

Analysis of the absorption spectra in the visible and ultraviolet regions of some medical ointments available in Iraqi markets

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Abstract

Three types of medical commercial creams Silvazine, Cinolon Tar and Hydroquinon Domina were incorporated in this study. The medical creams were taken directly and placed uniformly on the glass slide. Each type of pharmaceutical was weighed at 1 mg and dispersed on an area of 1x1 cm. This process ensures same thickness for all samples. The creams were analyzed by using double-beam UV/visible spectrophotometer Metertech SP8001. The absorption spectrum for each of samples was measured against wavelength range of 300–700 nm.

Key words

Medical creams, absorption spectrum, UV-visible region.

Article info.

Received: Oct. 2017

Accepted: Dec. 2017

Published: Mar. 2018

تحليل اطياف الأمتصاص في المنطقة المرئية وفوق البنفسجية لبعض المراهم الطبية المتوفرة في الأسواق العراقية

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الخلاصة

ثلاثة انواع من المراهم الطبية الشائعة وهي سلفازين وسينولون وهيدروكينون دومينا استخدمت في هذه الدراسة. اخذت هذه المراهم بصورة مباشرة ووضعت بشكل منتظم على شرائح زجاجية. تم اخذ وزن 1 ملغم من كل نوع ونشر على مساحة 1 سم²، تم الحصول من هذه العملية على غشاء رقيق بنفس السمك لكل العينات. استخدام سيكتروفوتوميتر لتحليل الطيفي للعينات المحضرة وتم قياس الأمتصاصية كدالة للطول الموجي ضمن المدى 300-700 نانومتر.

Introduction

Skin has been the barrier which holds body-water in and bacteria or

chemical compounds out. Chemical absorption is a phenomenon (physical or chemical) or a procedure that

the molecules and/or ions enter some bulk phase - gas, liquid or solid material. Now and again, it consolidates with physical absorption. This kind of absorption relies on the stoichiometry of the response and the centralization of its reactants [1]. The hyperpigmentary troubles of the skin are due to the through produce of melanin, either through a normal or raised figure of melanocytes, or through hormonal deficiency [2, 3]. Hydroquinones (HQs) were utilized for years in gels, creams and/or lotions for the therapy of the disorders. It is the nearly frequently utilized compounds in skin-toning preparations [4-6]. They belong to the groups of phenol derivatives and alike analogical compound of these groups, it is readily subject oxidative degradation, generally in the presence of metal, high concentrations of oxygen, basic media and on exposure to light [7, 8]. The impacts of HQ have been transitory and concentration below 3.0% didn't result skin injurie, but concentrations above 5.0% may induce local irritation being this the major trouble for the effectiveness of a simple technique [9-11]. Many analytical techniques hold for HQs determination in the skin/toning preparation have been describing, thorough high performance liquid chromatography (HPLC) [12], chromatography capillary [13], and chromatography micelle [14], in addition to other analytical techniques [15]. Ozone existing in the atmospheric earth have been absorb fully the solar rays with wavelength

under 290 nm with safeguard our biosphere from harmful ultraviolet radiations. Each mitigation in atmospheric ozone reason a raise arriving solar ultraviolet radiation, and so improving the harm because of such radiations [16]. Several of the ultraviolet spectra that have extent the ground has been non ionizing, however was though, medically dangerous because of the capability of unique photon of the energy to issue excitation of electron in medical molecules, and consequently will harm them through means of unfavorable reactions [17-19]. The shallow layers of the epidermis, the stratum corneum, give all the skin's hindrance properties. The basal epidermal layers and the fundamental dermis are rapidly porous that the frequently utilized term "transdermal ingestion" is erroneous. The stratum corneum is comprised of layers of covering cell plates containing the stringy protein keratin. Most medication retention is trans cellular: it is impossible that recognizable assimilation occurs between cells or through sweat pores and hair follicles [20]. Concerning to a continuance published articles [21-26], we focus on the absorption spectrum pact on medical creams.

Materials and methods

Three types of commercial medical creams available in the Iraqi market were used in this investigation. Different properties of these pharmaceuticals were tabulated in Table 1.

Table 1: Medical cream types used in this investigation.

Trade name	Scientific content	Indication	Product
Silvazine	Each gram of cream contains 10 mg silver sulfadiazine. Silvadene Cream 1% is a delicate, white, water-miscible cream containing antimicrobial operator silver sulfadiazine in micronized structure.	Silvazine cream has wide antibacterial action. It is bactericidal for some gram-negative and gram-positive microbes and is additionally successful against yeast infection. Adequate information had been acquired to show that silver sulfadiazine will restrain microbes that are impervious to other antimicrobial specialists. Silvadene Cream 1% (silver sulfadiazine) is a topical antimicrobial medication for patients with second-degree and severely burn areas.	Unipharma (Universal Industrial Pharmaceutical Co.) EI-Obour City, Cairo, Egypt
Cinolon Tar	Each 100 g contains: Fluocinolone Acetonide 25 mg Alcoholic extract of tar 5 g	Fluocinolone Acetonide is a corticosteroid which is anti-inflammatory and antipruritic, and has vasoconstricting actions. Alcoholic extract of tar: Tars and its oils can reduce the thickness of the epidermis; they are antipruritic and may be weakly antiseptic. They are used topically in the treatment of a variety of skin disorders including eczema and psoriasis. Cinolon-Tar has been mainly referenced to the treatment of psoriasis and chronic refractory eczema in addition to lichen. Contraindications: Hypersensitivity for all of the ingredients product, skin affections, pyoderma and syphilitic.	Health Lione company
Hydroquinon Domina	Each 100g Cream contains 2 g or 4 g of Hydroquinone.	Hydroquinon Domina Cream works by preventing the production of melanin in the skin. As less and less melanin is created, the obscured skin continuously blurs to match ordinary skin. Hydroquinon Domina Cream is utilized to help restricted regions of hyperpigmented skin such as skin flaws, lentigo, melasma, chloasma, and spots.	Mederal company

Experimental procedure

The medical creams were taken directly and distributed uniformly on the glass slide. Each type of pharmaceuticals was weighed at 1 mg and dispersed on an area of 1x1 cm. This is to ensure about same thickness for all samples. Dual-beam UV/visible absorption spectrophotometer type SP8001 Metertech was used to analyze the absorption spectrum of each sample. The samples were measured in the wavelength range of 300–700 nm.

Results and discussion

Absorption spectrum of Silvazine cream

Fig. 1 shows the correlation between the absorbance and the wavelength for medical cream Silvazine. It is clearly shown that the highest value of absorption spectrum is at a wavelength of 400 nm with an absorption value is 0.213. This result indicates that the absorbance at this wavelength is the maximum value. The

absorbance at wavelength range 300–340 nm represents minimum values and the radiation reaching the skin is at maximum. The wavelength longer than

500 nm shows approximately equal absorbance values which indicate that the amount of sunlight reaching human skin is approximately equal.

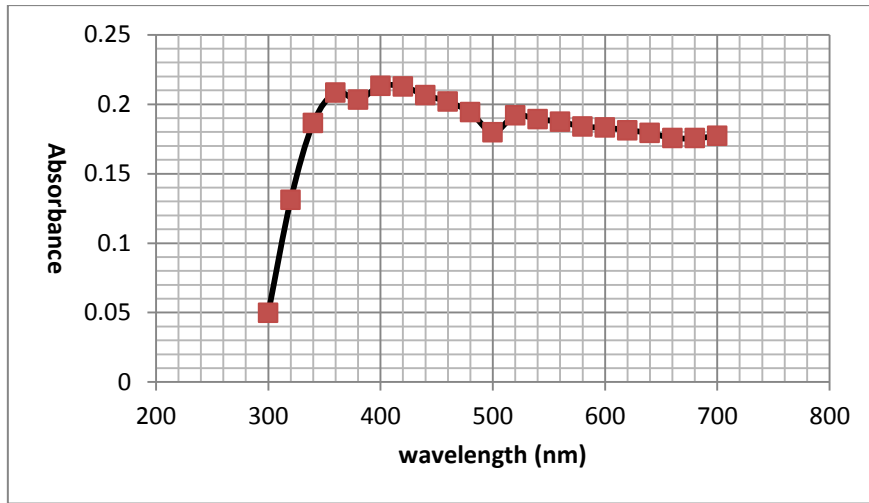


Fig. 1: Absorption spectrum of Silvazine cream.

Absorption spectrum of Cinolon Tar cream

Fig. 2 shows the correlation between the absorbance and the wavelength for medical cream Cinolon Tar. This indicates clearly that the maximum value of absorption spectrum is at a wavelength of 500 nm and is equivalent to 0.195. This result indicates that the absorbance after this

wavelength will result have approximately equal values. The absorbance at the wavelength range 300–440 nm increased gradually and the radiation that reached the skin decreased gradually due to reduced radiation energy. The maximum quantity of sunlight reaching the human skin is at the range of wavelength 300–460 nm.

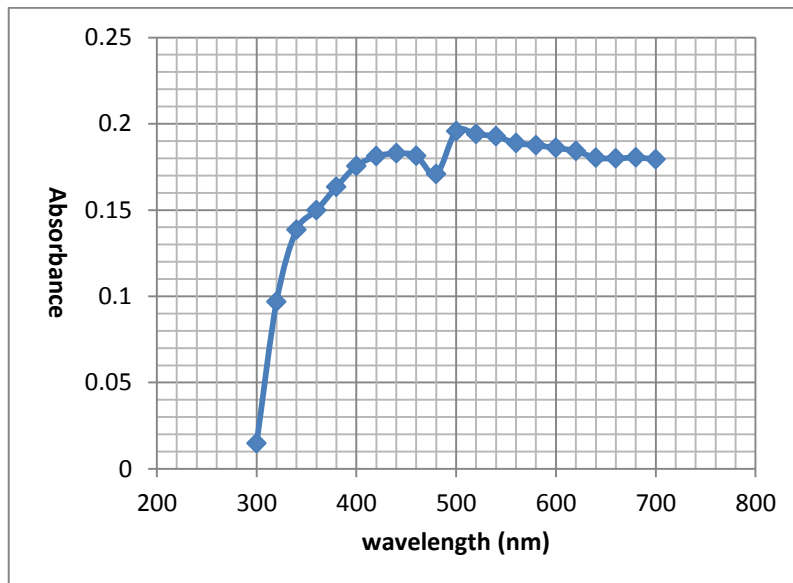


Fig. 2: Absorption spectrum of cinolon Tar cream.

Absorption spectrum of hydroquinon domina cream

Fig. 3 shows the correlation between the absorbance and the wavelength for medical cream Hydroquinon Domina. It is clearly shown that the maximum value of the absorption spectrum is at the wavelength of 400 nm which has 0.2025 absorbance value. This result represents as an indicator that the absorbance after this wavelength was

approximately of equal values except for the value at wavelength 480 nm. The absorbance at wavelength range 300–440 nm increased gradually and the radiation reaching the skin decreased gradually until 500 nm. The absorbance at the wavelength range of 500–700 nm is approximately the same values which has been shown. This showed that the quantity of sunlight that reached human skin at this range is the same.

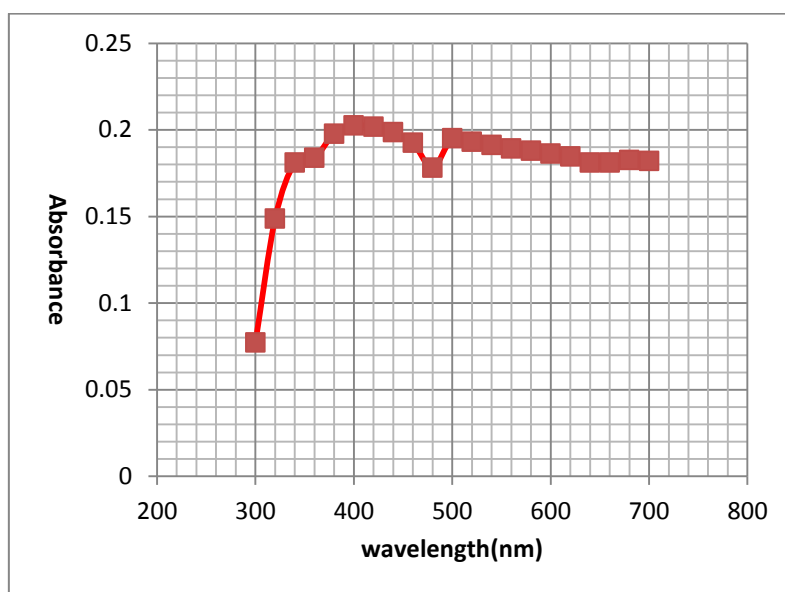


Fig. 3: Absorption spectrum of hydroquinon domina cream.

Conclusions

From this work, an important point that can be concluded is that the absorption spectrum of the medical creams which have been chosen and showed clearly that it is possible to determine the wavelength which delivers the maximum amount of sunlight onto the human skin and thus lead to reduced effectiveness of treatment. The best medical cream chosen relative to other creams is Silvazine, with the highest value for absorbency at 0.2132, while the worst cream is Cinolon Tar where the highest value for absorbency was 0.195.

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