$$B = [\exp(-0.0035 \cdot D_N)] - 1;\ D_N = D - 850.$$

CI – cetane index, points; $T_{10\%}$, $T_{50\%}$, $T_{90\%}$ – boiling point of 10%, 50%, 90% fraction, °C; D – fraction density at 15 °C, kg/m^3.

For this study, 5 diesel fuel samples were purchased at various filling stations in Tomsk. Samples were assigned with numerical codes. Fractional composition of purchased samples was determined experimentally using laboratory device of fractional distillation (Table 1).

Table 1. Fractional composition of diesel fuel samples

Numerical codes	$T_{10\%}$	$T_{50\%}$	$T_{90\%}$
	°C		
1	219	269.5	330
2	216	279	331
3	217	275.5	322
4	193	264	340
5	216	269	330

Table 2. Comparison between required and experimental characteristics

Numerical codes	Cetane Index USS R 52368-2005	Cetane Index experimental value	Density USS R 52368-2005 at 15 °C	Density Experimental value at 15 °C
			kg/m^3	kg/m^3
1	>46.0	50.04	820–845	843.8
2		48.26		851.0
3		47.16		852.0
4		47.27		843.9
5		49.57		844.1

Purchased samples were then checked for the compliance with USS R 52368-2005 "Fuel diesel Euro. Specifications" by such parameters as density and cetane index. The results are presented in Table 2.

It was found that all purchased samples meet the requirements in terms of cetane index . However, it can be seen from Table 2 that samples No. 2, 3 do not meet the requirements for density.

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SYNTHESIS OF VANILLOLOSIDE, CALLERYANIN, AND THEIR DERIVATIVES

D.L. Avetyan

Scientific Supervisor – PhD, Assistant Prof., E.V. Stepanova

Linguist – PhD, Assistant Prof., E.V. Stepanova

Tomsk Polytechnic University

634050, Russia, Tomsk, Lenin Avenue, 30, 634050, ave.dave@mail.ru

Natural aryl glycosides are biologically active substances which can be isolated from variety of plants and are attractive for utilizing in medicine. For instance, vanilloloside 1 was isolated from *Nelumbo nucifera* stamens [1], and others, and has specific activity against cancer cells, such as HeLa (cervix cancer) and MCF-7 (breast cancer) [2], and is efficient at inhibiting fermentative activity of acetylcholinesterase and, thereby, could potentially be utilized to cure Alzheimer [1]. Calleryanin 2 was isolated from *Pyrus Calleryana* leaves and shows scavenging and antioxidant activity [3]. Its derivative 7-O-*trans*-caffeoylcalleryanin 5 was isolated from *P. Calleryana* [5] and may have the similar activity.

On the first step of the synthesis we performed glycosylation of vanillin 1a and protocatechuic aldehyde 2a with acetobromoglucose (ABG) in two different systems. Obtained aldehydes 1b and 2b were reduced with $NaBH_4$ in conditions of phase

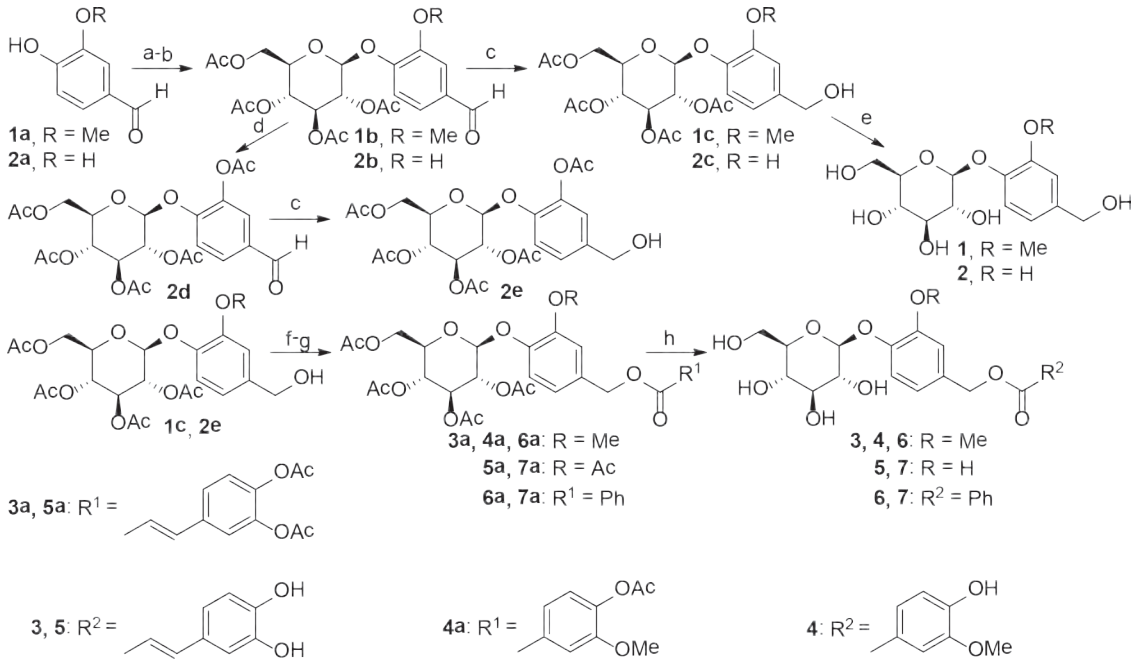

Fig. 1. *Synthesis of desired aryl glycosides: a – Ag_2O, ABG, quinolone, 2h; b – ABG, KOH, MeOH, CH_3Cl, 78°C, 3h; c – $NaBH_4$, CTMAB, $CHCl_3$, H_2O, RT, 3–6h; d – 2 eq. Ac_2O, Py, RT, 24h; e – MeOH, MeONa, RT, 10 min.; f – R^1OCl, 2 eq. Py, $CHCl_3$, RT, 24h; g – vanillic acid acetate, DMAP, DCC, CH_2Cl_2, RT, 24h; h – HCl/EtOH/$CHCl_3$ (1 : 3 : 1)*

transfer catalysis with CTMAB [4] (cetyltrimethylammonium bromide) to give tetraacetates of vanilloloside 1c and calleryanin 2c, respectively. Then the latter glycosides were deacetylated in the presence of MeONa [5] to give desired vanilloloside 1 and calleryanin 2.

Glycoside 2b was acetylated to protect hydroxyl of the aglycon in the further synthesis. Obtained pentaacetate of aldehyde 2d was also reduced with $NaBH_4$ to give glycoside 2e (pentaacetate of calleryanin).

Then we preformed esterification of glycosides 1c and 2e with acyl chlorides of diacetate of caffeic and benzoic acids in chloroform in the presence of the 2 equivalents of pyridine. Furthermore, we performed esterification of vanilloloside tetraacetate 1c with acetate of vanillic acid in methylene chloride with DMAP (dimethylaminopyridine) and DCC. Obtained glycosides 3–7a were subjected to deacetylation in the system HCl/EtOH/$CHCl_3$ (1 : 3 : 1) [6] to give desired aryl glycosides 3–7.

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