isolates are high in protein but low in glycomacropeptides, lactoferrin, lactoperoxidase and some bioactive peptides. Microfiltration/ultrafiltration whey protein isolates have higher amounts of glycomacropeptides, lactoferrin, lactoperoxidase and the bioactive peptides, but are lower in bovine serum albumin. Interestingly, bovine serum albumin, along with beta-lactoglobulin and IgG1, are proteins with abundant glutamylcysteine sequences. Glutamylcysteine is the precursor to glutathione. Cross-flow microfiltration gives a whey protein isolate which is greater than 90% in protein that is undenatured and that retains all important sub-fractions in natural ratios, with no fat or lactose.

ACTIONS AND PHARMACOLOGY

ACTIONS

Whey proteins may have antimicrobial and immunomodulatory actions. They may also have antioxidant activity.

MECHANISM OF ACTION

The mechanism of the possible antimicrobial actions of whey proteins may be accounted for by examining the activities of some of the whey proteins. Lactoferrin binds iron very tightly. Iron is a nutrient essential to support microbial growth, especially the growth of pathogenic bacteria. Lactoferrin may also inhibit the adsorption and/or penetration of bacteria and viruses in the intestinal wall. Lactoperoxidase may inactivate or kill microorganisms via an enzymatic activity producing reactive oxygen species. The immunoglobulins may also play a passive immunity role.

The possible immunomodulatory activity of whey proteins may also be due, in part, to the immunoglobulins playing a role in passive immunity. Whey proteins are rich in L-cysteine and L-glutamate, two amino acids that are precursors to the tripeptide glutathione. Some are also abundant in the dipeptide sequence of glutamylcysteine. This dipeptide is also a precursor to glutathione. There is some indication that