Please translate the following paragraphs into Chinese.

1. Arsenic (As) is a well-known human carcinogen and the intake of As through consuming rice may lead to significant cancer risks. Arsenic is widely distributed in the environment through anthropogenic (mining activity, industrial pollution, arsenical pesticide application) and natural (volcanic activity, hot spring) pathways. In recent years, many studies have indicated that rice consumption is the primary human exposure route for As. Rice is the staple food for half of the world's population. Unfortunately, the mobility and bioavailability of As is greatly exacerbated under flooding soil conditions, leading to the readily uptake of As by rice plants. Therefore, compared with other cereal crops, paddy rice is much more efficient in accumulating As in grains. Moreover, paddy rice grown in As-contaminated soils and/or irrigated with high As concentrations of water may lead to increased phytotoxicity and a reduction in grain yields. **(25 points)**

2. The roots and shoots of rice seedlings were oven dried at 70°C for 48 hr, and ground to a fine powder. Dried plant tissues (0.1-0.2 g) were digested in HNO_3/H_2O_2 in heating blocks, and the digests diluted to 50 mL with deionized water and As concentrations in digests were determined by ICP-MS. A certified reference materials of the plant sample (NSC DC73349) were used to verify the recovery of the As analysis. The total Si contents in shoots of rice seedlings were determined by microwave-$NaOH/H_2O_2$ digestion, which was a modification of procedures in Seyfferth and Fendorf (2012). Dried shoot samples (0.05 g), 3 mL 50 % NaOH and 2 mL 30 % H_2O_2 were added to a Teflon vessel and mixed evenly. The vessels were sealed and digested in a microwave digestion instrument, in which the temperature was raised to 100°C within 5 minutes and held for an additional 5 minutes, then raised to 175°C within 10 minutes and held for an additional 20 minutes. After cooling, the digests were diluted to 50 mL with deionized water and Si concentrations in digests were determined by ICP-OES. **(25 points)**

3. Good Agricultural Practices, or GAP, are production and farm level approaches to ensure the safety of fresh produce for human consumption. GAP production and post-harvest guidelines are designed to reduce the risk of foodborne disease contamination on fresh produce. These voluntary procedures can be tailored to any production system. GAP recommendations are directed toward the primary sources of contamination: soil, water, hands and surfaces.

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GAP protocols were developed in response to the increase in the number of outbreaks of foodborne diseases resulting from contaminated fresh produce. Produce can become contaminated by any of a number of microbes (bacteria, viruses, parasites, or fungi) at any stage of production, processing, packaging, or marketing. While the cooking process would normally kill these microorganisms, fresh produce is often consumed raw and thus, at risk. Research shows that the detection of residual pathogens prior to marketing is extremely difficult. Similarity, it is very hard to sanitize harvested produce so that it is completely free of harmful microorganisms. The most effective strategy for reducing the risk of contamination is through prevention. GAP provides simple steps that fruit and vegetable growers can implement to greatly reduce the potential for contamination on the farm. **(25 points)**

4. Nanoemulsions are kinetically stable liquid-in-liquid dispersions with droplet sizes on the order of 100 nm. A typical nanoemulsion contains oil, water and an emulsifier. The addition of an emulsifier is critical for the creation of small sized droplets as it decreases the interfacial tension i.e., the surface energy per unit area, between the oil and water phases of the emulsion. The emulsifier also plays a role in stabilizing nanoemulsions through repulsive electrostatic interactions and steric hindrance. The emulsifier used is generally a surfactant, but proteins and lipids have also been effective in the preparation of nanoemulsions. Their small size leads to useful properties such as high surface area per unit volume, robust stability, optically transparent appearance, and tunable rheology. Nanoemulsions are finding application in diverse areas such as drug delivery, food, cosmetics, pharmaceuticals, and material synthesis. Additionally, they serve as model systems to understand nanoscale colloidal dispersions. High and low energy methods are used to prepare nanoemulsions, including high pressure homogenization, ultrasonication, phase inversion temperature and emulsion inversion point, as well as recently developed approaches such as bubble bursting method. **(25 points)**

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