

1. Please translate the following paragraphs into Chinese (20%)

What is Agroecology? The term agroecology has come to mean many things. Loosely defined, agroecology often incorporates ideas about a more environmentally and socially sensitive approach to agriculture, one that focuses not only on production, but also on the ecological sustainability of the production system. This might be called the “normative” or “prescriptive” use of the term agroecology, because it implies a number of features about society and production that go well beyond the limits of the agricultural field. At its most narrow, agroecology refers to the study of purely ecological phenomena within the crop field, such as predator/prey relations, or crop/weed competition.

2. Please translate the following paragraphs into Chinese (15%)

The term “natural product” is perhaps something of a misnomer. Strictly speaking, any biological molecule is a natural product, but the term is usually reserved for secondary metabolites, small molecules (mol wt < 1500 amu approx.) produced by an organism but that are not strictly necessary for the survival of the organism, unlike the more prevalent macromolecules such as proteins, nucleic acids, and polysaccharides that make up the basic machinery for the more fundamental processes of life.

3. Please translate the following paragraphs into Chinese (15%)

The science of plant nutrition is situated between soil science and plant physiology. It comprises the definition of the elements nutritive for plants; the uptake of plant nutrients and their distribution in the plant; the function of the nutritive elements in plant metabolism; their effect on plant growth; yield formation and quality parameters in crops; soil nutrient exploitation by plant roots; factors and processes that control the plant nutrient availability in soils; toxic elements in soils and their impact on plant growth; the application of plant nutrient carriers (fertilizers) and their turnover in soils; nutrient balance; and the maintenance of soil fertility.

見背面

4. Please answer the questions after reading the following paragraphs (30%).

Prebiotics and probiotics have been found to be safe and effective dietary substances that possess therapeutic properties on gut microbiota for the host. Prebiotics are non-digestible food components responsible for selectively stimulating the growth and/or activity of beneficial bacteria. Key features of prebiotics, from this perspective, were found to be that those compounds are fermented by microbiota, resistance to enzymes, gastric acidity, and, most importantly, able to inspire activity and growth of beneficial bacteria. Prebiotics also induced satiety, modulated gut peptides involved in appetite regulation, and caused an increase of Bifidobacteria and Lactobacilli. Most of all, prebiotics contain carbohydrates, which are not accessible to the enzymes produced by the human body. Still intact, they reach the distal sections of the gastrointestinal tract where they constitute fermentable substrates for intestinal bacteria. These carbohydrates include such compounds as inulin, resistant starch, fructooligosaccharides (FOS), galactooligosaccharides (GOS), xylooligosaccharides, arabinoxylan, glucooligosaccharides, and lactulose, raffinose, and arabinogalactan. For this reason, prebiotics can be a useful tool in the prevention of weight gain obese people, as well as a non-invasive treatment for people suffering from severe obesity. More recently, it was found that prebiotics reduces complications linked with high-fat diet, which induced some metabolic disorders like insulin resistance and obesity. Dewulf et al. (2013) examined the effects of treatment with inulin-type fructans (ITF prebiotics) of 30 obese women over a period of three months. In subjects treated with ITF prebiotics an increase in *Faecalibacterium prausnitzii* and *Bifidobacterium* were observed, and a decrease *Bacteroides vulgatus*, *Bacteroides intestinalis*, and *Propionibacterium*. They also observed that both bacteria *Faecalibacterium prausnitzii* and *Bifidobacterium* are negatively correlated with concentrations of lipopolysaccharide. Obese women who ingested ITF demonstrated an increase in the amount of *B. longum*, *B. pseudocatenulatum*, and *B. adolescentis*, whereas there was an inverse linked between fat mass percentage and changes in the number of *B. adolescentis* and *B. bifidum* (Salazar et al., 2015).

The definition of probiotics by the World Health Organization is live bacteria or yeasts that, when administered in adequate amounts, confer a health benefit to the consumer. These are also commonly referred to as acidophilus. Luoto et al. (2010) suggested that treatment with probiotics during the early years incited modulation of the gut microbiota in children, which, in turn, restrained excessive weight gain. Lee et al. (2014) assessed the effects of probiotics *L. plantarum*, *L. acidophilus*, *L. rhamnosus*, *B. lactis*, *B. longum*, *B. breve*, and *Streptococcus thermophiles* with herbal medicine in the treatment of obesity. They observed in the treated subject (as compared to controls) a significant reduction in weight, but otherwise found no significant changes in metabolic markers and body composition parameters (such as BMI- body mass index, FAT-fat mass, BST-blood sugar test, TG-triglyceride, or TC- total cholesterol). In

this study, two positive correlations were observed: the correlation of the population of *L. plantarum* with lipopolysaccharide level and a change in body composition parameters, and a correlation of the total cholesterol level with gram-negative bacteria and changes in body composition parameters. Whereas, there was found a negative correlation between lipopolysaccharide level and *B. breve* population. This research shows that a reduction in lipopolysaccharide production through altered microbiota plays a major role in deterring obesity.

Questions

- (a) Please define the prebiotics and the probiotics in Chinese. (10%)
- (b) What are the findings on the relationship between intestinal microbiota, dietary components (prebiotics and probiotics) and obesity? (14%)
- (c) How do you management your diet for preventing some metabolic disorders like insulin resistance and obesity? (6%)

5. Please translate the following paragraph into Chinese. (20%)

Sucralose is an artificial sweetener. Although the name sucralose ends in -ose, it is not a sugar like fructose or sucrose, so the name is rather misleading. It is a modified form of ordinary sugar (sucrose). Sucralose-based products are in a broad range of lower-calorie foods, including table top sweeteners, fizzy drinks, chewing gum, baking mixes, breakfast cereals and salad dressings.

Sucralose itself contains no calories but because it is very sweet (approximately 600 times as sweet as sugar), sucralose in the granulated format is often mixed with other sweetening ingredients such as maltodextrin. This dilutes its intense sweetness and provides volume and texture. These, however, are not calorie-free, so a teaspoon contains about 2-4 calories. The claim that 'sucralose has less of an impact on blood glucose than sugar' has been validated by the European Food Safety Authority. Sucralose can be useful for weight reduction and for helping diabetics reduce their sugar intakes. Sucralose has no effect on tooth decay thus it is commonly found in oral health products. Sucralose is not cariogenic, but, as always, good oral hygiene should be maintained.

As part of a healthy diet, the population as a whole could also be encouraged to consider consuming fewer 'sweet snacks and drinks', rather than simply replacing those containing sugar with those containing artificial sweeteners.

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