PA-08

「Partial purification of TAHEEBO tea-derived components possessing moisture absorption and retention abilities, and their characteristics」

タヒボ茶由来吸湿・保湿成分の部分精製とその性質

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【緒言】

タヒボ(Tabebuia avellanedae Lorents and Griseb)は南米のブラジル近辺に生育するノウゼンカズラ科タベブイア属の植物であり、タヒボ茶として南米インディオの間で昔から健康維持のため飲用されてきた。我々はこのタヒボ茶からとれる水抽出物に保湿能のあることを発見し「科学と工業化学」に報告した1)。本実験では、タヒボ茶から得られるタヒボ茶水抽出物をエタノール沈殿法で部分精製を行い得られた成分の吸湿能・保湿能について検討したので報告する。

【実験方法】

タヒボ樹皮50gに蒸留水1000mlを加え煮沸水溶中で1時間撹拌抽出しブフナーを用いて吸引濾過した後、その濾液を凍結乾燥し得られた茶褐色の乾燥粉末をタヒボ茶水抽出物とした。得られたタヒボ茶水抽出物4gに蒸留水100mlを加え30分撹拌した後、遠心機で沈殿を除去し、その上澄み液にエタノールを加え可溶性成分を沈殿させた。遠心機により上澄み液と沈殿に分け上澄み液は凍結乾燥を行った。これらの過程で得られた前者を成分1、後者を成分2として、吸湿性試験及び保湿性試験を行った。ただし対象として、尿素、D-ソルビトール、グリセリンを用いた。

吸湿性試験は、底部に塩化マグネシウム飽和溶液(相対湿度:31.9%)、硝酸ナトリウム飽和溶液(相対湿度:61.8%)、硝酸カリウム飽和溶液(相対湿度91.0%)をそれぞれ入れたデシケーター内に試料を置き、37℃の恒温器内に保管し、各試料の重量を2、4、6、8、24時間後に測定して吸湿率を求めた。保湿性試験は、底部にシリカゲルと硝酸ナトリウム飽和溶液(相対湿度:64.8%)をそれぞれ含ませたデシケーター内に試料を置き20℃の恒温機内に保管し、各試料の重量を2、4、6、8、24時間後に測定して水分残存率を求め指標とした。

【結果・考察】

吸湿性試験及び保湿性試験において、各相対湿度における5種類の試料の吸湿率と水分残存率の経時を求めた。成分1の吸湿能は、相対湿度61.8%と91.0%でも高い値を示し、相対湿度64.8%の保湿性試験においても吸湿性を示すことから、極めて強い吸湿能を持つことが明らかになった。成分2の吸湿能は、相対湿度の変化にあまり影響を受けていないことから相対湿度に依存しておらずあまり強い吸湿能を持たないと言える。尿素とD-ソルビトールの吸湿能は相対湿度に大きく依存しており、グリセリンの吸湿能は時間とともに大きく増加していることから強い吸湿性を持つことがわかった。相対湿度64.8%において成分1は水分残存率が時間とともに増加しており強い吸湿能を持つことが示された。成分2の保湿能は相対湿度64.8%では高い値を示したが乾燥条件下では時間とともに急激に減少していることから比較的低いことがわかった。

■English translation

[Introduction]

TAHEEBO (Tabebuia avellanedae Lorents and Griseb) is a Tabebuia plant of Bignoniaceae, and grows in neighboring areas of Brazil, South America. TAHEEBO has been taken as a tea for the maintenance of health since ancient times by South American natives. We discovered that the water extract of TAHEEBO tea has a moisture retention ability, and published the study in "Nippon Kagaku Kaishi" (Journal of the Chemical Society of Japan)1). In the present experiment, we partially purified the water extract of TAHEEBO tea by the ethanol precipitation method, and investigated the moisture absorption and retention abilities of the components obtained.

[Experiment Methods]

TAHEEBO bark (50 g) was extracted by stirring in 1000 mL of distilled water for 1 hour in a boiling water bath. The solution obtained was filtered under vacuum through a Buchner funnel. The filtrate was lyophilized, and the brown lyophilized powder obtained was used as the water extract of TAHEEBO tea. To 4 g of the obtained water extract of TAHEEBO tea, 100 mL of distilled water was added. After stirring for 30 minutes, the precipitate was removed by centrifugation. To the supernatant, ethanol was added, to allow soluble components to precipitate, and centrifugation was performed. The supernatant was separated from the precipitate, and lyophilized. The supernatant and precipitate obtained in this process were designated as Component 1 and Component 2, respectively. Using these components, a moisture absorption test and a moisture retention test were performed. Urea, D-sorbitol, and glycerin were used as control substances.

In the moisture absorption test, the test samples were placed in each of three desiccators that contain a saturated magnesium hydrochloride solution (relative humidity: 31.9%), a saturated sodium nitrate solution (relative humidity: 61.8%), or a saturated potassium nitrate solution (relative humidity: 91.0%) in the bottom. These desiccators were placed in a thermostat set at 37℃. The weight of each sample was measured at 2, 4, 6, 8, and 24 hours later to calculate the percentage of moisture absorption. In the moisture retention test, the test samples were placed in each of two desiccators that contain silica gel or a saturated sodium nitrate solution (relative humidity: 64.8%) in the bottom. These desiccators were placed in a thermostat set at 20℃. The weight of each sample was measured at 2, 4, 6, 8, and 24 hours later to calculate the residual water content, which was used as the index of moisture retention ability.

[Results and Discussion]

In the moisture absorption and moisture retention tests, the time-course profiles of the percentages of moisture absorption and the residual water content were obtained. The moisture absorption ability of Component 1 was high even at the relative humidity of 61.8% or 91.0%, and was also demonstrated in the moisture retention test at the relative humidity of 64.8%. These results demonstrate that Component 1 has quite high moisture absorption ability. The moisture absorption ability of Component 2 was little affected by the change in relative humidity, showing no dependency on relative humidity. Therefore, it is considered that the moisture absorption ability of Component 2 is not so high. The moisture absorption abilities of urea and D-sorbitol were greatly dependent on relative humidity. The moisture absorption ability of glycerin increased greatly over time, indicating that it has strong moisture absorption ability. At the relative humidity of 64.8%, the percentage of moisture retention of Compound 1 increased over time, suggesting that Compound 1 has potent moisture absorption ability. The moisture retention ability of Component 2 was high at the relative humidity of 64.8%, but rapidly decreased over time under dry conditions. This indicates that the moisture retention ability of Component 2 is low.

※日本化学会誌「化学と工業化学」(1999年2月18日受理)でも同様の報告が行われています。
This similar report was published in the Journal of the Chemical Society of Japan, "Nippon Kagaku Kaishi" (accepted on February 8, 1999).