Journal of Food Technology 9 (6): 141-142, 2011
ISSN: 1684-8462

Food Technologies for Delicious and Beautiful Polyphenols of Bitter Olives etc.

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Abstract: Polyphenols and nutrition are useful but frequently make the foods too bitter to eat e.g., fresh olives and oriental medicines, etc. To eat fresh olives must have been treated by sodium hydroxide or 5 months fermentation. Sodium hydroxide destroys all polyphenols and makes olive oil acidity high with the result of formation of sodium salts of fatty acids i.e., soap. However, there is no way to take the natural polyphenols tasty. This is the industrial situation in the world. The sodium hydroxide destroys olive structures and kills beneficial bacteria and rapidly decays and putrefies the olives. Contrarily the food technologies make olives strong and prevent oil leak which destroys alcohol quality when olives are mixed with alcohol. Researchers show that coagulations of olives etc. with calcium and carboxylation make bitters tasty and change the colors. When these are ingested into the stomach, gastric acid discoagulates and returns them to original bioactive substances with original pharmacologic activity. Because of the bitter as only one reason, olive industry produce a vast amount of industrial waste such as oil cake and sodium hydroxide to be abandoned into Mediterranean sea. These were all overcome by the food technologies. The researchers anticipate that these food technologies have vast potencies for current and potential food industry applications and for future developments.

Key words: Food technology, polyphenol, nutrition, olive, food industrial waste, bitter health food

INTRODUCTION

Polyphenols and natural nutrition are useful (Aberoumand and Deokule, 2010; Pinheiro *et al.*, 2009) but frequently make the contained foods too bitter to eat e.g., fresh olives and oriental medicines, etc. In order to eat fresh olives must have been treated by sodium hydroxide or 5 months fermentation. Sodium hydroxide destroys and removes all polyphenols, nutrition and natural colors etc. and makes olive oil acidity high with the result of formation of sodium salts of fatty acids i.e., soap.

However, there is no way to take the natural polyphenols tasty. Neuronal sensations for substances are affected by their configurations and can be changed by the configuration changes which are sometimes experienced with calcium-containing researches (Yamada, 1975, 1979, 1987; Yasuyuki and Nagoya, 2011; Oomura *et al.*, 1974). Here the researchers show that coagulations of oriental medicines, etc. with calcium make bitters tasty and change the colors. When these are ingested into the stomach, gastric acid discoagulates and returns them to original bioactive substances.

MATERIALS AND METHODS

As the olives, Manzanillo and Mission were used. As the bitterest oriental medicine, Polygonaceae Rhei Rhizoma was used. This medicine contains many plyphenols such as sennoside A-F, rhatannin I, II, chrysophanol, emodin, physcion, aloe-emodin, citreorosein, rhein, rhein anthrone, aloe-emodin anthrone and lindleyn etc. Edible calcium oxide, calcium hydroxide and calcium carboxide were supplied by Kawai Lime (Oogaki, Japan).

RESULTS AND DISCUSSION

About 1 g of powdered Polygonaceae Rhei Rhizoma was soaked into saturated edible calcium hydroxide (0.17% solution) for 1 sec. This was dried in air for 24 h for complete carboxylation and ingested with the result of the same pharmacologic activity of the laxative. Original dark brown color changed to white brown. Produced calcium carbonate which is main component of shells are used in the variety of medicine and foods.

Ripe olives were soaked into the saturated calcium hydroxide for 10 days. In order to speed up, bitter immature olives were enucleated and soaked into calcium hydroxide suspension (15 w/v%) for 18-24 h depending on the bitterness.

These were washed completely in flowing tap water and carboxylated with bubbling carbon dioxide for 60 min. The produced olives were stocked in the solution which contained 45% vinegar, 45% corn syrup and 10% ethanol. These olives were stable for 3 years at equilibrated solution was delicious with red wine color. Its olive polyphenols amount was 40 mg dL^{-1},

Fig. 1: Examples of red olive polyphenols. Olive wine, green olives in polyphenol vinegar, stuffed olives with brewers' grains (sakekasu), olive sushi with sushi rice

measured by Fermentation and Food Research Institute of Kagawa Prefecture. Another kind of olive wine could be made as follows: the olives are soaked into 36% w/v crystal sugar and 11% w/v crushed lemon in white liquor (35% v/v ethanol). Olive vinegar with polyphenols of red wine color could be made similarly to a variety kinds of fruit vinegar i.e., by soaking fruit into an existing vinegar. When ordinary olives were soaked into liquor or vinegar in order to make fruit wine or fruit vinegar, these became terribly bitter substances with no color (Fig. 1).

The saturated calcium hydroxide 1 mL was mixed with crushed edible materials 200 mg. The saturated calcium hydroxide microscopically immediately coagulated crushed particles and weakened bitterness as follows; μm in diameter pre-post and percent (%) in final bitterness: Rhei Rhizoma 5-50, 30. This bitterness became 10% after dried and fully carboxylateded in air. Green and black olive 5-100, 10. Olive leaf 5-50, 30. Olive branch 50-150, 30. This bitterness became 10% after dried and fully carboxylateded in air. Mustard leaf (*Brassica juncea*) 3-25, 10, red pepper 5-50, 30. Bile of great amberjack (*Seriola dumerili*) 10-100, 30. Turmeric leaf, mixture of 3 and 20-100, 10. Turmeric calyx 3-100, 10.

Viscera of sweetfish (*Plecoglossus altivelis*) 1-50, 50. Kale (borecole) 5-20, 10. Bitter melon (*Momordica charantia*) 5-50, 30%. This bitterness became 0% after sliced by 2 mm thickness and soaked for 3 days. Carrot leaf, mixture of 3 and 10-80, 10. Astringent persimmon 10-500, 10. Calyx of Astringent persimmon 5-150, 10. Leaf of Astringent persimmon 5-100, 10. Branch of Astringent persimmon, mixture of 10 and 100, mixture of 30 and 200, 10. Then, the other calcium compounds were examined. Rhei Rhizoma and olive were soaked in 5% calcium lactate, calcium citrate and calcium chloride. There was little masking action. There were no anti-denaturalizing and no anti-bacterial action. These easily corrupted. The sodium hydroxide destroys olive defending structures and kills beneficial defending bacteria such as yeasts, etc. and rapidly decays and putrefies the olives. Contrarily coagulation makes olives stiff and strong and prevent oil leak which destroys alcohol quality.

Intracellularly olive oils are made and stocked in membranes of smooth-surfaced endoplasmic reticulum which might be strengthened by calcium. Because of the bitter as only one reason, olive agriculture and industry in all over the world, produce a vast amount of nutritious and valuable industrial waste such as oil cake and nuts which become delicious and nutritious wine, vinegar and foods, etc. and the polyphenols-destroying sodium hydroxide to be abandoned into Mediterranean sea. Which should be changed to universally useful and recyclable calcium which holds and makes delicious beautiful polyphenols.

CONCLUSION

Researchers anticipate that bitter edible substances such as olives have vast potencies for future developments such as trans-free olive margarine by oil coagulation with 1% microfilament starch cotton which immediately dissolves by salivary amylase in mouth (Yasuyuki and Nagoya, 2011) The researchers anticipate that these food technologies have vast potencies for current and potential food industry applications and for future developments.

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