

ОДЕСЬКА НАЦІОНАЛЬНА АКАДЕМІЯ
ХАРЧОВИХ ТЕХНОЛОГІЙ

ЗБІРНИК
НАУКОВИХ ПРАЦЬ
МОЛОДИХ УЧЕНИХ,
АСПІРАНТІВ ТА СТУДЕНТІВ



ОДЕСА
2016

ББК 36.81 + 36.82
УДК 663 / 664

Головний редактор, д-р техн. наук, проф.
Заступник головного редактора, д-р техн. наук, проф.
Заступник головного редактора, канд. техн. наук, доцент.
Відповідальний редактор, д-р техн. наук, проф.

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доктори наук:

Одеська національна академія харчових технологій
Збірник наукових праць молодих учених, аспірантів та студентів
Міністерство освіти і науки України. – Одеса: 2016. – 408 с.

Збірник опубліковано за рішенням вченої ради від 01.07.2016 р., протокол № 12
За достовірність інформації відповідає автор публікації

ISBN 966-571-063-х

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РОЗДІЛ 1

**АКТУАЛЬНІ ПИТАННЯ ЗБЕРІГАННЯ
ТА ТЕХНОЛОГІЇ ПЕРЕРОБКИ ЗЕРНА,
ОВОЧІВ ТА ФРУКТІВ**

2. Хельмут Роглер, Пивоваренный ячмень. Ситуация на мировом рынке и технология возделывания в Германии [Текст] / Хельмут Роглер // Материал для доклада ТрисдорфКонсалт. – 14.06.06. – С. 7.

COMPOSITION OF PRODUCTS INTERACTION SUGAR-JUICE DEFECATION SLUDGE WITH SUBSTANCES OF ACID NATURE

Perepelytsya O.P., Petrenko T.V., Yakymenko L.O.
National University of Food Technologies, Kyiv

An introduction. Of sugar-juice defecation sludge is chemical setting of sugar-refinery, it is using as fertilize for acid grounds [1], application of which is not knowing into other branches. News are published about investigations of this precipitation as adsorption for purification of sludge waters from dye [2] and component of mixtures with NPK-fertilizes [3]. Studing of sugar-juice defecation sludge is not realized in other fields. There for purpose of this research is to study reactions of calcium carbonate precipitation of sugar-juice defecation sludge, chemical composition of which is determined [4, 5].

The experimental part and discussion of results. Acid oxides MoO_3 , WO_3 , phosphate acid H_3PO_4 is had quality “A. R. purity”, sugar-juice defecation sludge was too from Kapitanivsky sugar plant of the Kirovograd region for experiment. Methods of chemical analysis (trylonometria [6] – for determination quantity of Ca^{2+} and precipitation NH_4MgPO_4 – for determination of quantity PO_4^{3-} ions [7]), pH-measuring (pH-metr type Y-160 MY), termogravimeasure (derivatograph Q-1500-D system P. Paulik – L. Paulik – L. Erdey, corundum tube, rapid of heat rate is 0,1667 grad/s, DTA – 250, DTG – 500, TG – $0,2 \cdot 10^{-3}$ кг) and X-ray (DRON 3M with $\text{Cu K}\alpha$ -ray) are used.

Mixtures of calcium carbonate of sugar-juice defecation sludge and MoO_3 or WO_3 were too at proportion $[\text{CaCO}_3] : [\text{EO}_3] = 1,0 : 1,0$, E – Mo, W.

Results of termogravimetric analysis of investigated mixtures are representative into table.

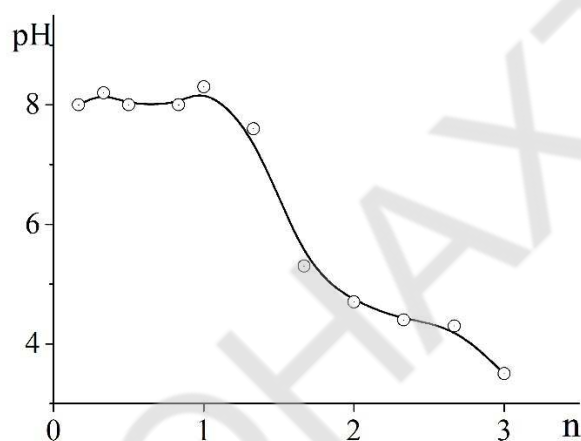
Results of termogravimetric analysis of mixtures of calcium carbonate of sugar-juice defecation and MoO_3 or WO_3

Composition of mixtures, mol	Temperature of anhydration, °C	Temperature of termolysis and reduction of EO_3 , °C	Temperature of interaction, °C	Finished substance
$[\text{CaCO}_3] : [\text{MoO}_3] = 1,0 : 1,0$	110–190	250–530	580–827	CaMoO_4
$[\text{CaCO}_3] : [\text{WO}_3] = 1,0 : 1,0$	120–190	240–528	645–863	CaWO_4

Nature of finished products of those reactions are studied by method X-ray and enstaled of its belong to tetrahedral symmetry with parameters for CaMoO_4 $a = (0,5237 \pm 0,0002)$ nm; $c = (1,147 \pm 0,0005)$ nm; for CaWO_4 $a = (0,5225 \pm 0,0002)$ nm; $c = (1,144 \pm 0,0005)$ nm. Differ of those quantities of parameters of unit cells from literature facts [8] is coused admixtures of MnO , Fe_2O_3 , SiO_2 , TiO_2 and ZrO_2 into prepared products, thus its are modified oxidic materials for metallurgy [9].

The results of application those methods are giving reason to confirm about such process or reactions: $EO_3 + C_xH_yO_z$ (organic fase) $\rightarrow E O_{3-x} + CO_2\uparrow + y/2 H_2O\uparrow$; $2 EO_3 + x O_2 \rightarrow 2 EO_3$; $CaCO_3 + EO_3 \rightarrow CaEO_4 + CO_2\uparrow$, E—Mo, W.

Chemical interaction H_3PO_4 and sugar-juice defecation sludge was studied too. For this purpose variable quantities of volumes $2,11 \cdot 10^3 \text{ mol/m}^3 H_3PO_4$ are added to constant mass of carbonate precipitation ($1 \cdot 10^{-3} \text{ кг}$) and water to $5 \cdot 10^{-5} \text{ м}^3$. Crushed proportions $[PO_4^{3-}] : [Ca^{2+}]$ into heterogeneous system were changed from 1,00 : 0,17 до 1,0 : 3,0. Mixtures after one month standing and mixing were filtrated and pH, concentrations Ca^{2+} and PO_4^{3-} are determinate in filter liquor. On figure is showing dependence pH from crushed proportions $[PO_4^{3-}] : [Ca^{2+}]$. Reaction of sugar-juice defecation sludge and H_3PO_4 is accompanied with change of quantities pH from 8,1 to 4,4 and is corresponded to crushed proportions $[PO_4^{3-}] : [Ca^{2+}]$ from 1,0 : 1,0 to 1,00 : 2,33.



**Dependence pH in liquor of system:
carbonate sludge – H_3PO_4 – H_2O from crushed proportions $[PO_4^{3-}] : [Ca^{2+}]$, (n)**

X-ray of precipitations is determinate the forming mixtures $Ca_3(PO_4)_2$, $CaHPO_4$ and $Ca(H_2PO_4)_2$ at every crushed proportions $[PO_4^{3-}] : [Ca^{2+}] = 1,5 : 1,0$; $1,0 : 1,0$ i $1,0 : 2,0$. It is possibly be cause next reactions or process are taking place: $3 CaCO_3 + 2 H_3PO_4 = Ca_3(PO_4)_2 + 3 CO_2\uparrow + 3 H_2O\uparrow$; $CaCO_3 + H_3PO_4 = CaHPO_4 + 3 CO_2\uparrow + 3 H_2O\uparrow$; $CaCO_3 + 2 H_3PO_4 = Ca(H_2PO_4)_2 + CO_2\uparrow + H_2O\uparrow$; $Ca(\text{polygalactur.})_x + 2 H_3PO_4 \rightarrow 2x H(\text{polygalactur.}) + Ca(H_2PO_4)_2$. Polygalactur. — remain of polygalaturon acid.

Phosphate fertilizers were prepared on base of those investigations and tested on growth of wheaten or rye seeds, positive biological effect was obtained [10].

Conclutions. Reactions of sugar juice defecation sludge with MoO_3 , WO_3 and H_3PO_4 are investigated, products of those reactions are determination its should be useful for technology processing of industrial calcium carbonate precipitation on oxidic materials for metallurgy or phosphate fertilizers for agriculture.

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INFLUENCE OF TECHNOLOGICAL REGIMES ON CONTENT OF FERMENTATION BY-PRODUCTS FROM HIGH-GRAVITY BEER WORT

**Polyuzhyn L.I., student on EQL "Bachelor"
in Institute of Chemistry and Chemical Technology
National University "Lviv Polytechnic" Lviv, Ukraine**

For the production of beer high consumption are observed for heat, refrigerants and energy, particularly in the stages of mash preparation and its fermentation. Nowadays, more than ever, it is important to introduce energy-saving technologies that can reduce energy costs. These technologies include high-gravity brewing (HGB). When implementing HGB technology increased osmotic pressure of medium and greater concentration of alcohol cause a decreasing in the activity of yeast and their early sedimentation.

The consequence of these processes may be a change of organoleptic properties of the drink. The process intensification can be particularly made by temperature increasing, that, in turn, has a significant impact on the composition of the fermentation by-products which form the flavor profile of the final beer. Therefore, there are scientific and practical interests for the study of the effect of temperature regimes of high-gravity wort fermentation on formation of fermentation by-products in beer.

Research objects were brewing yeast Saflager W-34/70. The yeast was cultivated in wort with concentration 12 % of dry matter at the temperature 25 °C in three stages, 24 hours duration of each. Yeast biomass was separated by centrifugation at 4000 rpm for 10 minutes, then it was washed by sterile water and used for fermentation of 200 cm³ hopped wort with concentration of 16 % of dry matter for 7 days at temperatures 9, 14 and 19 °C. Fermentation by-products content was determined in distillates of young beer. Vicinal diketones (VDK) were determined by spectrophotometric method after interaction with ortho-phenylenediamine.

Chromatographic studies were performed using chromatograph of model Kristall-4000 M-LUX. To calibrate the chromatograph calibration water-ethanol solutions were used: such as types GWER-6.1 (ester) and GWER-6.2 (alcohol) according to TU U 18.426-99. Chromatography conditions were as follow: capillary chromatographic column HP-FFAP (Agilent); stationary liquid phase – nitro-monoester of terephthalic acid and polyethylene glycol (molar ratio 2:1) with a film thickness of 0,5 microns; column length – 50 meters; internal diameter – 0,32 mm; column temperature program was as: isotherm at 40 °C for 5 min., then heating from 40 °C to 160 °C with speed of 4 °C per one minute, and at the end it was isotherm at 160 °C (10 min.); injector temperature – 250 °C; detector temperature – 200 °C; carrier gas –

СУЧАСНА ПЕРЕРОБКА САДОВО-ГОРОДНЬОЇ СИРОВИНИ У ФРЕШ-БАРАХ СУЧАСНИХ ФУД-КОРТІВ Муртузалієв А. М.	26
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Наукове видання

**Збірник наукових праць
молодих учених, аспірантів
та студентів**

Головний редактор, д-р техн. наук. Б.В.Єгоров
Заст. головного редактора, д-р техн. наук. Л.В.Капрельянц
Заст. головного редактора, канд. техн. наук Н.М. Поварова
Відповідальний редактор, д-р техн. наук. Г.М. Станкевич

Підписано до друку 2016 р. Формат 60×84/8. Папір офсетний.
Ум. друк. арк. 47,4. Тираж 30 прим. Замовлення