

[Antioxidative action of TAHEEBO tea extract]

タヒボ茶水抽出物の抗酸化作用

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【目的】

茶にはアルカロイドをはじめ、渋み成分であるカテキン類やアスコルビン酸などの様々な物質が含まれており、抗菌作用、抗酸化作用、抗アレルギー作用などのあることが報告されている。近年茶の飲用者が増加しており健康ブームと重なってその普及が広がってきている。また、活性酸素やフリーラジカルが癌を引き起こす要因になっている可能性が指摘されており抗酸化作用を有する物質を摂取することで各種疾患の予防につながることを期待され、ますます茶が注目されるようになった。特に緑茶は人々によく知られているが、南米に生育するタヒボ茶についてはほとんど知られていない。今回、このタヒボ茶に注目しその抗酸化作用について検討することとした。

【方法】

タヒボ茶水抽出物の抗酸化作用を評価する方法としてロダン鉄法及びDPPH法を用いた。

ロダン鉄法: 0.02M リノール酸原液1ml、10%および1%濃度の添加物0.2ml、緩衝液0.8mlの混合液をincubate (38°Cで24, 72, 120hr)した。試料液0.1mlに75% EtOH 4.7ml、30%ロダンアンモニウム0.1ml、0.02M塩化第一鉄の3.5%塩酸溶液0.1mlを加え、正確に3min後に500nmにおける吸光度を測定した。

DPPH法: 400 μ M DPPH 0.3ml、200mM MES buffer 0.3ml、20% EtOH 0.3mlの混合液に80% EtOHと分析試料を加え、20min後に520nmにおける吸光度を測定した。

【結果・考察】

リノール酸の自動酸化に対するタヒボ茶水抽出物の抗酸化活性において、Controlでは日数経過とともにリノール酸が酸化されて過酸化物質が上昇し、その後過酸化物質の分解が起こり過酸化物質が減少した。しかし、タヒボ茶水抽出物を添加した溶液では濃度1%、10%共に過酸化物質の上昇はほとんど見られず、陽性標準物質であるTroloxよりも強い抗酸化活性を示した。一方、DPPH法におけるラジカル消去活性については、タヒボ茶水抽出物はTroloxと同程度のラジカル消去活性が検出され、タヒボ茶水抽出物中にラジカル消去活性を有する物質が含まれていることが明らかになった。また、緑茶、玄米茶、烏龍茶、ほうじ茶の各種水抽出物についてもタヒボ茶水抽出物と同条件でリノール酸の自動酸化に対する抗酸化活性を測定した結果、タヒボ茶水抽出物が最も強い抗酸化活性を示し、タヒボ茶水抽出物中に、含まれる抗酸化活性物質は比較的強い抗酸化能を有する事が示唆された。

■ English translation

[Objectives]

Teas are reported to have antibacterial, antioxidative, and antiallergic actions, since they contain alkaloids and various other substances, such as catechins, which are the components responsible for the astringent taste, and ascorbic acid. In recent years, the number of tea drinkers has been on the increase. In addition, related to the growth in health-consciousness, the popularity of teas has been rising. At the same time, reactive oxygen species and free radicals are suspected of being cancer-causing factors. Therefore, it is expected that the intake of substances possessing antioxidative action may lead to the prevention of various diseases. Thus, teas have been gaining more atten-

tion. Particularly, although the effects of green teas are widely known, little is known about TAHEEBO tea from plants growing in South America. In the present study, we focused on this TAHEEBO tea and investigated its antioxidative action.

[Methods]

The ferric thiocyanate assay and the DPPH assay were employed to assess the antioxidative action of the water extract of TAHEEBO tea.

Ferric thiocyanate assay: A mixture of 1 mL of 0.02 M linoleic acid stock solution, 0.2 mL of 10% or 1% solution of the test sample, and 0.8 mL of the buffer was incubated at 38°C for 24, 72 and 120 hours. To 0.1 mL of each sample solution incubated, the following substances were added: 4.7 mL of 75% EtOH, 0.1 mL of 30% ammonium thiocyanate, and 0.1 mL of 0.02 M ferrous chloride in 3.5% hydrochloride solution. Exactly 3 minutes later, the absorbance of the solutions was determined at 500 nm.

DPPH assay: To a mixture of 0.3 mL of 400 mM DPPH, 0.3 mL of 200 mM MES buffer, and 0.3 mL of 20% EtOH, 80% EtOH and the test sample were added. Twenty minutes later, the absorbance was determined at 520 nm.

[Results and Discussion]

In the investigation on the antioxidative activity of the water extract of TAHEEBO tea against the autoxidation of linoleic acid, the peroxide value of the control increased due to the oxidation of linoleic acid as the number of days elapsed, and thereafter decreased due to the degradation of the peroxide. However, the solutions containing the water extract of TAHEEBO tea at the concentration of 1% and 10% showed little increase in peroxide value, and exhibited higher antioxidative activity than Trolox, a positive standard. On the other hand, regarding the radical scavenging activity measured by the DPPH assay, the water extract of TAHEEBO tea exhibited radical scavenging activity equivalent to that of Trolox. This result demonstrates that the water extract of TAHEEBO tea contains substances possessing radical scavenging activity. In addition, regarding the water extracts of green tea, brown rice tea, oolong tea, and roasted green tea, their antioxidative activities against autoxidation of linoleic acid were determined under the same condition adopted for the water extract of TAHEEBO tea. The water extract of TAHEEBO tea exhibited the most potent antioxidative activity. These results suggest that the active antioxidative substances contained in the water extract of TAHEEBO tea have relatively potent antioxidative activity.

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The similar report was also presented in the 122nd Annual Meeting of the Pharmaceutical Society of Japan in Chiba (March 26-28, 2002) and published in the Journal of the Chemical Society of Japan, "Nippon Kagaku Kaishi" (accepted on October 15, 2001).