

Electronic supplementary material

UDC 630*86+547.9+542.943-92+544.034

**INFLUENCE OF PARTICLE SIZE OF POWDERED PINE WOOD
(*PINUS SYLVESTRIS*) ON ITS OXIDATION INTO VANILLIN***

© *V.E. Tarabanko***, *K.L. Kaygorodov*, *M.A. Smirnova*, *Yu.V. Chelbina*, *S.A. Vorobyev*, *E.V. Mazurova*,
A.V. Korsakov

*Institute of Chemistry and Chemical Technology SB RAS, Federal Research Center
"Krasnoyarsk Scientific Center SB RAS", Akademgorodok, 50/24, Krasnoyarsk,
660036, Russia, veta@icct.ru*

* The full text of the article has been published: Tarabanko V.E., Kaygorodov K.L., Smirnova M.A., Chelbina Yu.V., Vorobyev S.A., Mazurova E.V., Korsakov A.V. *Khimiya Rastitel'nogo Syr'ya*, 2026, no. 3, pp. 363–369.
<https://doi.org/10.14258/jcprm.20260319369>.

** Corresponding author.

The reactor for the high-intensity stirring (Nano-Mag Technologies, India) was equipped with a six-blade axial flow impeller (diameter 70 mm) actuated by a 200 W engine via a magnetic coupling (Fig.1). Duration of heating (under argon) and stabilization of the temperature was 25–40 min, then oxygen was introduced. Oxygen was fed into the reactor from a calibrated buffer volume (Fig.1) through a valve V5, maintaining constant pressure in the reactor during all the process of oxidation. Amount of the consumed oxygen was calculated from pressure change inside the buffer volume. Samples of the reaction mixture with a volume of 13–15 ml were taken from the reactor through the special valves V9, V10 during the oxidation process.

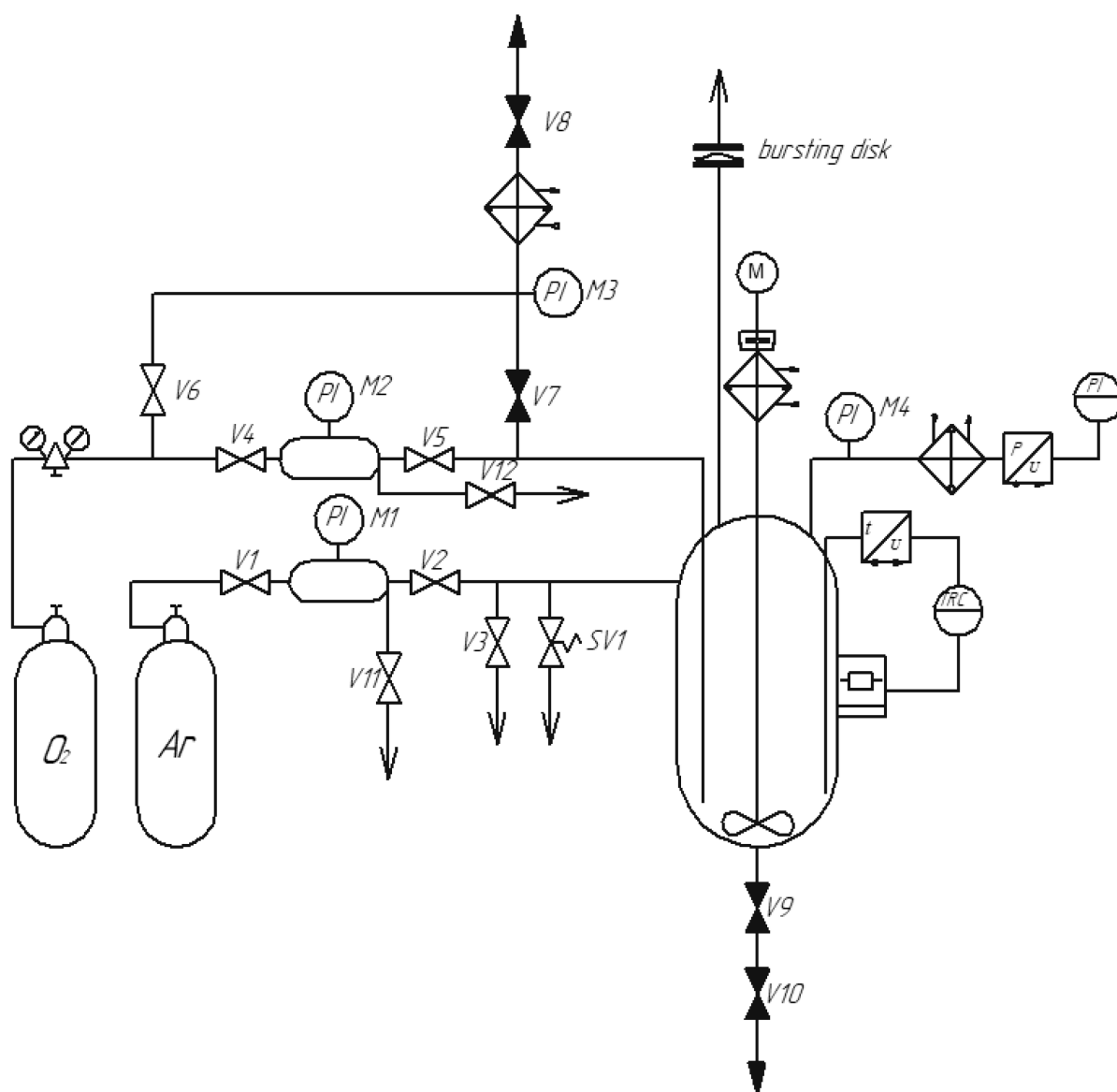


Fig. 1. Scheme of installation for the catalytic oxidation of wood

V1 – Supply valve. Argon to the buffer tank, V2 – Supply valve. Argon to the autoclave from the buffer tank, V3 – Autoclave venting, V4 – Supply valve. Oxygen to the buffer tank, V5 – Supply valve. Oxygen to the autoclave from the buffer tank, V6 – Supplying oxygen to the sampling line, V7 – Sampling of autoclave liquid phase into the sampling line, V8 – Liquid phase removing from the sampling line, V9 – Liquid phase sampling from the autoclave, V10 – Liquid phase sampling from the autoclave, V11 – Venting of the argon buffer tank, V12 – Venting of the oxygen buffer tank, SV1 – Safety valve, M1 – Argon pressure in the buffer volume, M2 – Oxygen pressure in the buffer volume, M3 – Sample line pressure, M4 – Autoclave pressure

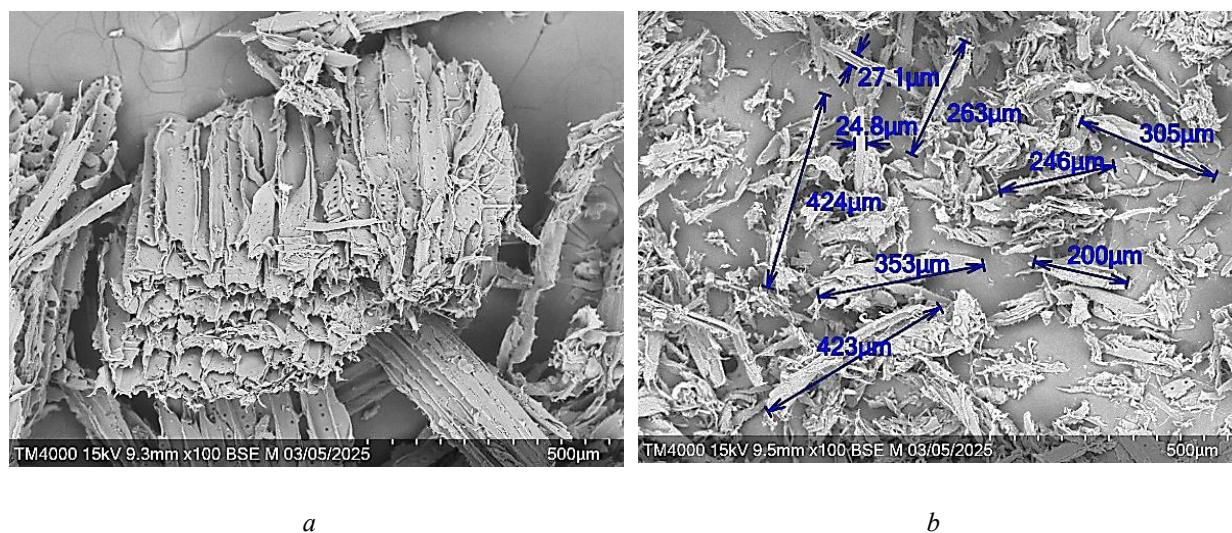


Fig. 2. SEM images of wet-milled pine wood after 5 min (a) and 15 min (b) of milling

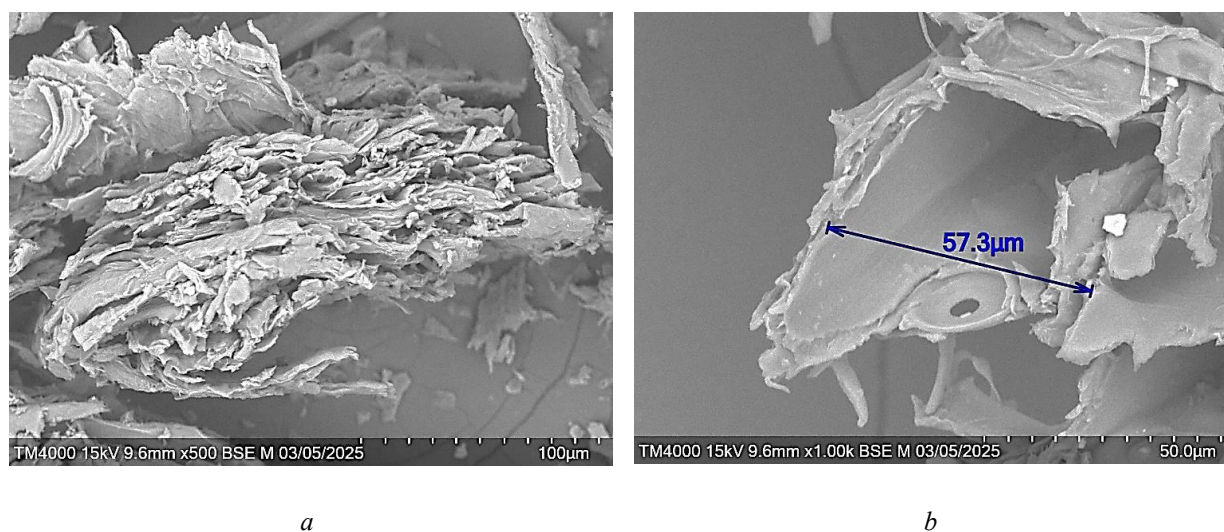


Fig. 3. SEM images of lignocellulosic residues from the oxidation of pine wood powder, wet-milled for 5 min (a); and of dry-sieved pine wood powder (<0.5 mm) (b)