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B017 Analytical characterisation of different green teas from world market and investigations on extratability of phenols and alkaloids

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Green tea preparations are featuring a strongly increasing market potential for their antioxidative, chemopreventive, antibacterial and stimulatory effects. As pharmacological active components the flavan-3-ols, the oligomeric procyanidins and the xanthins are known. To establish an overview on the quality of green teas sold on the market an HPLC-method (C-18 column, detection 274 nm, water-MeOH gradient) was established and validated for the simultaneous quantification of the 3 xanthin alkaloids beside catechin, catechingallate, epicatechin, epicatechingallate, epigallocatechin, epigallocatechingallate, gallocatechin, gallocatechingallate and gallic acid. 49 commercialy available green teas were analyzed and those compounds quantified. The tannin content, determined as the sum of catechins, epicatechins, catechingallates, and epicatechingallates varied between 8 and 19 %, while the alkaloid content with coffein being the dominant alkaloid was in a range between 1,7 to 4,7%. Decaffeinated green teas showed strongly reduced alkaloid content, but also a significant reduction of tannins (range 6,7 to 9,2%), indicating that the extraction process is not specific for the alkaloid fraction. Statistical group analysis indicated significant reduction of xanthin and catechin content in older teas. No significant differences were observed between green teas produced in tropical and temperate climatic zones. In these experiments slightly reduced – but not significant different – contents of xanthins and tannins were detected. No significant differences were evaluated between green teas produced as "bio-ecological"-teas with special agricultural limits. No significant differences were observed between green teas commercialized in pharmaceutical specialized trade and food trade. The main differences between green teas are shown to be the way of preparation of the aqueous extract: the longer the extraction time and the higher the stirring of the extracts the higher the respective xanthin and tannin content. Only when 30 min extraction time was chosen a decrease of phenolics was observed. The higher the water hardness, the lower was the tannin content in the extracts.

B018 Polymeric proanthocyanidins from the bark of *Hamamelis virginiana* L.

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Several pharmacological activities have been reported for polymeric proanthocyanidins from the bark of *Hamamelis virginiana* L. Up to now, no study on the exact composition of the polymeric compounds was done. We here present a detailed phytochemical characterization of polymeric proanthocyanidins from the bark of *Hamamelis virginiana* L. The polymers have been isolated from an acetone-water extract. After extraction with petroleum ether and ethyl acetate, water soluble compounds were separated on Sephadex LH-20. The fraction eluted with ethanol contained dimeric to oligomeric proanthocyanidins and high amounts of carbohydrates. The fractions eluted with methanol and acetone-water contained polymeric proanthocyanidins, which were further separated on Sephadex LH-20. The polymers were characterized as follows:
Determination of chain extension units and chain terminating units by complete acid-catalyzed degradation with benzyl mercaptane. Gallic acid, catechin, gallocatechin, epicatechin-4-benzylthioether, 3-*O*-galloyl-epicatechin-4-benzylthioether, epigallocatechin-4-benzylthioether and 3-*O*-galloyl-epigallocatechin-4-benzylthioether were isolated and identified by ^{1}H-NMR-spectroscopy.
Determination of the molecular weight was done by 2 methods: GPC of the peracetates and HPLC-analysis after complete thiolytic degradation; determination of interflavonoid-linkages by partial thiolytic degradation. Proanthocyanidin B1 and B3 were identified. In conclusion, the proanthocyanidin polymers can be described as follows: they are mixed procyanidin-prodelphinidin-polymers. A di- and trihydroxylation of the B-ring occurs at a ratio of about 1: 1. The polymers are completely galloylated at position 3, except the chain terminating unit which is catechin (95%) or gallocatechin (5%). The stereochemistry within the chain is 2,3-*cis*. Interflavonoid-linkages seem to be predominantly 4$\beta\rightarrow$8-bonds, there are hints that 4$\rightarrow$6-bonds also occur. Degrees of polymerisation vary from 17 to 29 monomeric units which corresponds to molecular weights of 12900 to 22100.