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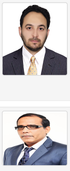

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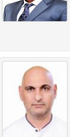

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cv.nahrainuniv.edu.iq/en/view/134
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rsaadeh@zu.edu.jo
+962791812653
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www.alheet.com/m/mustafa
mustafaowaid@gmail.com
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www.scopus.com/authid/detail.uri?authorId=8214114100
i.hamadneh@ju.edu.jo
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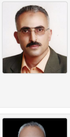

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Centre for Advanced Studies in Physics (CASP), Government College University, Lahore, Pakistan

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naveedafzal@gcu.edu.pk
+92 3334654277
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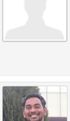

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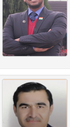

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Department of Physics, Lancaster University, Lancaster LA1 4YB, UK

physics

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+447424159186
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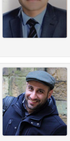

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Department of Chemical Engineering, Indian Institute of Technology Jammu

Nanotechnology, Material Synthesis, Natural Products, photochemistry, catalysis

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gaurav.bhaduri@iitjammu.ac.in
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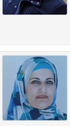

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University Of Anbar/ College of Applied Sciences-Hit/Department of Applied Chemistry

Organic Chemistry

dr.rasim@hotmail.com
07816089162
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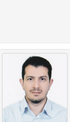

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Department of Physics, College of Science, University of Anbar, Ramadi, Iraq

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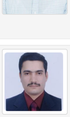

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+9647904461294
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University of Anbar-college of scince- Department of Mathematics

Mathematics- graph theory

www.uoanbar.edu.iq/staff-page.php?ID=1257
sc.alirashed@uoanbar.edu.iq
+964 781 667 6390
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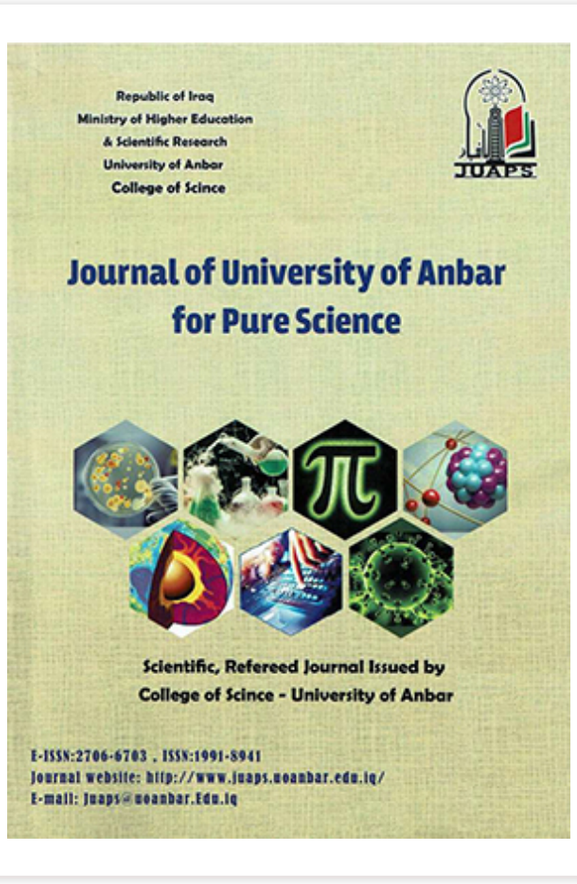

Antioxidant Polymer brushes Architecture on the modified surfaces
Ahmed Al-Ani; Amamer M. Redwan; Omar Al-Obaidi; Emad Yousif

Volume 18, Issue 2 , December 2024, Page 1-4
https://doi.org/10.37652/juaps.2024.185791

Abstract In last few decades, extensive research has been performed designing new synthetic procedures not only to create new classes of polymers, but also to control the architecture of those ... Read More ...

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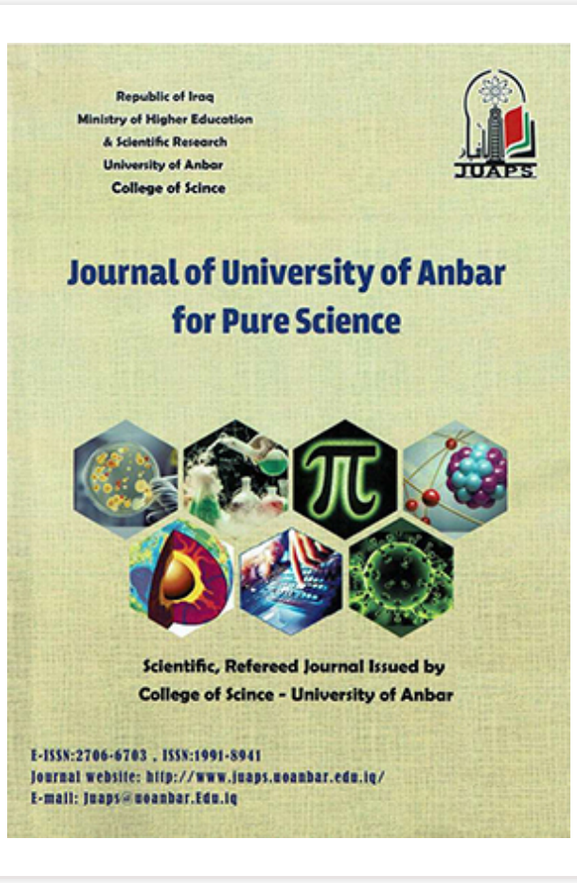

Impact of Healthy Eating and Physical Activity on Overweight/ Obese Males and Relation with Some Hormone Levels
Nour Shakir Rezaieg

Volume 18, Issue 2 , December 2024, Page 80-87
https://doi.org/10.37652/juaps.2024.152165.1291

Abstract The purpose of the study was to compare the efficiency of healthy lifestyle interferences in reducing weight gain risk. The study was a controlled experiment done from 2023 to 2424, ... Read More ...

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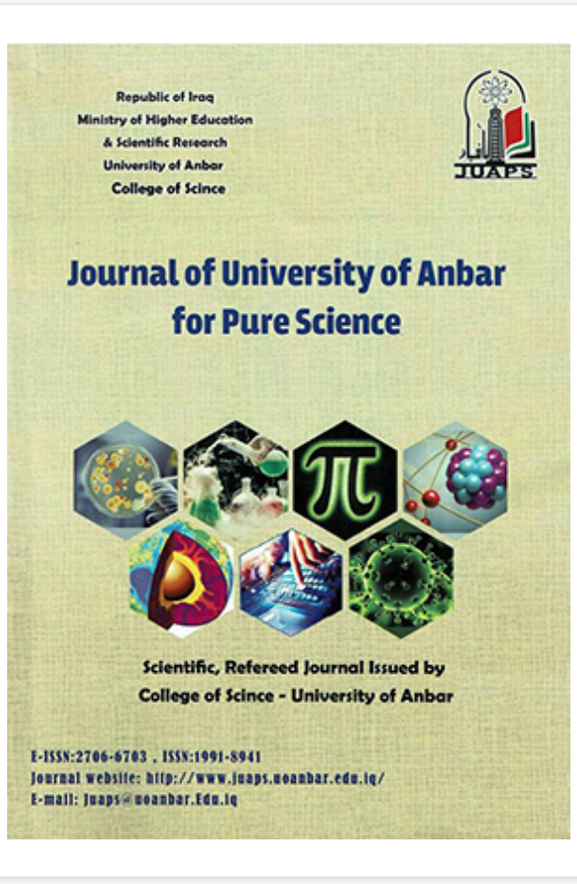

Synthesis and Characterization of New Spiroheterocyclic from Isatin and Evaluation of Some Their Antifungal and Antibacterial Activity
Zubaida Amir Al-Heety; Ali Kareem Al-Nasseri

Volume 18, Issue 2 , December 2024, Page 88-95
https://doi.org/10.37652/juaps.2024.146390.1183

Abstract Spiro compounds Spiro cycles are widely found in natural products, medicines, and functional materials[1] the spiro atom forces the planes of the two rings to almost face one another, ... Read More ...

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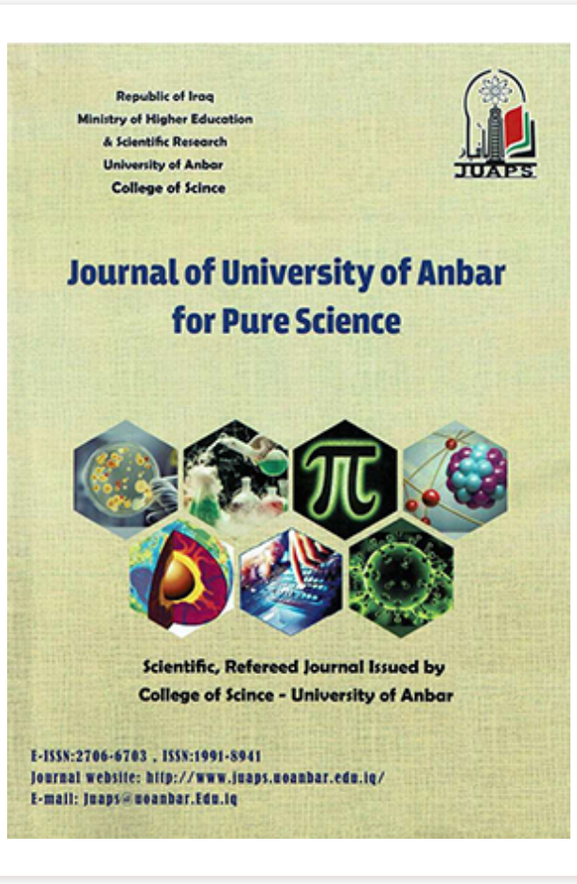

Comparative Quantum Chemical Study Using HF and DFT Methods in Conjunction with Different Sizes of Basis Sets
Ali J. A. Al-Sarray; Fatima A. Abed; Omer El-Amin Ahmed Adam

Volume 18, Issue 2 , December 2024, Page 96-102
https://doi.org/10.37652/juaps.2024.147024.1202

Abstract In this work, a quantum chemical study was conducted for a Schiff base derivative that had been synthesized recently by utilizing the B3LYP of Density Functional Theory and Hartree-Fock ... Read More ...

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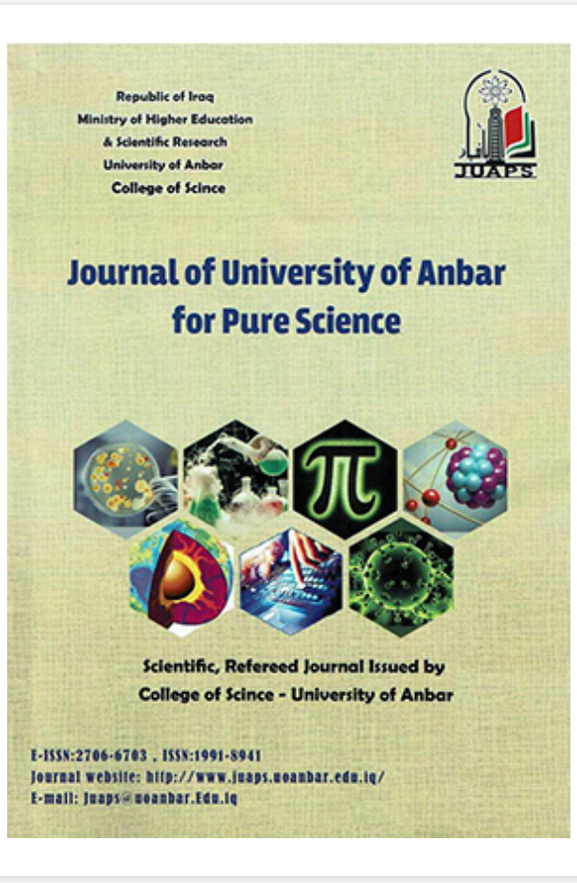

Theoretical Calculations and Molecular Design of Novel Dioxoisoindoline Derivatives as Anticancer Agents.
Rawaa Mohammed Ahmed; Mohammed Oday Ezzat

Volume 18, Issue 2 , December 2024, Page 103-111
https://doi.org/10.37652/juaps.2024.147172.1205

Abstract The decline in anticancer drugs is a constant problem in both basic and advanced medicine .It suggests using a theoretical chemical study to identify potential drugs using Dioxoisoindoline ... Read More ...

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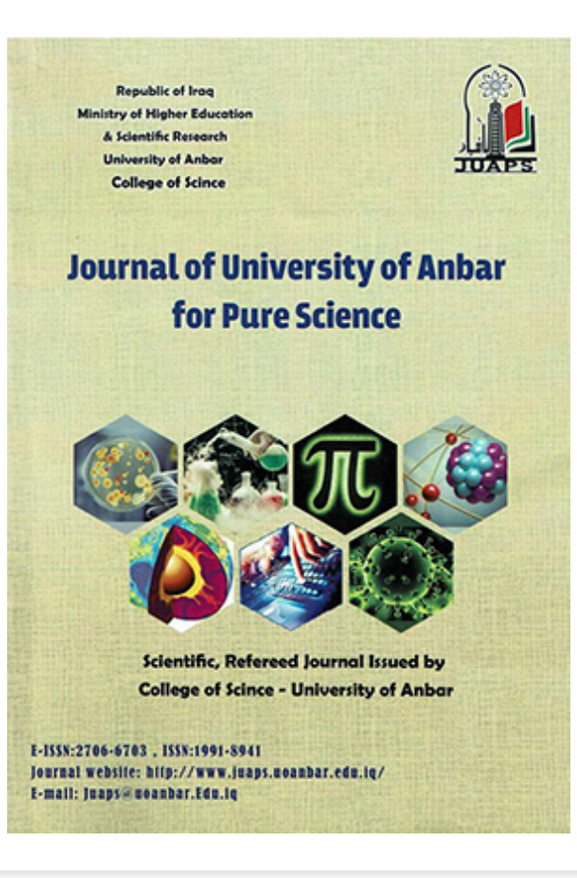

Preparing sulfur nanoparticles and determining their effect on the photodegradation of polycarbonates
rand malallah hassan; Hameed Khalid Ali; Muthanaa Mohammad Sirhan

Volume 18, Issue 2 , December 2024, Page 112-122
https://doi.org/10.37652/juaps.2024.148119.1223

Abstract This study involved the preparation of sulfur nanoparticles using the extract of Ziziphus-spina leaves and examined their effect on the photodegradation of polycarbonate membranes with ... Read More ...

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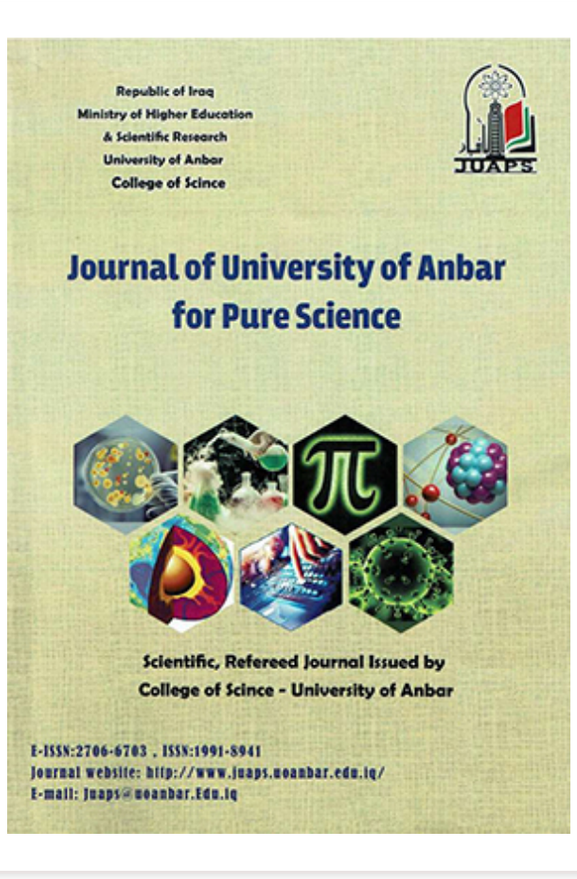

synthesis and characterization of 1,2,4-traiazole derivative from methyl benzaoate with sulfur bridge links
Ahmed Ahmed; Noor Tariq; Waled Abdo Ahmed; Amamer M. Redwan

Volume 18, Issue 2 , December 2024, Page 123-129
https://doi.org/10.37652/juaps.2024.147525.1212

Abstract The basic nucleus S-(4-(((E)-benzylidene)amino)-5-phenyl-4H-1,2,4-triazol-3-yl) 2-((4-(((E)-benzylidene)amino)-5-phenyl-4H-1,2,4-triazol-3-yl)thio) ethanethioate T.4 produced with many ... Read More ...

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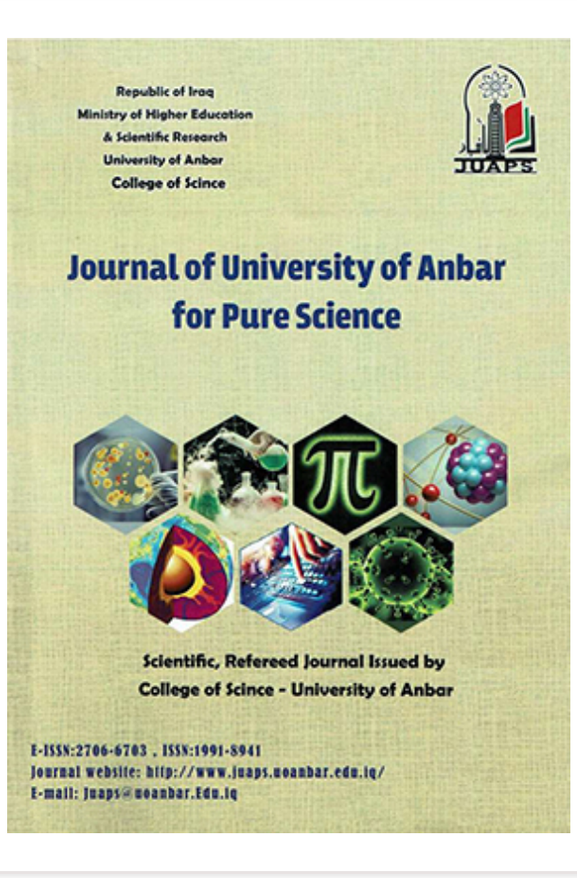

Green Chemistry of Lemon Peels, Extracting Components for Sustainability: A Review
Mohammed Hussein Al-Mashhadani

Volume 18, Issue 2 , December 2024, Page 130-138
https://doi.org/10.37652/juaps.2024.148332.1226

Abstract This thorough analysis investigates the unrealized promise of the environmentally benign and sustainable chemistry of lemon peels. Lemon peel's chemical makeup, which includes limonene, ... Read More ...

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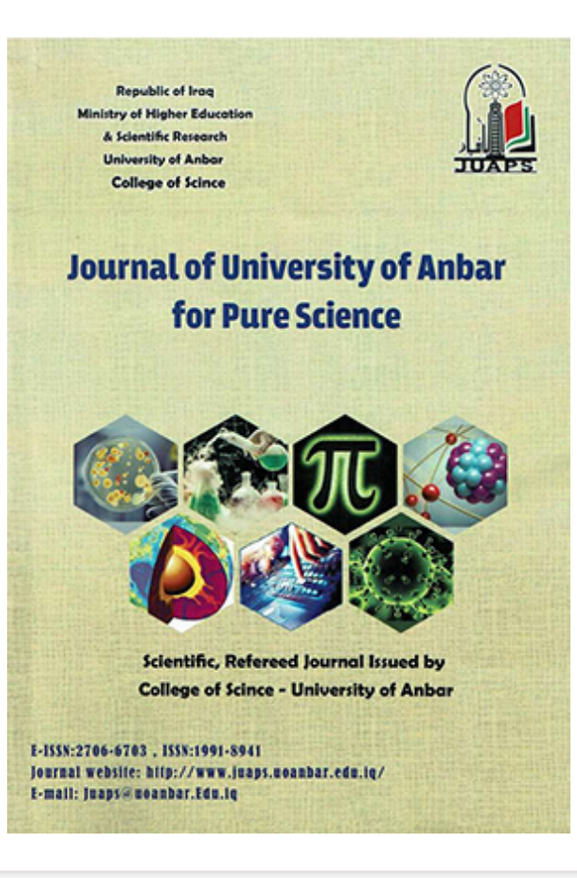

Green synthesis of silver nanoparticles using Annona muricata extract and their antibacterial and antibiofilm activity against multidrug-resistant bacteria
Eman Kaml Al-Fahdawi; Yousif Hinde Khalaf

Volume 18, Issue 2 , December 2024, Page 146-153
https://doi.org/10.37652/juaps.2024.149129.1244

Abstract The study is centered on the synthesis, characterization, and application of silver nanoparticles (Ag NPs), which show promising potential for biomedical applications. Nanobiotechnology ... Read More ...

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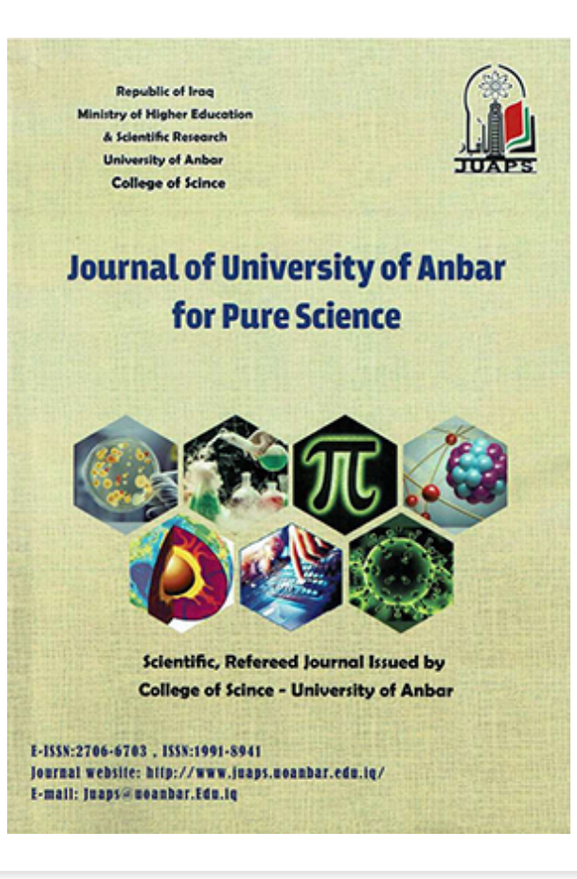

Prospective randomized controlled trial study of liver function tests in unstable angina risk prediction
Fatimah Nabeel Mezaal; Sami Mukhlif Mishlish; Kutayba Farhan Dawood

Volume 18, Issue 2 , December 2024, Page 154-162
https://doi.org/10.37652/juaps.2024.149368.1248

Abstract Cardiovascular diseases continue to be the leading cause of morbidity and mortality in developed nations. Elevated levels of liver function have recently been implicated as possible ... Read More ...

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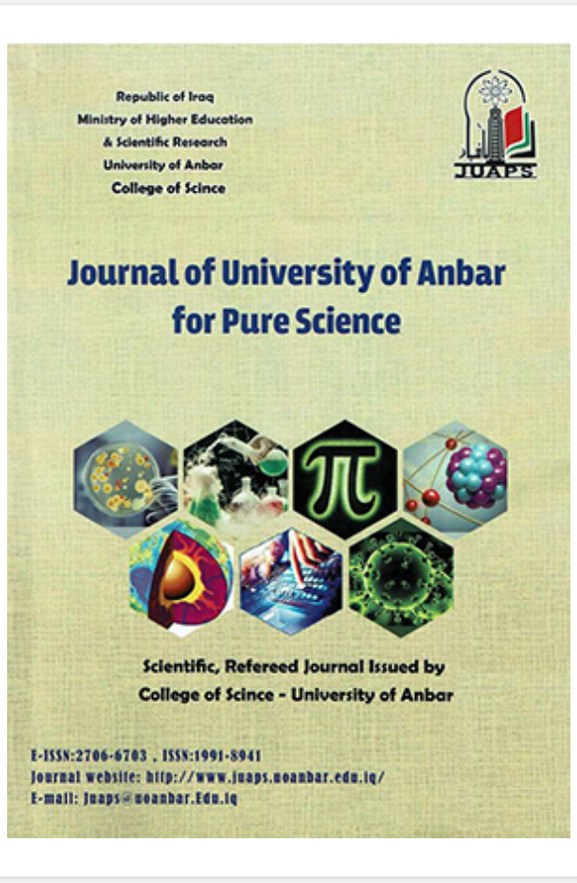

Overview of diabetes mellitus types and medications
Ahmed al-ani; Raghda Alsayed; Zeyad Fadhil; Omar Al-Obaidi; Dina Ahmed; Shams A. Ismael; Nany Hairunisa; Husnun Amalia; Emad Yousif

Volume 18, Issue 2 , December 2024, Page 163-169
https://doi.org/10.37652/juaps.2024.146836.1196

Abstract Insulin is a hormones produce naturally by pancreas through β cells, while glucagon is a hormones secreted by pancreas also through α cells, and somatostatin secreted by ... Read More ...

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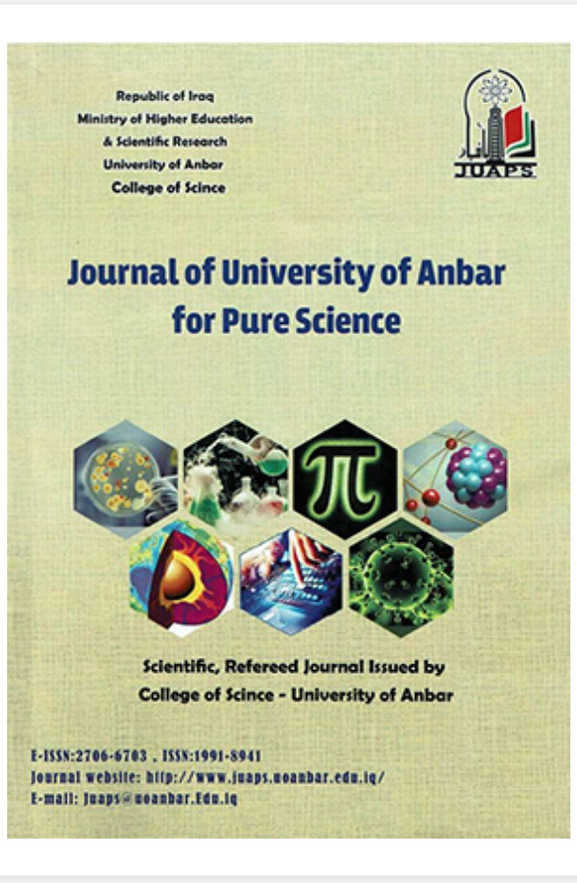

Evaluation the Initial Values for Eccentric Anomaly for an Ellipse Orbit: Article Review
Rasha H. Ibrahim; Abdul-Rahman H. Saleh

Volume 18, Issue 2 , December 2024, Page 170-179
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Abstract The equation of Kepler is used to solve different problems associated with celestial mechanics and the dynamics of the orbit. It is an exact explanation for the movement of any two ... Read More ...

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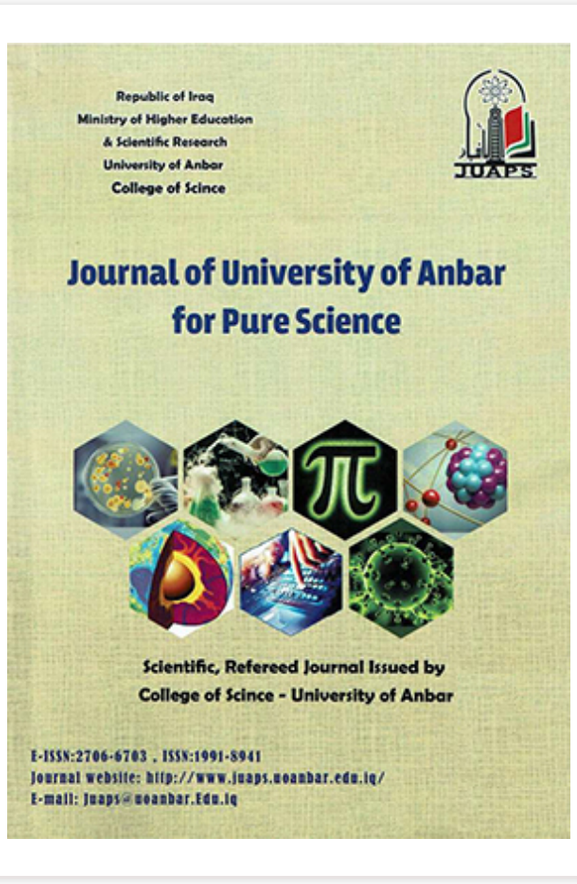

The density of nuclear levels parameter effect on the fission cross section that is induced using Gilbert-Cameron model
Dumooa Thiker Kamel; Nabeel Fawzi الكبيسي

Volume 18, Issue 2 , December 2024, Page 197-202
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Abstract Fission cross sections exhibit a high degree of sensitivity to both saddle point deformations and the level density at equilibrium. Throughout this research, optical and statistical ... Read More ...

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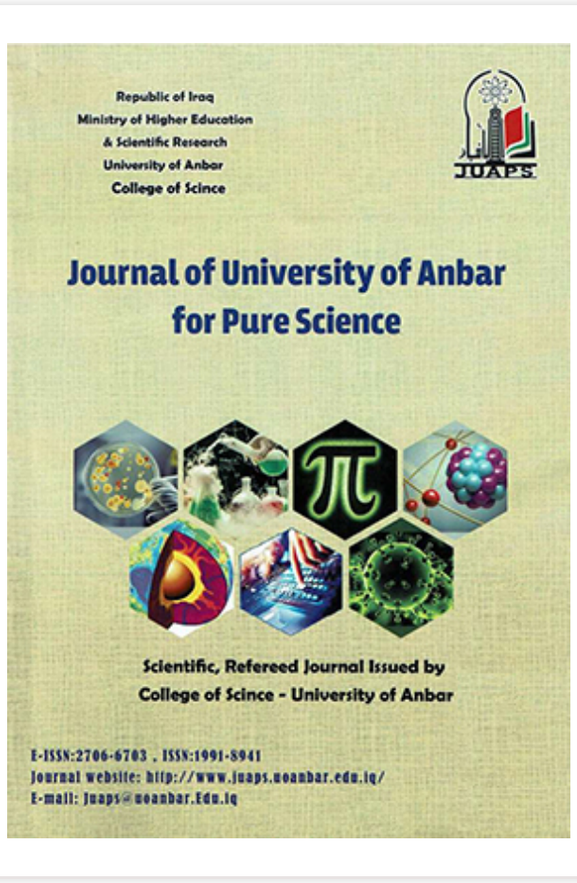

Characterization of Nickel Oxide Nanoparticles Prepared Via Pulsed Laser Ablation: Evaluated the Influence of Laser Parameters
Bushra Mohammed Ghdhaib; Sahar Naji Rashid

Volume 18, Issue 2 , December 2024, Page 203-212
https://doi.org/10.37652/juaps.2024.148124.1224

Abstract The top-down pulsed laser ablation in liquids is a process that has many advantages in synthesizing nanoparticles. In this work, nanoparticles of pure nickel plate were prepared via ... Read More ...

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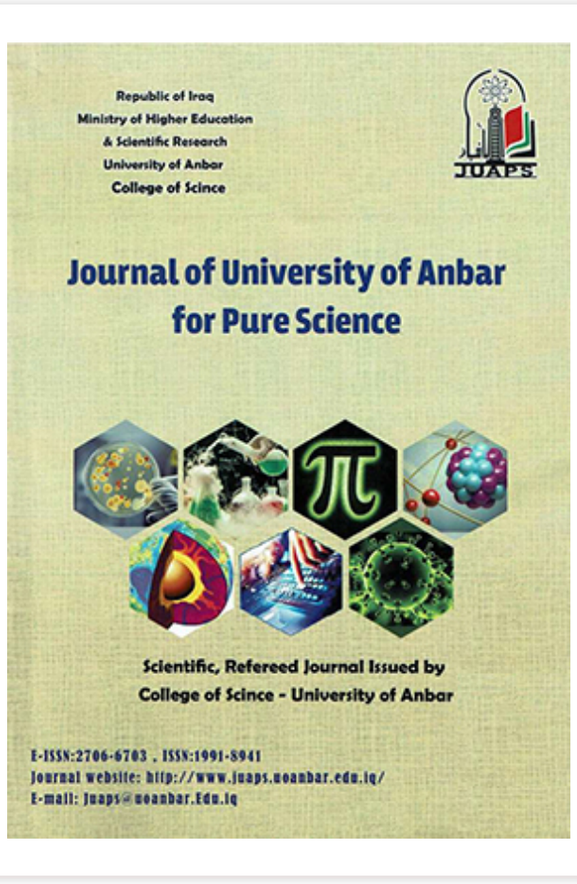

Quantum interference comparison between benzene, naphthalene, and azulene single molecular junction.
Baker N. Abdalrazzaq; Alaa A. Al-Jobory

Volume 18, Issue 2 , December 2024, Page 213-218
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Abstract The ability to build devices from single-molecular junctions depends on the fabrication of molecular structures. Here we report significant changes in the transmission coefficient for ... Read More ...

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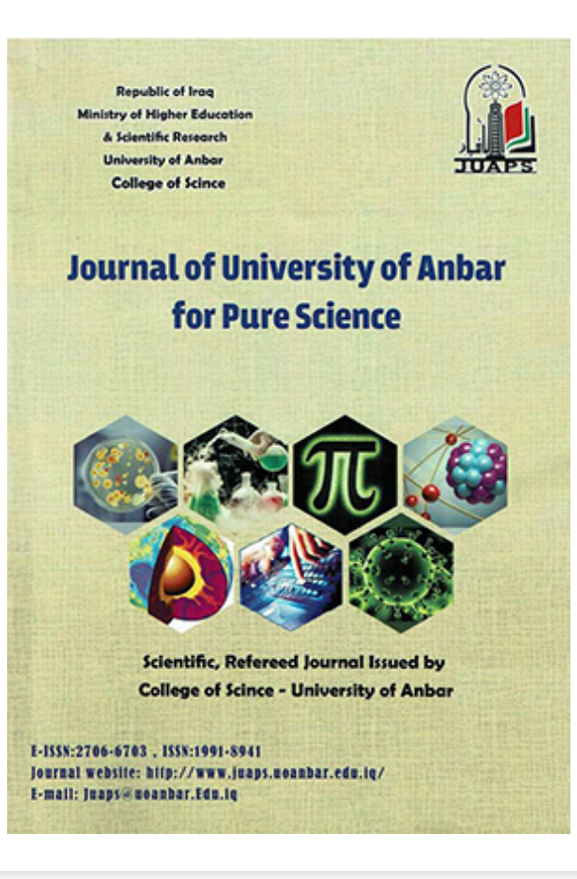

Low-lying spin states of even–odd 191Pt nucleus
Nabeil Ibrahim Fawaz

Volume 18, Issue 2 , December 2024, Page 219-224
https://doi.org/10.37652/juaps.2024.185595

Abstract Although the complex odd mass 191Pt nucleus has been studied theoretically by several models, there is still a lack of information concerning its electromagnetic moments and transitions. ... Read More ...

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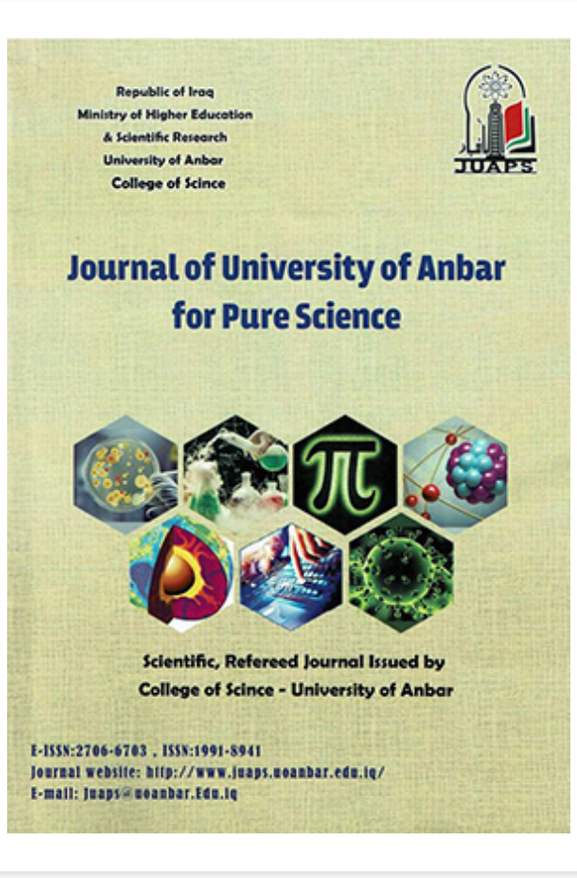

Machine Learning Techniques and Recommender Systems for Large Educational Data
Ammar Abbood Mohammed; Murtadha Hamad

Volume 18, Issue 2 , December 2024, Page 231-240
https://doi.org/10.37652/juaps.2024.146489.1187

Abstract E-learning approaches allow learners with a range of courses on online platforms to choose appropriate courses according to their preferences and interests. Recommender systems show ... Read More ...

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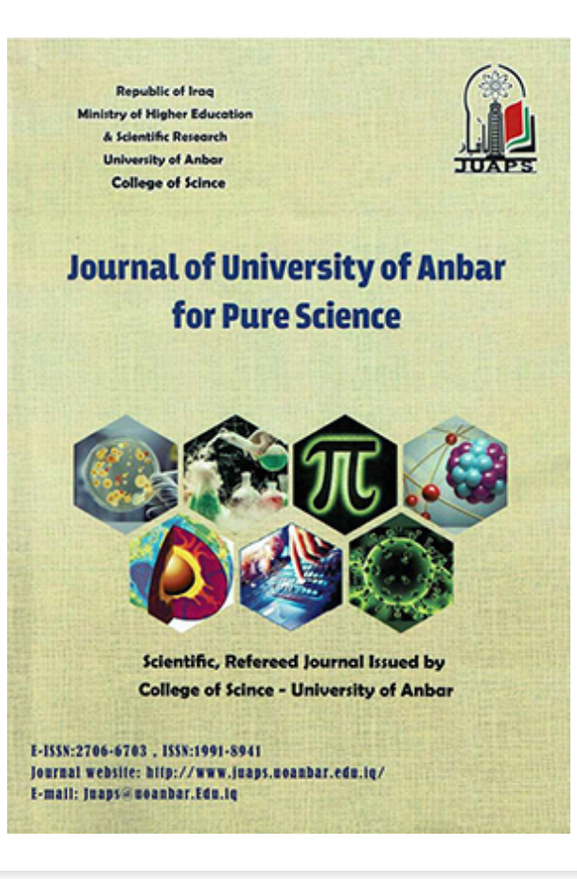

Other Classes of Generalized Compact Spaces Based on New Generalized ω-Open Sets
Alaa Mahmood Al-jumaili; Manar jassim Mohammed

Volume 18, Issue 2 , December 2024, Page 241-247
https://doi.org/10.37652/juaps.2024.147903.1219

Abstract The concept of generalized compactness is very useful and essential concept not only in general topology but also in the other advanced branches of pure and applied mathematics. As ... Read More ...

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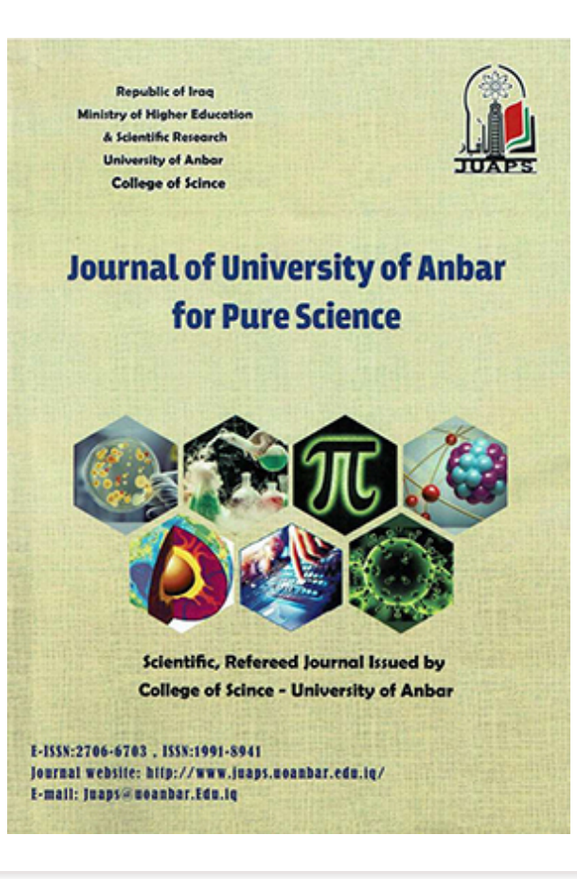

Solve Schrodinger Fractional Order Boundary Value Problem by Laplace Transformation Method
Shwan Swara Fatah; Hozan Dlshad Hilmi; Karwan Hama Faraj Jwamer

Volume 18, Issue 2 , December 2024, Page 248-256
https://doi.org/10.37652/juaps.2024.147572.1213

Abstract Asymmetry plays a significant role in the transmission dynamics of novel fractional calculus. Few studies have mathematically modeled such asymmetry properties, and none have developed ... Read More ...

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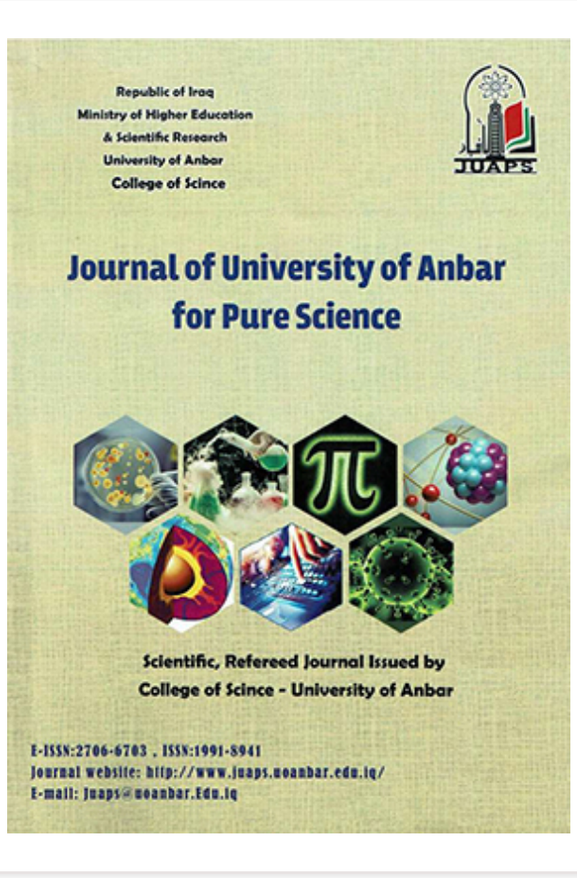

n- Refined Neutrosophic of Fine Module With Some Applications
Muntaha Jaafer AL-Fahdawi; Majid Mohammed Al-Shujairy

Volume 18, Issue 2 , December 2024, Page 257-264
https://doi.org/10.37652/juaps.2024.147949.1222

Abstract Abstract: In this paper, we study and present an important concept in module theory which namely neutrosophic fine module. Fine property for modules and rings. We denote (- module) ... Read More ...

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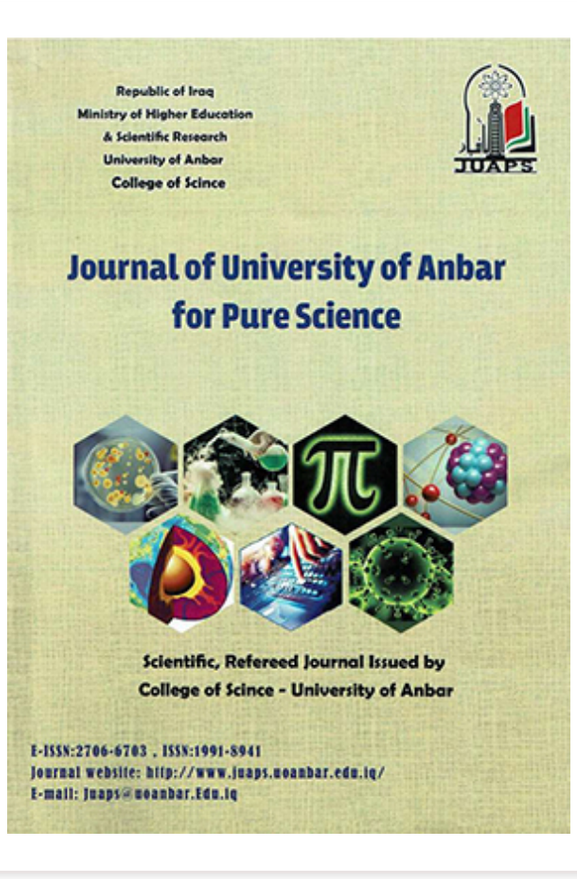

A New Convex Estimator Combining Ridge and Ordinary Least Squares Estimators
Karam K Al-janabi; Mustafa I. N. Alheety

Volume 18, Issue 2 , December 2024, Page 265-270
https://doi.org/10.37652/juaps.2024.149465.1250

Abstract In the presence of high correlation between the independent variables in the linear regression model, which is known as the multicollinearity problem, the ordinary least squares estimator ... Read More ...

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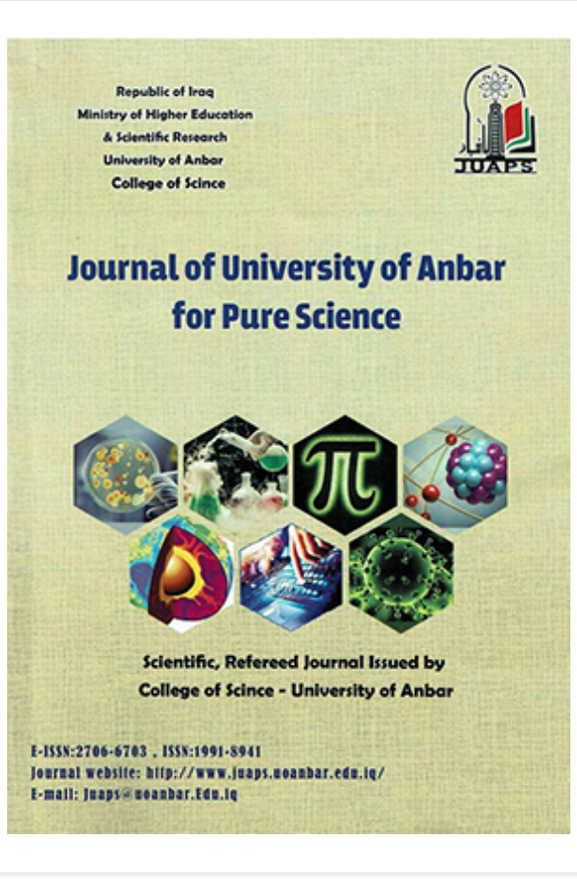

Chemical Treatment of Efflorescence in Clay Bricks During the Manufacturing Process
Mahmoud Hameed Alsalmany; Mohammed Ahmed Al-Nuaimy

Volume 18, Issue 2 , December 2024, Page 271-282
https://doi.org/10.37652/juaps.2024.148903.1234

Abstract Efflorescence is a white deposit of salts that are deposited on the faces of buildings constructed using bricks, resulting from the evaporation of water loaded with dissolved salts. ... Read More ...

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Overview of diabetes mellitus types and medications

Ahmed Al-Ani[1], Raghda Alsayed [1], Zeyad Fadhil[2], Omar Al-Obaidi[3], Dina Ahmed[4], Shams A. Ismael [1], Nany Hairunisa[5]*, Husnun Amalia[6], Emad Yousif[1*]

[1] Department of Chemistry, College of Science, Al-Nahrain University, Baghdad, Iraq;
[2]College of Pharmacy, University of Thi-Qar, Dhi Qar, Iraq
[3]Department of Chemistry, College of Sciences, University of Anbar, Anbar, Iraq
[4]Department of Chemical Industries, Institute of Technology-Baghdad, Middle Technical University, Baghdad, Iraq
[5]Department of Occupational Medicine, Faculty of Medicine, Universitas Trisakti, Jakarta, Indonesia
[6]Department of Ophthalmology, Faculty of Medicine, Universitas Trisakti, Jakarta, Indonesia

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ABSTRACT

Insulin is a hormone produced naturally by the pancreas through β cells, whereas glucagon is a hormone secreted by the pancreas through α cells. Somatostatin is secreted by δ cells. These hormones play vital roles in metabolic actions in the human body, especially regulating glucose levels. The absence or lack of insulin causes diabetes, which is characterized by increase in level blood sugar level. Diabetes is the main reason for many diseases, such as kidney diseases, vision loss, nerve disorders, and cardiovascular difficulties. Insulin medication and other related composition and inhibition can reduce diabetes cases and lower mortality due to diabetes.

Introduction

In the 20th century, diabetes become more problematic disease and has significantly increases in the world [1]. In general, Diabetes are two types, type 1 diabetes mellitus (T1DM) which is insulin dependent and type 2 diabetes mellitus (T2DM) which is noninsulin dependent. Diabetes considered one of the most serious chronic diseases. In general, diabetes and gestational diabetes are because of medications and genetic causes. Pregnant women may diabetes which is called gestational diabetes which is consequences of carbohydrate intolerance with the first recognition of carbohydrate during pregnancy [2].

*Corresponding author at: Department of Occupational Medicine, Faculty of Medicine, Universitas Trisakti, Jakarta, Indonesia
ORCID: https://orcid.org/0000-0003-2414-9224;
Tel:+6282154171253
E-mail address:nanyhairunisa@trisakti.ac.id

Type 1 diabetes mellitus (T1DM)

T1DM mainly appear on children, teenagers, and adults. The main reason for this type is insulin deficiency due to damage to β cells in the pancreas. β-Cell dysfunction may be caused by an impaired autoimmune system, viral infections, or exposure to ecological pollutants [3]. When β cells are damaged, the pancreas stops responding to glucose, and patients with T1DM lose weight, are always thirsty, and excessively urinate. Insulin-replacement therapy is needed to prevent high blood sugar and the deadly catabolic state of diabetic ketoacidosis in patients with T1DM [4].

β cells maintain the low levels of glucose by secreting insulin in the human body, preventing glycogenolysis, proteolysis, and lipolysis. The probability to develop T1DM is genetic predisposition, including specific HLA genotypes. The progress of diabetes in people with genetic link to it may be accelerated by external factors, such as eating habits or virus-related infection. The main cause of this disease is viral infection.

Exogenous insulin administered through insulin-replacement therapy prevents ketoacidosis and controls hyperglycemia in people with T1DM, in addition to regulating glycosylated hemoglobin level. The aim of insulin therapy is keep blood glucose level in the body as close to the normal range as possible [5, 6].

Type 2 diabetes mellitus (T2DM)

T2DM develops in 90% of T1DM cases, occurring because of genetic issues, aging and obesity, instead of autoimmune system dysfunction. The metabolic changes are generally minor than those observed with T1DM [7].

In T2DM causes insulin deficiency because impaired β cells in the pancreas. Therefore, insulin secretion in the blood circulation is insufficient to maintain glucose homeostasis, and β cells might slowly decrease. Obesity is the main causative factor for T2DM and causes insulin resistance in the body. The main causes of T2DM are genetics, eating habits, poor exercise, poor diet, and stress. T2DM treatments maintain glucose level in the blood circulation within the normal range. Different protocols can be implemented to maintain the glucose level within the range, including losing weight through exercise, diet, and change in lifestyle. However, people suffering from T2DM need medications that control glucose level [8, 9].

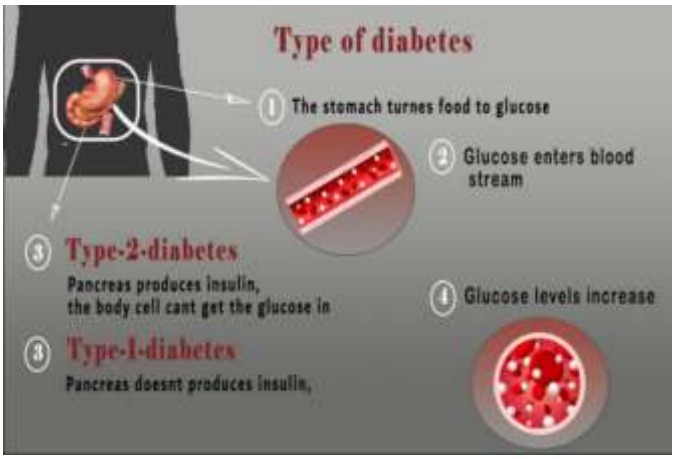

Figure 1. T1DM and T2DM diabetes

Table 1. T1DM and T2DM.

	T1DM	T2DM
Aging	Generally, from born to or adult	Normally over 35 years
Nutrition	Commonly undernourished	Obesity
Predominance	(5% -10%)	(90% - 95%)
Genetic predisposition	common	More common
Deficiency	β cells are damaged which reducing the insulin production	Lack of ability of β cells to secret suitable quantities of insulin;

Types of Insulin

Insulin treatment is important for the long-term survival of patients with T1DM and T2DM. Pregnant women with T2DM can be treated with insulin as well. However, the most common complication of using insulin is hypoglycemia, which is usually associated with high dosage of insulin or skipping meals. Insulin treatments are classified into short, intermediate, and long-acting. Short or fast-acting insulin treatments have faster onset and shorter action duration than intermediate and long-lasting insulin treatments and are sometimes known as rapid-acting insulin [10].

Table 2. Types of insulin treatments [11]

Fast-acting insulin:	Rapid Acting Insulin Analogs (Insulin Lyspro, Insulin Aspart, Insulin Glulisine): Have an onset of action (5-15) min., peak effect (1-2) hrs and Action duration (4-6) hrs, while regular Human Insulin: has an onset of action (1/2 -1) hr, peak effect (2-4) hrs, and action duration (6-8) hrs.
Intermediate-acting insulin:	NPH Human Insulin: Has an onset of insulin effect (1-2) hrs, a peak effect (4-6) hrs, and action duration more than 12 hrs. Pre-Mixed Insulin: Pre-mixed with either rapid- acting insulin analog or regular human insulin.
Long-acting insulin:	(Insulin Detemir, Insulin Glargine): Have an onset of insulin effect (1 1/2-2) hrs. Action duration 24 hrs for insulin glargine and (12-24) hrs for insulin detemir.

Medications

1. Sulfonylureas control glucose level by stimulating insulin secretion by pancreatic β cells. Second-generation sulfonylureas include glyburide, gliclazide, glipizide, and glimepiride, which are oral hypoglycemic agents that are widely used in T2DM treatment [12, 13]. The main mechanism action of sulfonylureas is closing ATP-sensitive K-channels in the β cell plasma membrane and initiates a chain of actions resulting in insulin release. Furthermore, sulfonylureas may decrease hepatic glucose production and enhance peripheral insulin sensitivity [14].

Oral medications bind to albumin, are metabolized by the liver, and are eliminated through the feces and urine. The duration is between 12 and 24 h. The side effects of using sulfonylureas are increased body weight, hypoglycemia, and hyperinsulinemia. Thus, it should be used carefully when renal insufficiency or hepatic dysfunction occurs becasue sulfonylurea accumulation may lead to hypoglycemia. Glyburide is the main component affecting people with kidney failure, considerably increasing the risk of hypoglycemia. Glimepiride or glipizide is safe for people with kidney failure and aging people. Glyburide can be transferred to the placenta and may be another source of insulin in gestational diabetes [15].

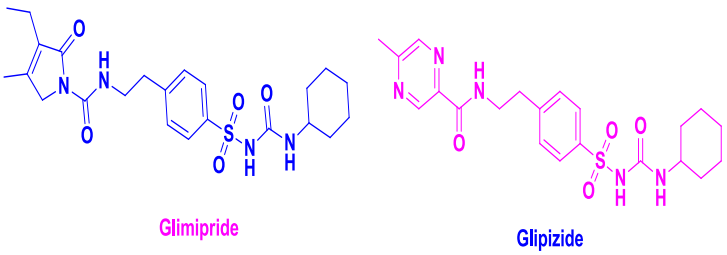

Figure 2. Structure of glimepiride and glipizide structure

2. Metformin restores the body's response to insulin, reducing the level of blood sugar produced by the liver and absorbed by the stomach or intestines. Biguanides constitute a class of medications for treating T2DM and other conditions [16], and metformin is the only biguanide available for T2DM treatment. In contrast to sulfonylureas, metformin does not enhance insulin secretion in the bloodstream. Thus, it does not cause hyperinsulinemia in the body, and the risk of hypoglycemia remains extremely low.

Metformin alters energy metabolism in cells and lowers glucose level by inhibiting hepatic gluconeogenesis and counteracting glucagon activity [17, 18]. Metformin is taken orally, not metabolized, and not bound to albumin and can thus be easily eliminated through urination. Metformin should not be used by people with kidney failure because of lactic acidosis. In addition, it should be discontinued by patients suffering from sepsis and heart failure, which ultimately lead to kidney failure [19].

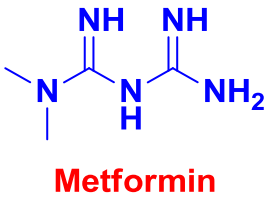

Figure 3. Metformin structure

3- Thiazolidinediones (TZDs) mainly include rosiglitazone and pioglitazone. TZDs do not enhance insulin release from β cells, and thus the risk of hyperinsulinemia is nonexistent.

TZDs lower insulin resistance by acting as agonists for the peroxisome proliferator–activated receptor γ (PPARγ), which is a nuclear hormone receptor. PPARγ initiates the transcription of some insulin-responsive genes, improving the insulin sensitivity of skeletal muscles, adipose tissues, and the liver [20, 21].

Pioglitazone and rosiglitazone can be consumed orally and bind to albumin. They are metabolized by the cytochrome P450 hemeprotein. Some pioglitazone metabolites have shown activity. The kidney is ineffective in eliminating pioglitazone, and most active medications and metabolites are concentrated in the bile and feces and then eliminated. Rosiglitazone metabolites are mostly excreted with the urine. Thus, adjusting the dosage of rosiglitazone in case of kidney failure is unnecessary, but it should not be administered to nursing mothers.

Some important issues regarding liver toxicity have been reported by using these medications. Obesity may occur because thiazolidinediones increases hypodermic fat and causes fluid retention that causes heart diseases [22].

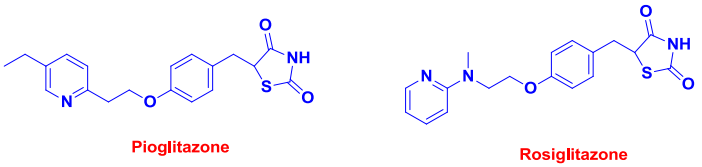

Figure 4. Structure of pioglitazone and rosiglitazone

4-Alpha-glucosidase inhibitors, such as miglitol and acarbose are used in T2DM treatment. The mechanism of this medication inside the human body is breaking down carbohydrates into simple sugars and glucose. Miglitol and acarbose reversibly inhibit α-glucosidase enzymes. At the beginning of a meal, these medications delay the digestion of carbohydrates, thus lowering glucose levels and do not induce insulin release, Therefore, these medications do not cause hypoglycemia [23,24]. Acarbose is weakly metabolized and absorbed by intestinal bacteria, and unmetabolized acarbose is eliminate with the urine. Miglitol is strongly absorbed, has no systemic effects, and is eliminated by the kidney. However, it has some side effects, such as diarrhea, flatulence, and abdominal cramping. This medication should not be administered to patients with colonic diseases, inflammatory bowel disease, ulceration, or intestinal obstruction [25].

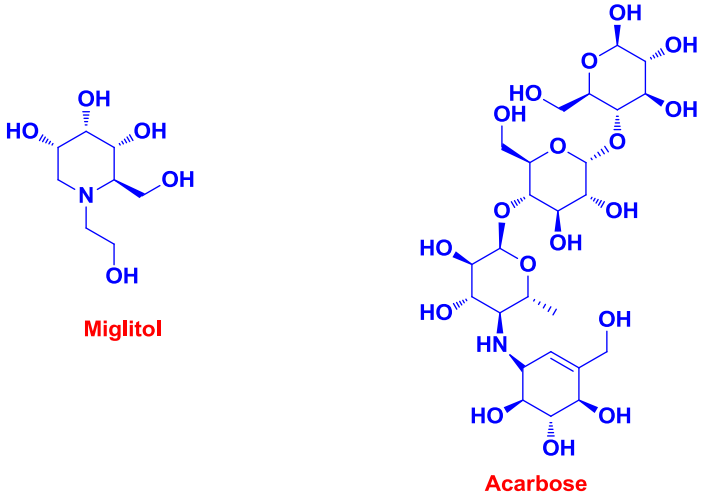

Figure 5. Structure of miglitol and acarbose

5- Sodium-glucose cotransporter 2 (SGLT2) inhibitors include dapagliflozin, canagliflozin, empagliflozin, and ertugliflozin are novel agents for T2DM treatment. They reabsorb glucose filtered by the kidney, inhibiting its reabsorption and elimination with the urine. In addition, inhibitors also inhibit the reabsorption of sodium and cause osmotic diuresis. Consequently, SGLT2 inhibitors may decrease systolic blood pressure, but they are ineffective for hypertension [26]. In general, medications are metabolized by glucuronidation into inactive metabolites, whereas the primary route of excretion for canagliflozin is the elimination through the feces. This medication should not be administered to people with kidney problems. The main effects of SGLT2 inhibitors are female genital mycotic infections, urinary regularity, and urinary tract infections. Hypotension also occurs, especially in patients on diuretics or old patients [27].

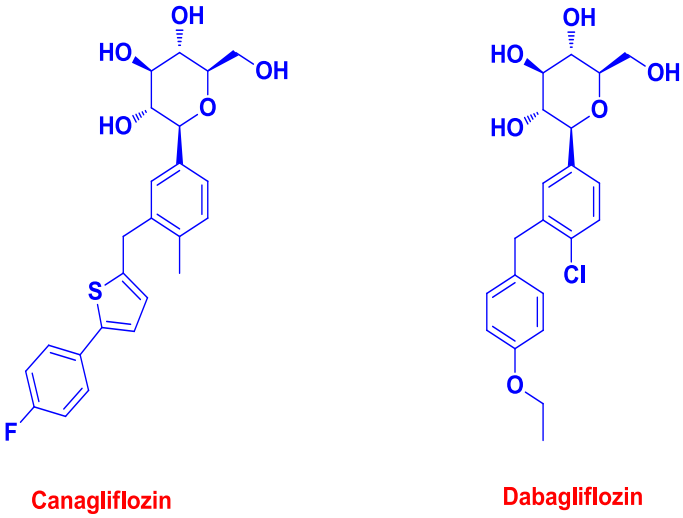

Figure 6. Structure of canagliflozin and dabagliflozin.

Diabetic diseases

Kidney disease

Diabetic nephropathy, which is also called diabetic kidney disease, is the main complication of T1DM and T2DM. In the USA, one of three people living with diabetes has diabetic nephropathy. Given that this disease affects the capability of the kidney to eliminate waste through the urine. Therefore, this disease can be prevented by controlling blood sugar level [28].

Diabetic nephropathy causes

Uncontrolled diabetes can cause severe damage to blood vessel clusters in the kidneys. Damaged kidneys cause high blood pressure, which then adversely affects the kidneys [29].

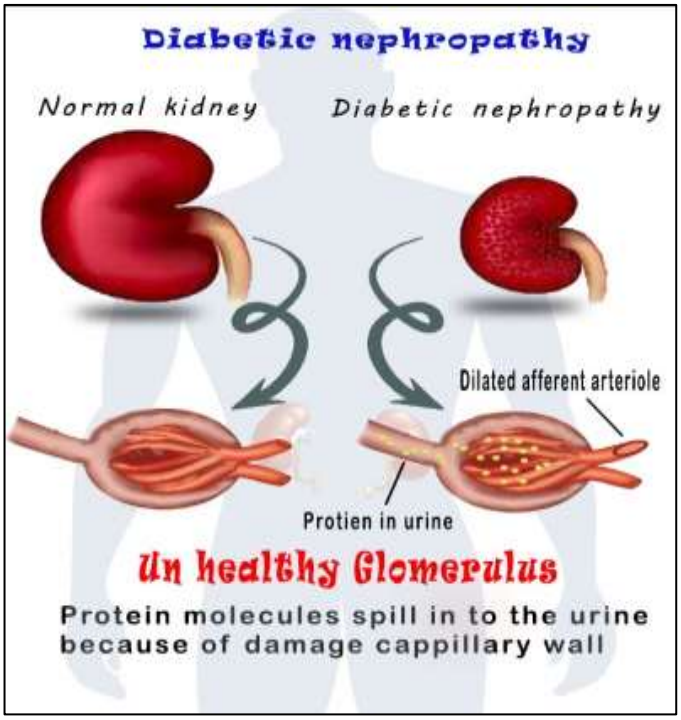

Figure 7. Difference between normal and unhealthy kidney

Conclusions

Diabetes is a chronic disease, and patients with T1DM and T2DM should comply with their respective doctors' advice and recommended medications. In addition, patients should perform exercises and follow specific diets to keep fit and prevent the complications of this disease. Furthermore, patients should receive excessive doses to prevent hypoglycemia, take medications on time. Owing to complexities associated with modern dye formulations, forensic fiber analysis remains a vital tool to the pursuit of justice. Its contribution to the exoneration of individuals under suspicion cannot be overstated, and its role within the broader framework of forensic science remains indispensable to crime resolution and fair and just legal systems

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أحمد العاني [1]، رغدة السيد [1]، زياد فاضل [2]، عمر العبيدي[3]، دينا أحمد [4]، شمس اسماعيل [1]، ناني خير النسا [5*]، حسنان أماليا [6]، عماد يوسف [1]

[1] قسم الكيمياء، كلية العلوم، جامعة النهرين، بغداد، العراق

[2] كلية الصيدلة، جامعة ذي قار، ذي قار، العراق

[3] قسم الكيمياء، كلية العلوم، جامعة الانبار، الانبار، العراق

[4] معهد التكنلوجيا، الجامعة التقنية الوسطى، بغداد، العراق

[5] قسم الطب المهني، كلية الطب، جامعة تريساكتي، جاكرتا، إندونيسيا

[6] قسم طب العيون، كلية الطب، جامعة تريساكتي، جاكرتا، إندونيسيا

nanyhairunisa@trisakti.ac.id

الملخص:

الأنسولين هو هرمون يفرزه البنكرياس بشكل طبيعي من خلال خلايا **β**، بينما الجلوكاجون هو هرمونات يفرزها البنكرياس أيضًا من خلال خلايا **α**، والسوماتوستاتين الذي تفرزه خلايا **δ**. تلعب هذه الهرمونات دوراً حيوياً في التحكم في العمليات الأيضية في جسم الإنسان، وخاصة مستويات الجلوكوز. يؤدي نقص الأنسولين كليًا أو جزئيًا إلى ما يسمى بمرض السكري، وهو ارتفاع مستوى السكر في الدم. يعد مرض السكري السبب الرئيسي للعديد من الأمراض مثل أمراض الكلى وفقدان البصر واضطرابات الأعصاب وامراض القلب والأوعية الدموية. يمكن لأدوية الأنسولين والتركيبات والمثبطات الأخرى ذات الصلة أن تقلل من مرضى السكري وتخفض معدل الوفيات الناتج من مرض السكر.

كلمات مفتاحية: أنواع مرض السكري، أنواع الأنسولين، مثبطات مرض السكري.