SPECTROPHOTOMETRIC METHOD FOR THE QUANTITATIVE DETERMINATION OF CAFFEINE IN THE HULLS OF RIPE TEA SEEDS

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The hulls of ripe tea seeds are a source for the production of theasaponin and, according to the results of our investigations, contain the alkaloid caffeine [1]. With the aim of estimating its amount in the raw material, we have developed a method for its quantitative determination.

Determination Procedure. In a round-bottomed flask, 10 g of comminuted hulls was extracted five time with hot water (S/L = 1:10) in the boiling water bath for 60 min, after which the extract was filtered through a suction filter. In a 100-ml separatory funnel, 5 ml of aqueous extract was treated with 5 ml of a solution of sodium phosphate buffer having pH 8.6, and the caffeine was extracted with chloroform (3 × 25 ml). The chloroform extracts were filtered into a 100-ml measuring flask through a layer (3 g) of anhydrous sodium sulfate previously moistened with chloroform. The sulfate on the filter was washed with small portions of chloroform which were added to the main extract, and the volume was made up to the mark with chloroform. The optical density was determined on a SF-26 instrument at λ 273 nm in a cell with a layer thickness of 1 cm. The amount of caffeine (X, %) was calculated from the formula:

$$X = \frac{(D - D_0) \cdot 100 \cdot 100 \cdot V_1}{E^{1\%}_{1\,cm} \cdot a\,(100 - b) \cdot V_2},$$

where D and D_0 are the optical densities of the analytical and control solutions in chloroform, respectively;

$E^{1\%}_{1\,cm}$ is the specific absorption index of caffeine at a wavelength of 273 nm, which is 500;

V_1 and V_2 are the total volume of the aqueous solution (solution A) and the volume of solution A take for analysis, ml;

a is the weight of the raw material, g;

b is the loss in weight on the drying of the raw material, %.

Below we give the results of the statistical treatment of determinations of caffeine in ripe tea-seed hulls; the level of caffeine recalculated to the absolutely dry raw material amounted to 0.460%:

f	$\overline{X}$	S^2	S	P	tp, f	ΔX	E, %	E_m, % $m=3$
9	0,4603	0,0000892	±0,00944	95	2,26	±0 0213	±4,63	±2,67

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LITERATURE CITED

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