

1-50 為單選題，每題 2 分，答錯倒扣 0.5 分 ※ 注意：請於試卷上「選擇題作答區」

內依序作答。

Article 1

Soybeans are rich in nutrients and bioactive substances. Among them, isoflavones have been reported to help in the prevention of cancer, osteoporosis, postmenopausal syndrome, and hypercholesterolemia. On the other hand, soybean has anti-nutritional factors (ANFs), such as trypsin inhibitors, lectins and phytic acid. These factors are generally inactivated or decreased by heat treatment during food processing. However, an excess of heating decreases the sensorial parameters and nutritive value of products.

The consumption of soy foods is increasing due to the benefits reported on nutrition and health. In this way, soybean is associated with the reduction of several diseases, such as certain cancers and heart illness. On the other hand, the role played by soybeans in the reduction of cholesterol or in the prevention of obesity is firmly established. Studies performed on Chinese athletes showed that soy proteins in the diet produced an increase of lean body mass, reducing body fat and increasing resistance to fatigue. These effects were also found in animals. Consequently, soybean proteins offer special benefits not found in other foods and are being used to replace some dairy foods, or in diet.

Emerging technologies such as high pressure treatments have been used in the last decade as excellent non thermal techniques for food preservation. They can compete with the traditional heating treatment, by decreasing the microbial population, maintaining the sensorial and nutritional properties of the foods.

Soy protein hydrolysates obtained with high pressure treatment have properties that make them attractive as a source of protein in human nutrition. They are physiologically better than intact proteins because their intestinal absorption appears to be more effective due to the increase of solubility and peptide content. (Source: Food Chemistry, 2004, 85: 641)

1. "Obesity" is a disease associated with (A) excessive of fat accumulation, (B) kidney failure, (C) heart failure, (D) malfunction of lung.
2. Which one of the following statements is incorrect? (A) Heating may decrease the phytic acid content of soybean. (B) Heating may inactivate trypsin inhibitor. (C) Heating may improve the nutritional value of soybean. (D) Heating may decrease the amount of lectins in soybean.
3. Select the wrong statement concerning the high pressure treatment: High pressure treatment can be used to (A) shorten the shelf-life of food. (B) improve the keeping quality of food. (C) replace thermal process as a preservation method. (D) inactivate microorganisms.
4. Select the wrong statement: Overheating may (A) damage the quality of food, (B) affect the sensorial property of food, (C) reduce the nutritional value of food, (D) increase the lectins content of soybean.
5. (A) Soy protein, (B) Phytic acid, (C) Lectins, (D) Trypsin inhibitor may exert beneficial effect on human health or nutrition.
6. Select the wrong statement: Eating soy food can (A) reduce heart disease. (B) prevent the occurrence of cancer. (C) reduce cholesterol content. (D) promote obesity.
7. Select the incorrect statement listed below: (A) Hydrolyzed proteins can be absorbed more effectively in intestine than the intact proteins. (B) Molecules of hydrolyzed proteins are larger than the intact proteins. (C)

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Intact proteins are not physiologically as good as the hydrolyzed proteins. (D) The solubility of hydrolyzed proteins is better than intact proteins.

8. "Last decade" means (A) about the past 5 years, (B) about the past 10 years, (C) about the past 24 years, (D) about the past 50 years.
9. Select the wrong statement: Isoflavones may help to reduce the occurrence of (A) obesity. (B) cancer. (C) hypercholesterolemia. (D) osteoporosis.
10. Osteoporosis is a disease associated with (A) bone. (B) kidney. (C) heart. (D) liver.

Article 2 Easier to Swallow: U.S. Beefs Up FDA with the Food Safety Modernization Act Mar 11, 2011

(Source: <http://www.scientificamerican.com/article/food-safety-modernization-act/>)

Existing laws and oversight from the U.S. Food and Drug Administration (FDA) have done a decent job of keeping the vast majority of Americans safe from food borne illnesses, but several recent cases of contamination have put the spotlight on what more we can do to protect ourselves from **unwittingly** consuming harmful bacteria, parasites, viruses and toxins that could be lurking on our dinner plates.

11. The word **unwittingly** means: (A) unintentionally; (B) unintelligence; (C) cheatingly; (D) purposefully.

The U.S. Centers for Disease Control (CDC) reports that, of the 48 million Americans afflicted with some sort of food borne illness every year, 128,000 are hospitalized and about 3,000 die. In response to this X problem, in January 2011 Congress passed and President Obama signed into law the landmark Food Safety Modernization Act (FSMA), a comprehensive \$1.4-billion bill that aims to stop outbreaks of food borne illnesses before they begin.

12. Which of the following words could be used as X? (A) shrinking; (B) wondering; (C) growing; (D) falling.

"This law makes everyone responsible and accountable at each step in today's global food supply chain," reports FDA Commissioner Margaret Hamburg. "This law represents a sea change for food safety in America, bringing a new focus on prevention, and I expect that in the coming years it will have a dramatic and positive effect on the safety of the food supply."

FDA inspectors have monitored domestic producers of seafood, juice, meat, eggs and poultry for decades, but the new law expands their powers to evaluate hazards in all kinds of food and to impose stricter standards on imported foods. Processors are now required to proactively take measures to prevent contamination, and must have plans in place for corrective action when something does go wrong. Smaller producers are exempt from some of the more **onerous** and costly provisions of the new law, but are nevertheless still responsible for maintaining the strict health safety standards set forth in its provisions. The new law also increases the number and frequency of inspections at both high-risk and non-high risk facilities. And the FDA can now order recalls of tainted foods; before FSMA's enactment, the agency could only negotiate with businesses to order voluntary recalls.

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13. Which of the following word has different meaning with **onerous**? (A) burdensome; (B) laborious; (C) cumbersome; (D) trivial.

Given that some 15 percent of our food supply—including 60 percent of fresh fruits and 80 percent of seafood—is imported, the new law also requires importers to verify the safety of food from their foreign suppliers and authorizes the FDA to block foods from facilities or countries that refuse inspections.

14. Under the new FSMA, the FDA can now forbid entering of suspicious foreign food products to the US market? (A) True; (B) False; (C) Not mentioned in the paragraph.

FSMA also provides funds for training, equipment and facilities at food safety agencies across federal, state, local, territorial, tribal and even foreign jurisdictions to ensure that all parties are up to snuff on the ways and means of preventing and containing food borne illnesses.

“Really this is a major victory for every American who will sit down at the dinner table and have more confidence that their food is going to be safe,” says Erik Olson of the Pew Health Group, one the most vocal of hundreds of nonprofits in favor of strengthening our nation’s food safety net.

15. What is the meaning of **in favor of**? (A) tasteful; (B) challenging; (C) sceptical; (D) supporting.

Article 3 Food Fight (abridged) Dec 14th 2013 (Source:

<http://www.economist.com/news/china/21591577-fierce-public-debate-over-gm-food-exposes-concerns-about-america-food-fight>)

Of the many thousands of usually small protests that break out in China every year, few relate to national policy. Many consider the risk of challenging the central government too great. But the entrance to the agriculture ministry is a gathering spot for **occasional** demonstrations. Their complaints are about an issue dear to the ministry: genetically modified (GM) crops. At one protest this year, a group chanted slogans calling for the eradication of “traitors” who support GM food. Debate over the technology is escalating, putting the government in a bind.

16. Which of the following word has similar meaning with **occasional**? (A) intermittent; (B) frequent; (C) regular; (D) constant.

Public unease about genetic modification is common around the world. In China, alongside rising concerns about food safety, it has taken on a strongly political hue. Chinese anti-GM activists often describe their cause as patriotic, aimed not just at avoiding what they regard as the potential harm of tinkering with nature, but at resisting control of China’s food supply by America through American-owned biotech companies and their superior technology. Conspiracy theories about supposed American plots to use dodgy GM food to weaken China abound online.

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17. The reason of Chinese public uneasiness is solely because of health concerns? (A) True; (B) False; (C) Not mentioned in the paragraph.

They are even believed by some in the government. In October an official video made for army officers was leaked on the internet and widely watched until censors scrubbed it. "America is mobilising its strategic resources to promote GM food vigorously," its narrator grimly intoned. "This is a means of controlling the world by controlling the world's food production."

18. What is the meaning of **scrub** in the paragraph? (A) wash; (B) rub; (C) remove; (D) subscribe.

Peng Guangqian, a retired major-general and prominent think-tanker, echoed these sentiments in an article published by official media in August. He said America might be setting a "trap". The result, he said, could be "far worse than the Opium War" between Britain and China in the 1840s that Chinese historians regard as the beginning of a "century of humiliation" at the hands of foreign powers.

China already uses plenty of GM products. More than 70% of its cotton is genetically modified. Most of the soybeans consumed in China are imported, and most of those imports are GM (often from America). The technology is widely used for growing papayas. The government wants to develop home-grown GM varieties and has spent Y on research, eager to maintain self-sufficiency in food. Officials see GM crops as a way of boosting yields on scarce farmland.

19. Which of the following words could be used as Y? (A) limitedly; (B) restrictively; (C) conservatively; (D) heavily.

In 2009 China granted safety certificates for two GM varieties of rice and one of maize. This raised expectations that it might become the first country in the world to use GM technology in the production of a main staple. But further approvals needed for commercial growing have yet to be granted. To the **consternation** of GM supporters, the safety certificates for the rice are due to expire next August.

20. Which of the following word has different meaning with **consternation**? (A) anxiety; (B) contentment; (C) panic; (D) fear.

Article 4

The U.S. Food and Drug Administration (FDA) on Jan. 14 issued a guidance as a strong reminder to manufacturers and distributors of conventional foods about Federal Food, Drug, & Cosmetic Act (FD&C Act) requirements for substances added to conventional foods, including beverages. The guidance, published in the *Federal Register*, also reminded dietary supplement manufacturers and distributors that the same requirements apply to certain substances that are added to dietary supplements; namely, those that are not dietary ingredients as defined in the FD&C Act.

The "Guidance for Industry: Considerations Regarding Substances Added to Foods, Including Beverages

and Dietary Supplements" states: "We are concerned that some of the novel substances that are being added to conventional foods, including beverages, may cause the food to be adulterated because these added substances may not be GRAS for their intended use and are not being used in accordance with a food additive regulation prescribing conditions of safe use. In addition, some substances that have been present in the food supply for many years are now being added to conventional foods at levels in excess of their traditional use levels or in new types of conventional foods. This trend raises questions as to whether these higher levels and other new conditions of use are safe."

FDA makes clear that if a substance is not generally recognized as safe (GRAS) by qualified experts for its intended use in food and does not qualify for any of the other exemptions from the food additive definition, it is a food additive. Many substances intentionally added to beverages and other conventional foods are food additives that require premarket approval based on data demonstrating safety. Usually, these data are submitted to FDA in a food additive petition, although the agency may also approve a food additive on its own initiative without first receiving a petition. FDA issues food additive regulations specifying the conditions under which an additive has been demonstrated to be safe and, therefore, may be lawfully used. Any unapproved food additive used in a beverage or other conventional food causes the food to be adulterated under the FD&C Act. Adulterated foods cannot be legally imported or marketed in the United States.

If a substance is GRAS under the conditions of its intended use in food, it is exempt from the definition of a food additive, and thus, from pre-market approval. For a particular use of a substance to be GRAS, there must be both evidence of safety and a basis to conclude that this evidence is generally known and accepted by qualified experts. In addition, under the second part of the GRAS standard, the scientific evidence to establish the safety of the substance for its intended use must be generally available, and there must be a basis to conclude that consensus exists among qualified experts about the safety of the substance for its intended use.

(Source: Food Product Design, Virgo Publishing, 2014-01-16, <http://www.foodproductdesign.com>)

21. What is the main purpose of this news? (A) A warning of food adulteration. (B) To announce that FDA issued "Guidance for Industry: Considerations Regarding Substances Added to Foods, Including Beverages and Dietary Supplements." (C) To report a food scandal. (D) FDA issued a withdrawal of food & drinks from the US market.
22. When is "Federal Food, Drug, & Cosmetic Act" issued? (A) Jan. 14, 2014. (B) Jan. 16, 2014. (C) Jan. 14, 2010. (D) It is not mentioned in this article.
23. What is GRAS? (A) A US Food and Drug Administration label. (B) A food brand name. (C) An FDA agent. (D) An administrator of FD&C Act.
24. According to this news, which food category does the guidance apply? (A) Foods (B) Beverages (C) Dietary Supplements (D) All of the above.
25. According to this news, what is adulterated foods? (A) Beverages with a GRAS substance added without a food additive label. (B) A dietary supplements with a GRAS substance added without a food additive label. (C) A conventional food with a non-GRAS substance added and a label. (D) Foods contaminated with mycotoxins.

Article 5

Most adolescents consume as much salt as adults –some more than twice the recommended daily

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allowance – and that high sodium intake correlates with fatness and inflammation regardless of how many calories they consume, researchers report.

In a study of 766 healthy teens, 97 percent self-reported exceeding the American Heart Association's recommendation of consuming less than 1,500 milligrams of sodium daily, according to a study in the journal *Pediatrics*.

"The majority of studies in humans show the more food you eat, the more salt you consume, the fatter you are," said Dr. Haidong Zhu, molecular geneticist at the Medical College of Georgia and Institute of Public and Preventive Health at Georgia Regents University.

"Our study adjusted for what these young people ate and drank and there was still a correlation between salt intake and obesity," Zhu said. These high-sodium consumers also had high levels of tumor necrosis factor alpha, which is secreted by immune cells and contributes to chronic inflammation as well as autoimmune diseases like lupus and arthritis. Additionally, the adolescents had high levels of leptin, a hormone produced by fat cells that normally suppresses appetite and burns fat, but at chronically high levels can have the opposite effects.

"Losing weight is difficult, but hopefully more people can be successful at reducing their sodium intake," said Zhu, the study's corresponding author. Reductions would result from not automatically adding salt to food and choosing fresh fruits and vegetables over French fries and processed meats and snacks.

"We hope these findings will reinforce for parents and pediatricians alike that daily decisions about how much salt children consume can set the stage for fatness, chronic inflammation and a host of associated diseases like hypertension and diabetes," said study co-author Dr. Gregory Harshfield, Director of the Georgia Prevention Center at the GRU institute.

High sodium intake has been linked to higher weight, possibly because of increased water retention. While the new study does not prove a causal effect, it contributes to mounting evidence that high sodium could be a direct cause of obesity and inflammation, Zhu and her colleagues report. Longitudinal or randomized clinical trials are needed to clarify the relationships, the researchers said.

"Obesity has a lot of contributing factors, including physical inactivity," Zhu said. "We think that high sodium intake could be one of those factors." Evidence suggests one direct cause may be increasing the size of fat cells.

The MCG study appears to be the first to use several robust measures of fatness to improve accuracy, including magnetic resonance imaging and dual-energy X-ray absorptiometry, which also measures bone density. Study participants were Augusta-area teens whose fitness and fatness were being assessed by Dr. Bernard Gutin, exercise physiologist and Emeritus Professor of Pediatrics at MCG. Data was collected from 2001-05. (Source: Medical College of Georgia at Georgia Regents University, 2014-02-03.)

26. What is recommended daily allowance for sodium intake? (A) 1.5 g. (B) 1500 g. (C) 766 g. (D) 97 g.
27. According to this news, who consume too much salt? (A) Most of adolescents. (B) Most of adults. (C) Most of healthy teens. (D) All of the above.
28. What is "lupus"? (A) A hormone. (B) A salty food. (C) An auto-immune disease. (D) A unit for body fat measurement.
29. According to this news, what is correlated with high salt intake? (A) High level of tumor necrosis factor alpha. (B) Obesity. (C) Chronic inflammation. (D) All of the above.

30. According to this news, what is the major finding of this study published in the journal *Pediatrics*? (A) Reducing sodium intake can easily lose weight. (B) High sodium intake could be a direct cause of obesity and inflammation. (C) Fat cells produce leptin, a hormone. (D) Dual-energy X-ray absorptiometry is an accurate method to measure sodium in human fat.

Article 6

Phytochemicals are non-nutritive plant chemicals that have protective or disease preventive properties. They are nonessential nutrients, meaning that they are not required by the human body for sustaining life. It is well-known that plants produce these chemicals to protect themselves but recent research demonstrates that they can also protect humans against diseases. There are more than thousand known phytochemicals. Some of the well-known phytochemicals are lycopene in tomatoes, isoflavones in soy and flavanoids in fruits. There are many phytochemicals and each works differently. These are some possible actions:

- **Antioxidant** - Most phytochemicals have antioxidant activity and protect our cells against oxidative damage and reduce the risk of developing certain types of cancer. Phytochemicals with antioxidant activity: allyl sulfides (onions, leeks, garlic), carotenoids (fruits, carrots), flavonoids (fruits, vegetables), polyphenols (tea, grapes).
- **Hormonal action** - Isoflavones, found in soy, imitate human estrogens and help to reduce menopausal symptoms and osteoporosis.
- **Stimulation of enzymes** - Indoles, which are found in cabbages, stimulate enzymes that make the estrogen less effective and could reduce the risk for breast cancer. Other phytochemicals, which interfere with enzymes, are protease inhibitors (soy and beans), terpenes (citrus fruits and cherries).
- **Interference with DNA replication** - Saponins found in beans interfere with the replication of cell DNA, thereby preventing the multiplication of cancer cells. Capsaicin, found in hot peppers, protects DNA from carcinogens.
- **Anti-bacterial effect** - The phytochemical allicin from garlic has anti-bacterial properties.
- **Physical action** - Some phytochemicals bind physically to cell walls thereby preventing the adhesion of pathogens to human cell walls. Proanthocyanidins are responsible for the anti-adhesion properties of cranberry. Consumption of cranberries will reduce the risk of urinary tract infections and will improve dental health.

Foods containing phytochemicals are already part of our daily diet. In fact, most foods contain phytochemicals except for some refined foods such as sugar or alcohol. Some foods, such as whole grains, vegetables, beans, fruits and herbs, contain many phytochemicals. The easiest way to get more phytochemicals is to eat more fruit (blueberries, cranberries, cherries, apple,...) and vegetables (cauliflower, cabbage, carrots, broccoli,...). It is recommended take daily at least 5 to 9 servings of fruits or vegetable. Fruits and vegetables are also rich in minerals, vitamins and fibre and low in saturated fat.

Phytochemicals are naturally present in many foods but it is expected that through bioengineering new

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plants will be developed, which will contain higher levels. This would make it easier to incorporate enough phytochemicals with our food. (Source: <http://www.phytochemicals.info>)

31. Which of the followings is not a phytochemical (A) saponin (B) carotenoid (C) capsaicin (D) cabbage
32. Why do plants produce phytochemicals (A) to promoter their DNA replication (B) to supply extra nutrients (C) to protect themselves (D) to induce plant hormone release
33. Why isoflavone can attenuate the syndrome of menopausal symptoms (A) it can induce the secretion of estrogen (B) it can counteract the effect of estrogen (C) it has a similar effect of estrogen (D) it promotes bone synthesis
34. According to this article, why indoles can reduce the risk of breast cancer (A) it can protect DNA from carcinogen (B) it can resolve the problem of menopause (C) it can interfere the effect of estrogen (D) it is an antioxidant.
35. Which of the following descriptions is not true (A) phytochemicals come largely from plants (B) Most phytochemicals protect our cells from oxidative stress through their anti-oxidation activity (C) most polyphenols are good anti-oxidants (D) consume cranberries will trigger urinary tract infections.
36. According to the descriptions in this article, why proanthocyanidins can prevent human beings from pathogen infection. (A) It can reduce oxidative stress (B) It can adhere to human cell wall to prevent physical binding of pathogens (C) It can break DNA of pathogen thereby killing pathogens. (D) It can stimulate enzymes of pathogen
37. According to this article, which of the followings is not a good resources of phytochemicals (A) whole grains (B) seaweeds (C) beans (D) herbs
38. Which of the followings can provide us enough phytochemicals (A) do more exercise (B) consume protein rich foods (C) take daily at least 5 servings of fruits or vegetables (D) take a multi vitamin tablet everyday
39. According to the article, which of the phytochemical/resource is not matched (A) terpenes/cherries (B) lycopene/tomatoes (C) allicin/cranberries (D) isoflavones/soy
40. The author might agree with which of the following ideas to incorporate more phytochemicals in our food (A) develop new plants with higher level of phytochemicals through bioengineering (B) eat as much fruits and vegetables as possible (C) develop phytochemicals tablets (D) take some other anti-oxidants instead.

Article 7 Changes in phenolics and antioxidant activity at each step of processing from pomegranate into nectar

Effect of all processing steps on polyphenols and antioxidant activity was investigated during an industrial scale pasteurized pomegranate nectar production, from which sampling was done at 12 steps of the process. Total phenolic (TPC), flavonoid (TFC), anthocyanin (TAC), tannin contents (TTC), antioxidant activity (TAA) (2,2'-azinobis-3-ethylbenzo-thiazoline-6-sulphonic acid diammonium salt (ABTS), cupric reducing antioxidant capacity (CUPRAC), ferric reducing ability of plasma (FRAP) and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays), phenolic and-anthocyanin profiles were analyzed in those samples. TPC, TFC, TTC and TAA were highest in whole pomegranate. For all analyses, peeling and processing into nectar resulted in significant losses, except for TAC data obtained for peeling. Losses at mashing (for TFC 24%), pressing (for TAC 13%, TTC 48%, TAA 21-63%), pasteurization (for TFC 76%, TAA 42-77%) and ultrafiltration (for TPC 18%, TFC 28%, AA 17-19%) were also significant. Pomegranate nectar, when compared with fresh edible fruit, retained 19% of

TPC and 14% of TAC at the end of processing, however, as initial values were very high for pomegranate, pasteurized nectar is still a promising source of polyphenols. (Source: Int J Food Sci Nutr. 2014, 65:194-202.)

41. What is the main purpose of this research? (A) How to produce pomegranate nectar. (B) To report the analyzed methods of antioxidant activity. (C) To report the processing step changed the contents of polyphenols in pomegranate nectar. (D) To show the pomegranate nectar was good source of polyphenols.
42. What is pasteurization? (A) A heating machine. (B) A heating process that destroys pathogens. (C) A method for collecting nectar. (D) A method for analyzing antioxidant activity.
43. Which processing step did **NOT** decrease the amount of polyphenols in pomegranate nectar? (A) Peeling. (B) Mashing. (C) Pasteurization. (D) Clarification.
44. Which one was **NOT** loss in peeling process? (A) TAA. (B) TFC. (C) TTC. (D) TAC.
45. How many TPC was left over starting from whole fruit as the raw material and ending in the pasteurized nectar as the final product? (A) 24%. (B) 18%. (C) 19%. (D) 14%.

Article 8 Sediments in concentrated green tea during low-temperature storage

The formation and the main chemical components of sediments, including reversible tea sediments (RTS) and irreversible tea sediments (IRS), in concentrated green tea during low-temperature storage were studied. RTS was mainly formed in the first 10 days, and IRS was mainly formed between 20 and 40 days of storage. The RTS were the primary sediment, contributing more than 90% of the total sediment. The RTS comprised of polyphenols, total sugar, caffeine, flavones and proteins, while the IRS mainly comprised of oxalates of Ca, Mg, Ga and Mn. The total mineral content in the IRS (17.1%) was much higher than that in the RTS (2.6%) after 80 days of storage. The Ca, Mg, Mn and Ga contents in IRS were over 1.0% (w/w) each. About 75% of the IRS was soluble in 0.1 M aqueous HCl, with the oxalate accounting for 68%. Minerals and oxalic acid were the crucial factors in the IRS formation. (Source: Food Chem. 2014, 149:137-43.)

46. What is the main purpose of this research? (A) To get sediments of concentrated green tea in low-temperature storage. (B) To measure chemical components of concentrated green tea. (C) To find the method for green tea storage. (D) To report the chemical ingredients of sediments during the low-temperature storage in concentrated green tea.
47. Which one was primary sediment in concentrated green tea? (A) Oxalates. (B) Caffeine. (C) Ca. (D) Ga.
48. How long was the study conducted? (A) 10 days. (B) 20 days. (C) 40 days. (D) 80 days.
49. Which statement is **Wrong** about this study? (A) RTS was the first showed sediment. (B) Oxalates were major components of IRS. (C) RTS was the most part of sediments. (D) IRS was soluble in alkaline aqueous.
50. Which one can use to remove IRS? (A) Enzymes. (B) Higher temperature. (C) Polyphenols. (D) Metal-chelator.