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Plant Based Future Foods

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INTRODUCTION

A number of major challenges facing modern society are related to the food supply. As the global population grows, it will be critical to feed everyone without damaging the environment. The major focus is on eating more plant source foods and eating no or less animal source foods, while the potential of future foods. Future foods as those foods for which our ability to produce considerable volumes is rapidly developing as a result of technological developments that offer the potential to scale production levels up and/or reduce the production costs and provide high nutritional benefits.

1. **Chlorella:** Chlorella is a freshwater, unicellular, green algae belonging to the family Chlorellaceae. It consists of 55-60% protein, 1-4% chlorophyll, 9-18% dietary fiber, vitamins and minerals. Lutein present in chlorella helps to prevent and treat macular degeneration and has anti-cataract properties. It can be used in the form of dried powder, tablets, or capsules for human consumption, Chlorella growth factor (CGF), Chlorella tea, Chlorella noodles.

2. **Spirulina:** Spirulina is a specific type of blue-green vegetable micro-algae. It represents the highest natural source of protein ever discovered i.e., 71% of total protein. Its protein is five times higher than meat, and nearly three times greater than the protein of the ever-popular soybean. It has the highest source of chlorophyll, beta-carotene (25 times more than raw carrots), natural antioxidants like vitamin E, B1, B5&B6. Spirulina promoted as the food of the future with exceptional constituents that contribute to high energy levels.
3. **Wakame seaweed *(Undaria pinnatifida)*:** Wakame (Undaria pinnatifida) is a species of edible seaweed, a type of marine brown algae, and a sea vegetable. It has a slightly sweet, but distinctive and strong flavor and texture. It is most often used in making soups and salads. Wakame contains fucoidan, which influence the inflammatory response in those dealing with cancer. It is rich in fucoxanthin that may help manage fat deposition in the body.
4. **Laver seaweed *(Porphyra spp.)*:** Laver (Porphyra spp.) is red seaweed, popular food item in Asian countries where rice is the stable food. Laver contains 33-47% of protein, 2.8 % fat (26.6 %MUFA, 26.9 % PUFA and 43.2% SFA) 37µg/g of Iodine; therefore, it is recognized as a health food. Taurine present in laver helps in decresing plasma cholesterol levels. Lavers produce exceptional quantities of VitB12 and thus can be used to treat the deficiency of VitB12 (e.g., methylmalonic acidemias) in vegan diets by the consumption of laver.
5. **ADZUKI BEANS (*Vigna angularis*):** Adzuki bean (Vigna angularis) is grown in more than 30 countries of the world which is an important legume crop. It contains high amounts of starch, digestible protein, mineral elements, and vitamins are abundantly. Adzuki beans do not contain gluten, which is found in other popular cereals such as wheat, barley, and rye. In Asiatic countries, adzuki beans used to prepare variety of foods (e.g., paste in pastries, desserts, cake, porridge, adzuki rice, jelly, adzuki milk, ice cream)
6. **MARAMA BEANS (*Tylosema esculentum*):** Marama bean is a perennial legume; a member of the Fabaceae, also known as “the green gold” is considered a native of the Kalahari Desert of South Africa. Adzuki seeds are oval-shaped and tough, and have reddish-brown-black coloration. The underground part of marama is a tuber that is larger in size and more nutritious than common potatoes, yams and sugar beets. The phenolic compounds in African legumes are believed to play a protective role in the body against oxidative stress and its effects due to their antioxidant properties.
7. **BAMBARA GROUNDNUTS (*Vigna subterranea*):** Bambara groundnut (Vigna subterranean) is a leguminous crop belonging to the family Fabaceae. It considered as complete food due to its composition of essential amino acids and essential fatty acids. 100 grams of Bambara groundnuts can provide around 395 calories from which about 260 calories from carbohydrates, 54 calories from fat and 80 calories from protein content. It can be boiled, roasted, fried or milled into fine flour. Tryptophan present in Bambara groundnut helps in secretion of serotonin in the brain. It is rich in beneficial bacteria, also known as probiotics. Milk made from Bambara groundnut used for therapeutic purposes in diarrhea and irritable bowel syndrome.
8. **BUCK WHEAT (*Fagopyrum esculentum)*:** Buckwheat (BW), which belongs to this family Polygonaceae, is found almost everywhere but grows mainly in the northern hemisphere. BW is recognized as a good source of nutritionally valuable protein, lipid, dietary fiber, and minerals, and in

combination with other health-promoting components, such as phenolic compounds and sterols, it has gained attention as a potential functional food. It is a good source of rutin and quercetin, which have protective antioxidant properties.

9. **WILD RICE (*Zizania*):** Wild rice (Zizania sp.) is an annual cross-pollinated, aquatic grass that grows naturally in the North America. The nutritional quality attributes of wild rice are superior to the conventional brown rice in terms of higher contents of important minerals (especially phosphorous, potassium, magnesium and calcium), B-complex vitamins, vitamin E and amino acids. It contains an appreciable amount of valuable compounds such as phenolic with antioxidant properties. Bioactive substances present in the wild rice impart towards medicinal benefits and multiple biological activities.
10. **MICROGREENS:** Micro greens are young and tender cotyledonary leafy greens which are gaining popularity and increased attention nowadays. They are a new class of edible vegetables harvested when first leaves have fully expanded and before true leaves have emerged. They are used to enhance salads, edible garnishes to embellish variety of other dishes. Commonly growing micro greens are mustard, cabbage, radish, buckwheat, lettuce, spinach, etc. The consumption of micro greens has been increasing due to higher concentrations of bioactive components such as vitamins, minerals, and antioxidants than mature greens, which are important for human health.

CONCLUSION

Consumption of these nutrient rich and antioxidant rich underutilized foods by replacing with common foods helps to improve the nutritional status of individuals. Adoption of these novel foods in the diet will helps to produce more food that sufficient to the huge population across the country and it leads to achieve the food security.

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