

ANTIOXIDANT EFFECT OF CHINESE HERBAL MEDICINES (BA-TSENG POWDER) USED IN THE FORMULATION ON CHINESE-STYLE SEMI-DRY SAUSAGE

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Background

Chinese-style semi-dry sausage is the most popular pork meat product in Taiwan. According to Chinese Agriculture Standards (CAS), the moisture and fat content of the finished product should be less than 40% and 30%, respectively. Nowadays, it has been sufficiently proven that the characteristics of the myoglobin of lean pork and the fatty acid composition of added pork back fat would be affected by the electrical heat drying (45-55°C, 4-6 hours) procedures. Finally, resulting in the TBA value and oxidation flavor of meat product would be increased by drying and storage periods. All these phenomena result in quality loss and reduced shelf life.

Objectives

Ba-Tseng powder is a mixture of eight kinds of Chinese herbal medicines (listed on Table 1) which is considerable interested in exerting beneficial health effects for Taiwanese and has antioxidant properties for containing a complex mixtures of phenols and other compounds (Halliwell, 1999). The objectives of this study was to evaluate the antioxidant effect of Ba-Tseng powder used in the formulation of Chinese-style semi-dry sausage as to be function a free radical interceptors and healthy enhancers on Chinese-style semi-dry sausage.

Methods

The experimental formulation consisted of (%): A. Ba-Tseng powder, 0+ Na-erythorbate, 0.05, B. Ba-Tseng powder, 0+ Na-erythorbate, 0, C. Ba-Tseng powder, 0.5+ Na-erythorbate, 0, D. Ba-Tseng powder, 1.0+ Na-erythorbate, 0. The finished products were vacuum packaged and refrigerated storage for 42 days. The pH Lab and TBA values, met-myoglobin content, nitrite residue content and water activity were determined at 0, 7, 14, 21, 35 and 42 days of refrigerated storage.

Results and discussion

Results in Table 1 showed that the antioxidant activity (TBA value) of Shao-yao (0.179), Chuan-chiung (0.171), Ti-huang (0.132) and Kan-tsao (0.163) were better than the other four herbal medicines. The pH value and water activity of Chinese-style semi-dry sausage formulated with different 5 group experimental treatments were not significantly difference during refrigerated storage periods (Fig. 3 & 4). The color a value of sampled products formulated with D treatment had the lowest value (Fig. 6) and the met-myoglobin content had the highest value (Fig. 2) which means the antioxidant activity of Chinese herbal medicines (Halliwell, 1999) were different from Na-erythorbate (reducing agent). The nitrite residue content (Fig. 8) of all sampled products were decreased with storage time increased, and the A group experimental treatment had the lowest content of nitrite residue. The TBA value of 5 group experimental treatments were not significantly changed during 28 days of refrigerated storage, but B group experimental treatment was higher increased ($p < 0.05$) than other treatments from 28 days refrigerated storage (Fig. 1).

Pertinent literature

- Halliwell, B. 1999. Food-derived antioxidants. Evaluating their important in food and in vivo. Food Science and Agriculture Chemistry. 1 (2): 67-109. (Taiwan)
- Tseng, T. F., Chou, C. K., Lin, K. J., Wu, C. P., 1996. Studies on the relationship between different parts of pork fats and the quality of Chinese-style sausage. (III) Fatty acid composition during curing and drying process. J. Chinese Agri-education Society. 43: 39-51.

Table 1. The moisture content, L, a, b values, total plate count and antioxidant effect (TBA values) of Ba-Tseng powder*

Items	moisture content (%)	L	a	b	total plate count (CFU/g)	antioxidant effect (TBA values)
Cambelliferae Angelica sinensis Diels	6.6	49.53	15.09	20.68	4.48	0.296
Paeniacaeae Paeonia albiflora Pall. var trichocarpophylla	6.4	83.24	4.01	12.69	3.58	0.179
Umbelliferae Ligusticum sinense Hort.	7.5	54.60	13.39	22.33	3.65	0.171
Scro. phalariferae Relbunium glutinosum Liboschitz var. purpureum Makino	8.9	21.59	7.89	7.38	4.48	0.132
Campanulaceae Codonopsis pilosula tangshen Oliv. Nannfeldt	3.9	50.34	14.80	21.06	4.53	0.475
Compositae Atractylodes ovata A. P. De Candolle	7.4	60.32	13.60	23.16	4.47	0.475
Portiacocae (Selw.)	8.5	88.72	5.58	8.66	4.48	1.279
Leguminosae Glycyrrhiza uralensis Fischer etc.	5	64.76	8.81	20.29	3.96	0.163
Mixture	6.8	53.18	9.21	16.80	3.76	0.156

*Ba-Tseng powder is a mixture of eight kinds of Chinese herbal medicines which include of Cambelliferae Angelica sinensis Diels, Paeniacaeae Paeonia albiflora Pall. var trichocarpophylla, Umbelliferae Ligusticum sinense Hort., Scro. phalariferae Relbunium glutinosum Liboschitz var. purpureum Makino, Campanulaceae Codonopsis pilosula tangshen Oliv. Nannfeldt, Compositae Atractylodes ovata A. P. De Candolle, Portiacocae Glycyrrhiza uralensis Fischer etc.

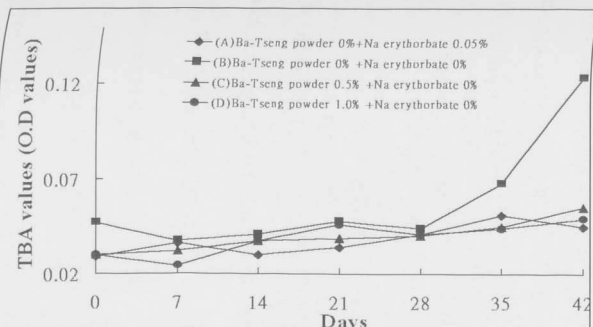


Fig 1. Effect of different additions of Ba-Tseng powder on TBA values of Chinese-style semi-dry sausage during storage periods.

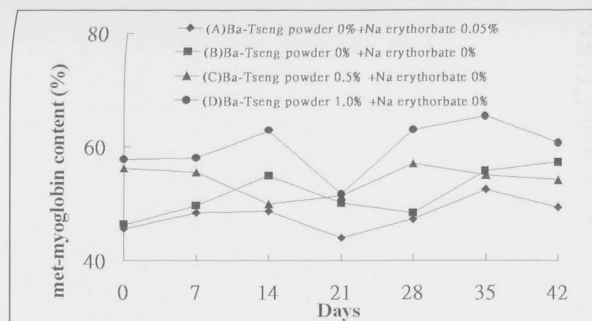


Fig 2. Effect of different additions of Ba-Tseng powder on met-myoglobin content of Chinese-style semi-dry sausage during storage periods.

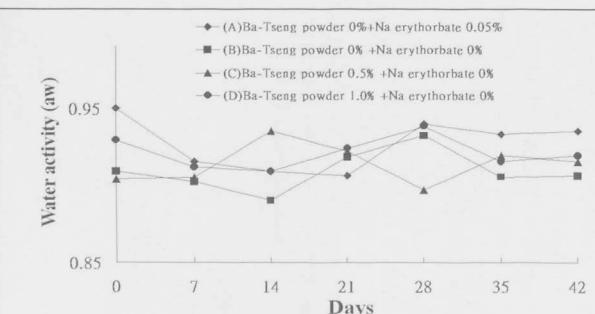


Fig 3. Effect of different additions of Ba-Tseng powder on water activity (aw) values of Chinese-style semi-dry sausage during storage periods.

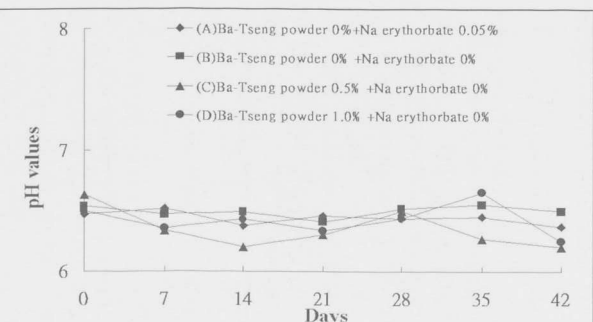


Fig 4. Effect of different additions of Ba-Tseng powder on pH values of Chinese-style semi-dry sausage during storage periods.

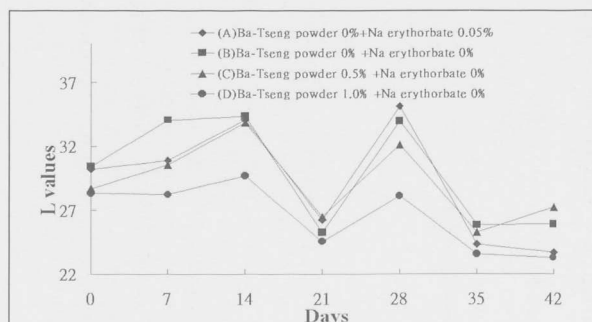


Fig 5. Effect of different additions of Ba-Tseng powder on L values of Chinese-style semi-dry sausage during storage periods.

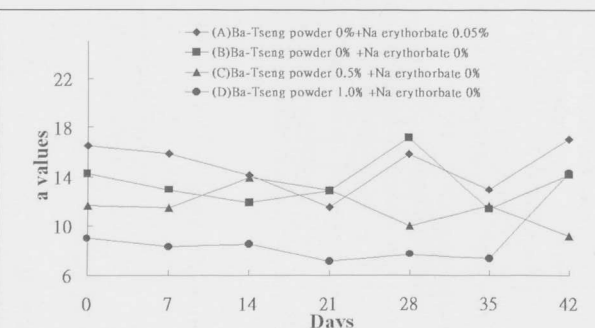


Fig 6. Effect of different additions of Ba-Tseng powder on a values of Chinese-style semi-dry sausage during storage periods.

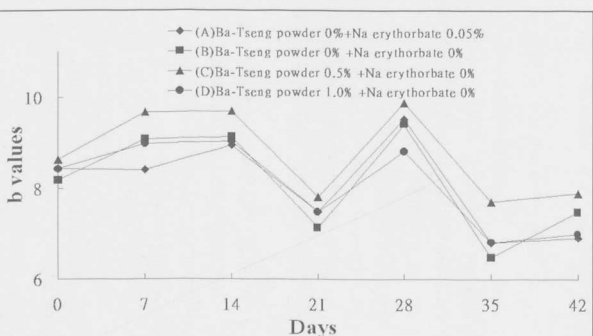


Fig 7. Effect of different additions of Ba-Tseng powder on b values of Chinese-style semi-dry sausage during storage periods.

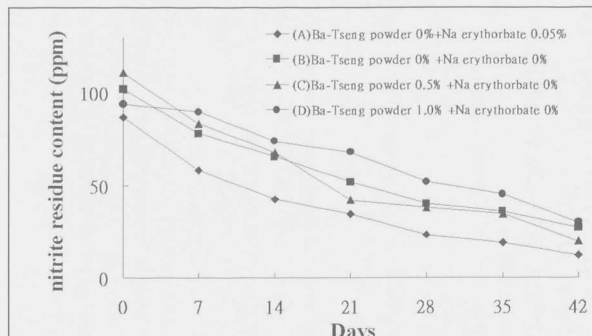


Fig 8. Effect of different additions of Ba-Tseng powder on nitrite residue content (ppm) values of Chinese-style semi-dry sausage during storage periods.