قسم هندسة الكيميائية الاحيائية مجلة مشاريع التخرج
لسنة ٢٠٢٠-٢٠٢١

مشروع التخرج		
الطالب	عذراء عباس مجيد زهراء علاوي كاظم هدى محمد أسماعيل	الصورة
الأستاذ المشرف	أ.م.د علي حسين عبار م.زينب يعقوب	
Research Title عنوان البحث	Acetone-Butanol-Ethanol (ABE) Fermentation Biorefinery plant design	
Abstract ملخص البحث	Acetone, butanol and ethanol are important organic solvents which are widely used in spraying paint, explosive, plastics, and pharmacy. Different approaches have been applied to produce these material from different sources. A mixture of acetone, butanol, and ethanol (ABE) can be produced biologically from different sugars and starches. This process was commercialized in the Union of Soviet Socialist Republics, England, Canada, and the USA during the First World War. Several industrial units were also established in other countries including Japan, Australia, China, and South Africa. Apple as one of the most widely cultivated fruits, has an increasing production over the past ten years, reaching more than 70 million metric tons production in 2015. About 30% of apples are industrially processed to produce juice, cider, or puree which generate large amounts of pulp, skin, and seed wastes, called pomace. Apple pomace occupies around 25-30% of the original fruits in dry mass. The present project was conducted to design plant for production ABE from apple The present project was conducted to design plant for production ABE from apple poems as a cheap source of sucrose. The plant was divided into three units: unit 100 in which preparation of apple poems for hydrolysis to get fructose and glucose solution was achieved. At the unit 200, a fermentation process was applied while the las unit (unit 300) in which separation and purification of products is occurred. Material and energy balances were conducted to treat raw apple at a capacity 200000 ton /year. Design of hydrolysis vessel, cooler and	

distillation column were performed to establish the final geometrical dimensions and energy load for each equipment The results of present project showed the ability to design this plant as an economical process using cheap raw material which is the waste from other food plants hence economic and environment issues can be resolved .		
		الطالب
		المواليد
		العنوان
جامعة بغداد	الجامعة	الاختصاص العام (البكالوريوس)
هندسة الخوارزمي	الكلية	
الهندسة الكيميائية الاحيائية	القسم	
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Research Title عنوان البحث		
Abstract ملخص البحث		

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مشروع التخرج		
الطالب	فلاح حسن عبد غفران عامر عبدالله	الصورة
الأستاذ المشرف	م.د. زياد طارق م. هدى عادل	
Research Title عنوان البحث	High fructose corn syrup production from starch	
Abstract ملخص البحث	High fructose corn syrup (HFCS) is widely used in industry for the production of foods and beverages. Our MyThis study objective is to design a plant for the production of HFCS from corn waste to participate in the provision of HFCS needed in Sudan. This HFCS production plant project is to meet the need for HFCS in Sudan. The annual consumption of HFCS in Sudan is 9000 tones. This plant will produce HFCS using acid hydrolysis followed by glucose isomerase enzyme hydrolysis of corn waste, and yields ethanol as a by-product. This is a full design and feasibility study. The project requires 2861.1 tons/day of corn waste, 1.14 tons /day sulfuric acid (H2SO4), 44.06 tons /day, of ethanol, 15.9*103 tons /day Glucose isomeraise and 1000 tonestons/day from (HCl). The cost of the raw material used by the project will be 58.72 Million $/year. The planned annual HFCS production of the project is about 10000 tones.The project will produce 171.7 tons of ethanol per day. Total capital investment cost is seven Million $.The estimated profite is 1.4 Million $ /year. The Ppayout period backe of the project (Payout time) is four years. A part of the energy needed by the plant is to be provided by steam boilers. The remaining will be provided as	

regular electricity. The plant is's proposed location in Sudan is in Al-Bbagir in Sudan, as because of the availability of appropriadte conditions for the cultivation of corn. The location of the plant also provides, security, labour, transportation, and facilitates guarantees the feasibility and effectiveness of the project. The plant complex consists of different specialized unitse. There are is a processing area, areas for utillities (like boilers and compressor), administration offices, hospitals , super market, schools, and social and sports clubs.The implementation of this project in Sudan has the potential of eliminating the reliance on imported HFCS by the food and beverage manufacturers and therefore significantly reduces the cost of production and enhances competitiveness, maintaining similar product quality.	
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مشروع التخرج		
الطالب	زين عزيز صيهود سنان لؤي لطفي	الصورة
الأستاذ المشرف	أ.م.د. خالد وليد حميد د. دعاء خالد	
Research Title عنوان البحث	Itaconic Acid Production by Using Aspergillus, A.terreus	
Abstract ملخص البحث	The aim of the present work is to design a plant of Itaconic acid production with capacity of 420 ton/year. The production is of a batch type, each batch takes 1 day, the operation time is 330 day/year and so there is 330 batch/year. The project involves the calculation of material and energy balance, equipment design, itaconic acid extraction, and performs the calculation by computer using SuperPro Designer software. The Itaconic acid is obtained by growth and development of the microorganism Aspergillus A. terreus, media consists briefly of glucose, water, salts and nitrogen source at 32 C o and aeration conditions for one day. The concentration of the acid at the end of the fermentation is 90 g/lit. The biomass is removed from broth by centrifuge, the acid concentrates by evaporator, Crystallizes the itaconic acid and filtrate by rotary vacuum filtration. The glucose required is 1919 kg/batch. The air required was 3.585 m 3 /batch .	

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مشروع التخرج		
الطالب	ميسرة عبدالله علوان سرى طالب عمير	الصورة
الأستاذ المشرف	م.د. صفاء رشيد ياسين م.م. نور محسن	
Research Title عنوان البحث	Lactic acid production from glucose	
Abstract ملخص البحث	Lactic acid is a naturally occurring organic acid that can be used in a wide variety of industries, such as the cosmetic, pharmaceutical, chemical, food, and, most recently, the medical industries. It can be made by the fermentation of sugars obtained from renewable resources, which means that it is an eco-friendly product that has attracted a lot of attention in recent years. Recently, the U.S. Department of Energy issued a report that listed lactic acid as a potential building block for the future. Bearing the importance of lactic acid in mind, this project summarizes information about lactic acid properties and applications, as well as its production and purification processes.	

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مشروع التخرج		
الطالب	منصور فالح شذر جعفر محمد نوري	الصورة
الأستاذ المشرف	أ.م.د. اسراء عبد الوهاب حمودي م.م. دنيا عبد اللطيف	
Research Title عنوان البحث	PHARMACEUTICALS AND PERSONAL CARE PRODUCTS: MANUFACTURE AND TREATMENT FROM DOMESTIC WASTEWATER	
Abstract ملخص البحث	Medicines and personal care products (PPCPs) are ubiquitous in freshwater ecosystems around the world .They are recognized as a pollutant of concern. Currently, pollutants of concern are classified due to Persistence, bioaccumulation and toxicity (PBT criteria). Pharmaceuticals and Personal Care Products (PPCPs) are a unique set of emerging environment Pollutants, due to their potential to cause physiological effects on humans at low dosesan increasing number of studies have confirmed the existence of many PPCPs in different environments compartments, raising concerns about potential adverse effects on humans and wildlife. We will discuss the following in the project. The project will study the pharmaceutical industries, and then study the treatment methods used globally to treat the damages arising from them.	

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مشروع التخرج		
الطالب	اسراء هاشم جاسم	الصورة
الأستاذ المشرف	م.د. اميل محمد رحمن م.د. حسن هادي	
Research Title عنوان البحث	Production of Monoclonal Antibodies	
Abstract ملخص البحث	Antibodies are glycoprotein structures with immune activity. They are able to identify or induce a neutralizing immune response when they identify foreign bodies such as bacteria, viruses, or tumor cells. Immunoglobulins are produced and secreted by B lymphocytes in response to the presence of antigens. The first monoclonal antibodies (mAbs) have emerged from a survey of hybridomas, and nowadays mAbs are produced mostly from cultivations of these cells. Additionally, there are studies and patents using a range of cells and microorganisms engineered for the production of mAbs at commercial scale. For some years, new methodologies have advanced with new production processes, allowing scale-up production and market introduction. Large-scale production has revolutionized the market for monoclonal antibodies by boosting its production and becoming a more practical method of production. Production techniques have only had a sizable breakthrough due to molecular techniques. Various systems of production are used, including animal cells, microorganisms, plants, and mammary glands. All of these require the technological development of production process such as a stirrer, a wave bioreactor, and roller bottles.	

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مشروع التخرج		
الطالب	نور سعد فاضل هبة فريد يونس	الصورة
الأستاذ المشرف	أ.د. علاء كريم محمد م.م. اسراء مزاحم رشيد	
Research Title عنوان البحث	Production of pectin from orange peels	
Abstract ملخص البحث	Pectin is a natural substance found in the tissue of fruits and vegetables. Because of its great water absorbing capabilities, it presents gelling, stabilizing and thickening properties. Pectin is widely used in the food, pharmaceutical and cosmetic industries. The purpose of this project is to design a plant for the production of pectin, operating in batch. Generally, the raw materials used are vegetable residues of juice factories, and, for this work waste of orange have been selected as raw materials. The plant to be designed should have a production capability of 40 ton /year (150 kg/day) of pectin. The production process of pectin consists basically in a prior selection and washing of raw material; solid-liquid extraction (at 60°C and in acid medium) to solubilize pectin; and filtering of solid waste; precipitation of pectin by addition of ethanol; solid-liquid separation of the precipitated pectin; and, finally, drying and milling and proceeds to final conditioning. The units that are designed for the process are: opened stirred and jacketed tank for extraction, filter press to separate solid waste, closed stirred and jacketed tank for precipitation of pectin, centrifuge for solid pectin separation, and spry dryer to remove the humidity (alcohol and water).	

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مشروع التخرج		
الطالب	تبارك احمد صلاح مريم قصي عاصي	الصورة
الأستاذ المشرف	م.د. محمد يعقوب عيسى م.م. أسامة فوزي سعيد	
Research Title عنوان البحث	Xylitol Production	
Abstract ملخص البحث	This project includes an overview of the properties uses and production routes of xylitol. It is a five-carbon sugar alcohol, a valuable sugar substitute, and widely used in the pharmaceutical and food industry due to its interesting properties. The increasing interest in biotechnological processes employing lignocellulosic residues is justifiable because these materials are cheap, renewable and widespread sugar sources. The types of lignocellulosic biomass that can be used for the production of xylitol include rice straw, sugarcane bagasse, corn cobs, and corn stover. The process of producing xylitol from xylose is implemented efficiently by biotransformation using corncobs. Calculations of material, energy balances and equipment design are achieved based on the recently practical scientific research papers. Washing, grinding, drying, acid hydrolysis, fermentation, filtration and crystallization are the main steps to produce Xylitol. The production rate of (97.32% purity) Xylitol is found to be 189.83 kg per 1000 kg of raw material (corncobs). The literature indicated that the optimal reaction conditions for the recovery of xylose from corn cob hemicellulose by hydrolysis were obtained using a sulfuric acid concentration of 2%, a reaction temperature of 130℃ and a solid to liquid ratio of 1:10. The xylitol formation was favored under oxygen-limited conditions (air flow rate 0.3 vvm) with a maximum conversion of xylose to xylitol (95.4%).	

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