Effect of Antioxidants and Cytotoxic Activities of Apricot (Prunus Armeniaca L.) and Peach (Prunus Persica L.) Kernels Extracts on Experimental Rats

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Effect of Antioxidants and Cytotoxic Activities of Apricot (Prunus Armeniaca L.) and Peach (Prunus Persica L.) Kernels Extracts on Experimental Rats

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Abstract:

Amygdalin (d-Mandelonitrile 6-O-β-d-glucosido-β-d-glucoside) is a naturally occurring disaccharide, a source of hydrogen cyanide (HCN), highly concentrated in fruit kernels from Rosaceae species. It is a medically interesting but controversial compound as it has anticancer activity on one hand and can be toxic on the other hand. Moreover, high dose exposures to amygdalin can produce cyanide toxicity. Twenty-eight male rats weighing (150± 10 g) were fed a basic diet then, rats were divided into seven groups (4 rats) as follows: Group(1) : Negative control group (-ve) was fed on basal diet (BD). Group (2) : Rats fed on BD and 0.5% Peach Kernels Extract PKE. Group (3): Rats fed on BD and 1.5% PKE. Group (4): Rats fed on BD and 0.5% Apricot Kernels Extract AKE. Group (5): Rats fed on BD and 1.5% AKE. Group (6): Rats fed on BD and 0.5% PKE and AKE. Group (7): Rats fed on BD and 1.5% PKE and AKE. Some clinical parameters were determined such as: Liver functions (GOT, GPT) and kidney functions (Urea, Uric Acid and Creatinine) at the end of experimental period. Finally, the results showed that the groups fed 0.5%. PKE, AKE or the mixture recorded the lowest value the group fed 1.5% PKE, AKE or the mixture with a significant difference at ($P \leq 0.05$). In conclusion, the current study proved that 0.5% AKE, PKE, and the mixture achieved the best results, as they had the least harmful and toxic effects on the kidney and liver levels of rats. Therefore, AKE, PKE, and the mixture can be used in our daily drinks and dishes.

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Introduction

Cyanide is one of the most potent and rapidly acting inorganic poisons and it can cause toxicity in animals, principally in ruminants. Although cyanides are released to environment in various forms, the natural source of cyanide ion from plants that contain enough cyanogenic glycosides are the most important cause of hydrogen cyanide poisoning in ruminants **(Gensa, 2019).**

Amygdalin (d-Mandelonitrile 6-O-β-d-glucosido-β-d-glucoside) is a naturally occurring disaccharide, a source of hydrogen cyanide(HCN), highly concentrated in fruit kernels from Rosaceae species, for example, in bitter almonds, apricot and peach **(Flies *et al.*, 2019).** Amygdalin is composed of two molecules of glucose, benzaldehyde and hydrogen cyanide and can exist in the form of two R and S epimers **(Jaszczak *et al.*, 2021)**. Beta-glucosidase stored in compartments of plant cells is also present in the human small intestine and degrades amygdalin into prunasin, mandelonitrile, glucose, benzaldehyde and hydrogen cyanide. The anticancer activity of amygdalin is thought to be related to the cytotoxic effects of enzymatically released HCN and non-hydrolyzed cyanogenic glycosides **(Nowak and Zielińska, 2016). European Food Safety Authority Panel on Contaminants in the Food Chain (CONTAM). (2016),** reported that, amygdalin is the major cyanogenic glycoside present in apricot and peach kernels and is degraded to cyanide by chewing or grinding. Cyanide is of high acute toxicity in humans. The lethal dose is reported to be 0.5–3.5 mg/kg body weight (bw).

Apricot *(Prunus armeniaca L.)* being a good source of nutrients. Apricot kernel is an important source of dietary protein as well as oil and fiber. The kernel is also reported to have high antioxidant and antimicrobial activities. Apricot kernels are mainly used in the production of oils, folk medicine as a remedy for various diseases for example, asthma, cough, and constipation , and also added to bakery products either whole or grounded and also consumed as an appetizer **(Hayta and Alpaslan, 2011).** Apricot content of amygdalin 14 g / kg **(Bolarinwa *et al.*, 2014).**

Peach *(Prunus persica L.)* has many anti-disease properties such as anticancer, anti-allergic, antitumor, antibacterial, antimicrobial, anti-inflammatory **(Hans *et al.*, 2020).** Peach kernel is rich in ascorbic acid (vitamin C),carotenoids (provitamin A), and phenolic compounds that are good sources of antioxidants . Peach content of amygdalin 6.8 g / kg **(Bolarinwa *et al.*, 2014).**

The polyphenols found in Apricot, peaches and plums may help prevent breast cancer cells from forming and later multiplying. Evidence suggests the polyphenols help kill cancerous cells while leaving healthy cells alone **(Adhami *et al.*, 2009).**

The aim of this study was to determine the effect of antioxidants and cytotoxic activities of peach *(Prunus persica L.*) and apricot *(Prunus armeniaca L.)* Kernels extracts and their mixtures on liver and kidneys functions of rats.

2. Materials and Methods

Materials

2.1. Plants: Apricot *(Prunus Armeniaca L.)* and peach kernels *(Prunus Persica L.)* in June 2021 were obtained from countryside in El-Sharkia Governorate in Egypt.

Chemicals: All chemicals used in this study were produced obtained from El-Gomhouria Company and Pharmaceuticals, Zagazig**.**

2.2. Experimental Rats: Twenty-eight male white albino rats 10 weeks age, weighing (150± 10 g) were obtained from the Agricultural Research Center of Giza.

2.3. Analytical Methods

2.3.1 Preparation of plants extracts:

The kernels were separated from the seeds, and the kernels were dried at room temperature, then grinded to fine powder, then 2 g was weighed into a round-bottom flask (500 ml) soaked in absolute ethanol (50 ml) for 12 h **(Othman *et al.*, 2011)**. The organic extract was evaporated by

desktop rotary evaporator **(Buchi rotavapor R-114)** at 55 °C to obtain a viscous oily liquid and stored at - 20 °C **(Cassiem and de Kock 2019).**

2.3.2. Chemical Analysis:

Moisture content, total protein, fat, ash and carbohydrate were determined in peach and apricot according to **Association of Official Analytical Chemists, (2000).** Fiber according to **Pearson (1971).**Total carbohydrate contents of samples were calculated by the difference, according to the equation of **Chatffield and Admas, (1940).**

Total carbohydrate = 100 - (Moisture% +protein % +fat % + ash% + fiber%).

2.3.3. HPLC analysis

Analysis were performed by HPLC-(Agilent 1100) is composed of a two LC- pumps pump, a UV/Vis detector. C18 column (125 mm × 4.60 mm, 5 µm particle size). Chromatograms were obtained and analyzed using the Agilent ChemStation

- **Phenolic compound** was separated by employing a mobile phase of two solvents 0.1% methanol: phosphoric acid (50: 50 v/v, isocratic mode). The flow rate was adjusted to 1.0 mL/min; the detector was set at 280 nm with the mobile phase **(Lin *et al.*, 1996).**
- **For flavonoids** The mobile phase consisted of a binary mixture of methanol /water (50:50 v/v) adjusted to pH 2.8 with phosphoric acid , at isocratic flow rate of 1.0 mL min– 1. **(Kuntic *et al.*, 2007).**

2.4. Biological experimental:

Twenty-eight male rats weighing (150± 10 g) were fed a basic diet then, rats were divided into seven groups (4 rats) as follows:

Table (1): Classification of experimental groups

Group		**Description**
Group 1.	(-ve) control	The rats fed on BD
Group 2.	0.5% PKE	Fed on BD and 0.5% of PKE
Group 3.	1.5% PKE	Fed on BD and 1.5% of PKE
Group 4.	0.5% AKE	Fed on BD and 0.5%of AKE
Group 5.	1.5% AKE	Fed on BD and 1.5%of AKE
Group 6.	0.5% PKE and AKE	Fed on BD and 0.5% mixtures of PKE and AKE
Group 7.	1.5% PKE and AKE	Fed on BD and 1.5% mixtures of PKE and AKE

AKE Apricot kernel extracts PKE Peach kernel extracts

2.5. Biochemical analysis:

2. 5.1: Blood samples:

Blood samples were collected at the end of the experiment period (5 weeks).Using capillary glass tubes, blood was collected into a dry clean centrifugal tube and left to clot in a water bath (37°C) at room temperature for half an hour, plasma was separated by centrifugation at 3000 rpm for 10 minutes to separate the serum and transferred into transparent plastic tubes and kept frozen at (-2 °C) until analyzed.

Liver functions

Determination of serum alanine aminotransferase (ALT) and serum asparatate aminotransferase (AST) were carried out according to the method of **Clinica Chimica Acta, (1980) and Hafkenscheid and Dijt (1979),** respectively.

Kidneys functions

Serum urea was determined according to the enzymatic method of **Patton and Crouch, (1977).** Serum uric acid was determined calorimetrically according to the method of **Barham and trinder**, **(1972).** Creatinine was determined according to kinetic method of **Henry, (1974).**

2.5.2 Histopathology examinations:

Liver and kidneys tissues were taken immediately after sacrificing animals and fixed in 15% buffered neutral formalin solution Histopathology examinations were described according to **Sheehan and Hrapchak, (1980).**

2.5.3. Statistical analysis:

The data were analyzed using a completely randomized factorial design **(SAS, 1988)** when a significant main effect was detected. The means were separated with the Student-Newman-Keuls Test. Differences between treatments at $P \leq 0.05$ were considered significant using Costat Program. Biological results were analyzed by One Way ANOVA.

3. Results and discussion:

3.1. Chemical composition of apricot and peach

The chemical composition of apricot and peach are illustrated in Table (2). Data indicate that there were significant variations between the studied samples in their content of moisture, protein, ash, fat, fiber and carbohydrate. The results showed that, the content of moisture in peach kernel was 6.08 ± 0.11 g / 100 g followed by apricot kernel was (4.38 ±0.08g/100g. On the other side peach kernel recorded the highest percentage of protein and ash (26.3 ± 1.01 and 4.09 ± 0.04 g / 100 g) while, apricot kernel had the lowest mean value (21.3 ± 0.82 and 2.7 ±0.03 g / 100 g). In the same table, apricot and peach kernel contained the highest level of fat (44.04 ± 1.25 and 35.69 ± 1.01 g / 100 g, respectively), which reflects the health of these seeds in the oil industry. Similar results have been reported by **Zayan *et al.*, (2010) and Ahmed *et al.*, (2015).** In addition, it can be shown from the same Table that, apricot kernel had the highest content of crude fiber (3.5± 0.13 g / 100 g), while the peach kernel shows a lower content (3.0 ± 0.11 g / 100 g). In contrast, data showed that the highest level of carbohydrates has occurred in peach kernel (24.84 g / 100 g). These results are coincidence with those of **Tanwar *et al.*, (2018) and Sorour *et al.*, (2021).**

Table 2 . chemical composition of apricot and peach (g / 100 g)

Samples	Apricot	Peach
Moisture	4.38 ±0.08	6.08 ± 0.11
Protein	21.3 ± 0.82	26.3 ± 1.01
Ash	2.7 ±0.03	4.09 ± 0.04
Fat	44.04 ± 1.25	35.69 ± 1.01
Fiber	3.5± 0.13	3.0 ±0.11
T.carbohydrates	24.08±1.63	24.84±1.28

Values are the means of 3 independent determinations

3.2. Phenolic compound of AKE and PKE

The data in tab. 3 showed that the phenolic compounds of Apricot kernels were identified in the range of 2.09 to 14. 56 µg/ gm these vehicles include ferulic (14.56 µg/gm), ellagic (11.54 µg/gm), pyrogallol (9.69 µg/gm), P-coumaric (8.23 µg/gm), caffeic (4.74 µg/gm), epicatechin (2.13 µg/gm) and catechol (2.09 µg/gm), where the predominant compound in Apricot kernel was Ferulic 14.56 µg/gm. In the same Table showed that, peach kernel phenolic compounds range of 1.03 to 13.89 µg/gm. Peach kernel highest level content of Epicatechin was 13.89 µg/ gm. and Syringic 9.05 µg /gm, While, the lowest contents were measured in ellagic, ferulic, and caffeic (3.59, 3.41 and 1.03 µg/gm, respectively). Similarly, **Jaman and Sayeed (2018)** found that ellagic acid , sulforaphane , and ferulic acid , which are found in widely consumed fruits and vegetables, had the ability to inhibit breast cancer cells**.** Coumaric acid had a significant activity against the cellular viability of MCF-7 in a concentration dependent manner **(Kolahi *et al.*, 2016).** Epicatechin has been shown to reduce blood glucose levels in diabetic patients, with antioxidant properties, anti-angiogenic and direct cytotoxicity to cancer cells **(Abdulkhaleq *et al.*, 2017).** The composition of polyphenolic compounds identified in the peach kernels in this study agrees, to some extent, with the identification presented by **Senica *et al.*, (2016).** In studies carried out on kernels of peach and apricots. They showed the presence of phenolic acids: chlorogenic, neochlorogenic, feruloylquinic, dicaffeoylquinic acids and ellagic acid derivatives, as well as

(+)-catechin, (−) epicatechin and flavonols quercetin, keampferol, naringenin, according to **(Nowicka and Wojdyło, 2019).**

Table (3): Phenolic content of AKE and PKE (µg/gm)

Phenolic Compound	Concentration AKE	Concentration PKE
Syringic	-	9.05
Caffeic	4.74	1.03
Ferulic	14.56	3.41
Epicatechin	2.13	13.89
Catechol	2.09	4.11
Ellagic	11.54	3.59
p-coumaric	8.23	-
pyrogallol	9.69	-

AKE Apricot kernel extracts PKE Peach kernel extracts

3.3. Flavonoid compound of AKE and PKE

The data in tab.4 indicated that the main values of flavonoids contents of Apricot and Peach kernel extract. Apricot kernel contains a high amounts of flavonoids mainly Quersestin (10.7 µg/gm), Chrysocriol (9.2 µg/gm), Hisperdin (7.89 µg/gm) and naringin (6.3 µg/gm), while, luteolin, kampferol and rutin were reported to be present by tiny amounts (4.5, 2.1 and 1.2 µg/gm). In peach kernels, the flavonoids compounds; Kampferol, Hisperdin, Quersestin and catechin were present by 11.5, 10.3, 5.0 and 1.86 µg/gm, respectively. Flavones are a subclass of natural flavonoids reported to have an antioxidant, anticancer activity, antimicrobial, estrogenic and anti-inflammatory effects **(Grigalius and Petrikaite 2017 and Kopustinskiene *et al.*, 2020).**

Catechin is a plant polyphenol composed of epicatechin, among the various classes of flavonoids, catechin was found to be the most powerful free radical scavenger. The toxicity of catechin towards bacteria was studied using gram-positive bacteria (B. subtilis) and gram-negative bacteria (E. coli) as model organisms and was found to be more toxic towards gram-positive bacteria. From the results, catechin was found to be beneficial as well as toxic (inhibitory) to the bacteria at a selective concentration

behaving as double-edged swords with an IC50 value of 9 ppm for both the bacteria **(Fathima and Rao , 2016).**

Table.4: Flavonoids content of AKE and PKE (µg/gm)

Flavonoids Compound	Concentration AKE	Concentration PKE
Rutin	1.24	7.23
Naringin	6.33	-
Quersestin	10.77	5.00
Kampferol	2.09	11.58
Luteolin	4.55	2.41
Hisperdin	7.89	10.35
Chrysoeriol	9.22	7.03
Catechin	-	1.86

AKE Apricot kernel extracts PKE Peach kernel extracts

3.4. Effect of PKE and AKE and their mixtures on liver functions

Table 5 showed the effect of different concentrations of 0.5 and 1.5% of peach, apricot and their mixtures on the activity of liver enzymes of AST and ALT rat. The obtained results indicated that the liver enzymes activity AST and ALT of the negative control group recorded the lowest values of 55.00 and 21.0 U/L respectively, compared with the rest of the groups fed peach and apricot kernel and their mixtures at different concentrations. While the highest activity of AST liver enzyme was recorded for the group fed PKE and AKE mixture 1.5% (82.33 U/L). The lowest value and closest to the normal control group was recorded for the group fed PKE 0.5% (59.33 U/L), followed by AKE 0.5% (61.00 U/L) with unsignificant difference compared to control group . On the other hand, the ALT enzyme activity in the negative control group scored the lowest value when compared with the groups (2:7) with a significant difference at ($P < 0.05$) except for 0.5% PEK group. While the highest activity of liver ALT enzyme was recorded for the group fed on a mixture of 1.5% PKE and AKE. The best results were recorded for the groups fed on PKE 0.5% (25.33), followed by AKE 0.5% (29.33 U/L). The results of our study agree with those reached **Baghshani and Ghodsi, (2016) and Kadiri, (2019),**

where noticed that treating mice with different doses of cyanide negatively affected liver and kidney functions in rate.

These increases in the activity of liver enzymes in the groups receiving peach and apricot seed powder and their mixtures may be due to the fact that they contain a high percentage of vitamin B17, which is converted in the body into toxic cyanide **(Kuugbee *et al,* 2016 and Barakat *et al,* 2022**).

Compounds with the CN group, both of the organic (RCN) and inorganic (HCN, CN-anions) origin are absorbed into the body through the gastrointestinal tract, as well as through the respiratory system and skin (**Jaszczak *et al.,* 2017).** In animals, hydrogen cyanide reacts with methemoglobin in the blood, but most cyanide metabolism occurs in tissues (**Abraham *et al,* 2016).** A significant (80%) part of cyanides is detoxified in liver (**Simeonova and Fishbein, 2004).** Taking amygdalin in its natural form, which is cyanogenic glycoside, could easily result into toxicity because of the action of beta glucosidase in human body **(Jaswal *et al.,* 2018).** It was stated that 4 g of amygdalin per day after oral administration in human is enough to cause systemic toxicity **(Song and Xu 2014 and Iyanu, 2020).** Cyanide also has the ability to reduce the ATPs level of the brain and increase the lactate formation by impairing the Kreb's cycle **(Iyanu, 2020**). Some reports indicate a toxicity problem after consumption of apricot and other fruit seeds represented by elevated liver chemistry tests **(Seghers *et al.,* 2013).** Increase in serum ALT indicates liver damage more specifically than AST, **according to AbdelRahman, (2011) and Iyanu, (2020).**

Table.5: Effect of PKE and AKE and their mixtures on liver functions

Groups		AST	ALT
		U/L	
Group 1	Con.(-)	55.00 ± 8.00^{b}	21.0 ± 1.00^{c}
Group 2	PKE 0.5%	59.33 ± 7.76^{b}	25.33 ± 0.57^{c}
Group 3	PEK1.5%	72.00 ± 3.00^{ab}	35.0 ± 4.35^{a}
Group 4	AKE0.5%	61.00 ± 6.00^{b}	29.33 ± 1.52^{b}
Group 5	AKE1.5%	78.33 ± 9.42^{a}	32.66 ± 2.08^{a}
Group 6	PKE andAKE0.5%	75.33 ± 9.50^{a}	33.3 ± 2.51^{a}
Group 7	PKE and AKE 1.5%	82.33 ± 7.52^{a}	35.33 ± 4.85^{a}

The values in each column with different superscript are significantly different at ($p < 0.05$).

AKE Apricot kernel extracts **PKE** Peach kernel extracts

3.5. Effect of PKE, AKE and their mixtures on kidneys functions

The data in tab.6 showed that the negative control group had a significant decrease in the levels of uric acid, creatinine, and urea ($p < 0.05$) compared to the groups fed peach and apricot kernels and their mixtures. The obtained results indicated that the urea level in groups 2, 6, and 4 that were fed with 0.5%, the mean values were 43.93, 45.26, and 48.56 mg/dl, respectively, recorded the lowest value than groups 3, 5, and 7, which were fed with 1.5%. The mean values were 50.26, 51.46, and 55.30 mg/dl, respectively, when compared to the negative control group, 38.43 mg/dl, where the best was group 2 and the worst was group 7. On the other hand, the uric acid level in the negative control group less valuable when compared to other groups (2:7), with significant difference except for 0.5% AKE group. While the level of uric acid in the groups that were fed peach and apricot kernel extract and their mixtures 0.5% recorded the lowest value than the groups fed 1.5%, while group 7 (PKE and AKE mix 1.5%) recorded the highest value compared to the negative control group. In case of creatinine, the level of negative control rats group(0.50 mg/dl) recorded the lower value when compared with other groups with significant difference except for 0.5% of PKE and AKE groups (0.52 and 0.54 mg/dl,

respectively) . While, the highest creatinine level of group recorded for group fed on mix 1.5 % PKE and AKE (0.71 mg/dl). These increases in the activity of kidneys Function in the groups receiving peach and apricot seed powder and their mixtures may be due to the fact that they contain a high percentage of vitamin B17, which is converted in the body into toxic cyanide (**Kuugbee *et al*, 2016 and Barakat *et al*, 2022**).

The results of our study agree with those reached **Baghshani and Ghodsi, (2016) and Kadiri, (2019)** where they noticed that treating rats with different doses of cyanide negatively affected liver and kidney functions in rate. Results of their apricot kernel /amygdalin studies described variety of effects a slight increase in renal parenchyma dystrophy of rabbits fed apricot kernel **(Kolesárová *et al.*, 2017).** The same study showed decreasing tendency in urine urea **(Tušimová *et al.*, 2017).**

Table (6): Effect of PKE, AKE and their mixtures on kidneys functions

Groups		Urea	Uric Acid	Creatinine
		mg/dl		
Group 1	Con.(-)	38.43 ± 2.18^{c}	1.80 ± 0.10^{b}	0.50 ± 0.06^{b}
Group 2	PKE 0.5%	43.93 ± 2.81^{b}	2.40 ± 0.10^{a}	0.52 ± 0.02^{b}
Group 3	PEK1.5%	50.26 ± 3.71^{a}	2.77 ± 0.05^{a}	0.59 ± 0.00^{b}
Group 4	AKE0.5%	48.56 ± 3.78^{ab}	1.90 ± 0.17^{b}	0.54 ± 0.02^{b}
Group 5	AKE1.5%	51.46 ± 2.11^{a}	2.36 ± 0.15^{a}	0.62 ± 0.09^{a}
Group 6	PKE andAKE0.5%	45.26 ± 3.38^{b}	2.40 ± 0.10^{a}	0.61 ± 0.07^{a}
Group 7	PKE and AKE 1.5%	55.30 ± 2.26^{a}	2.63 ± 0.20^{a}	0.71 ± 0.07^{a}

The values in each column with different superscript are significantly different at ($p < 0.05$).

AKE Apricot kernel extracts **PKE** Peach kernel extracts

Histopathological examination of liver:

Microscopic examination of liver sections of rats from group 1 exhibited the normal histological structure of hepatic tissue (photo, 1). Otherwise, liver of rats from group 2 revealed proliferation of kupffer cells (photo, 2). On the other hand, liver of rats from group 3 demonstrated congestion of hepatoportal blood vessel, necrosis of sporadic hepatocytes

photo, 3), small focal hepatocellular necrosis associated with inflammatory cells infiltration (photo, 4). However, sections from group 4 exhibited proliferation of kupffer cells (photos, 5 & 6). Likewise, liver of rats from group 5 described vacuolation of sparse hepatocytes (photo, 7) and congestion of central vein (photo, 8). Meanwhile, liver of rats from group 6 showed proliferation of kupffer cells (photo, 9). On the other hand, liver of rats from group 7 revealed congestion of central vein (black arrow) and congestion of hepatic sinusoids as well as slight vacuolization of sporadic hepatocytes (photos, 10 & 11).

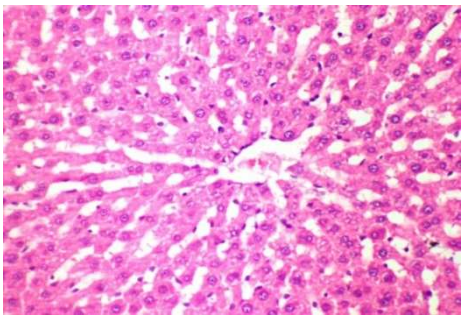

photo (1): Photomicrograph of liver of rat from group 1 showing the normal histological structure of hepatic tissue (H & E X 400).

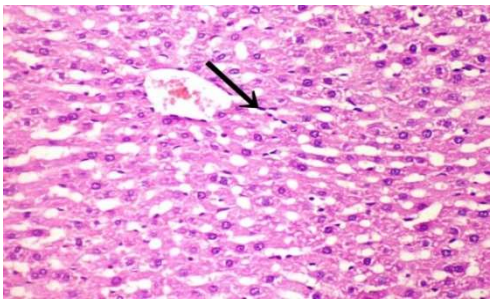

photo (2): Photomicrograph of liver of rat from group 2 showing proliferation of Kupffer cells (arrow) (H & E X 400).

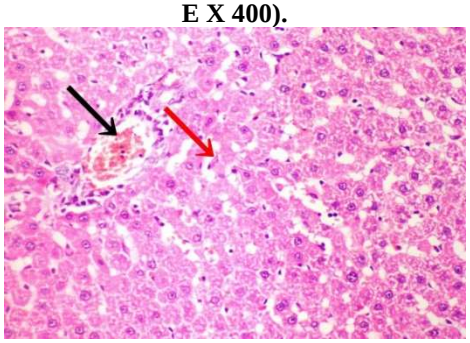

photo (3): Photomicrograph of liver of rat from group 3 showing congestion of hepatoportal blood vessel (black arrow) and necrosis of sporadic hepatocytes (red arrow) (H & E X 400).

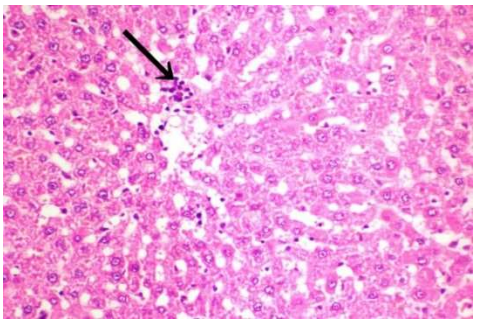

photo (4): Photomicrograph of liver of rat from group 3 showing small focal hepatocellular necrosis associated with inflammatory cells infiltration (arrow) (H & E X 400).

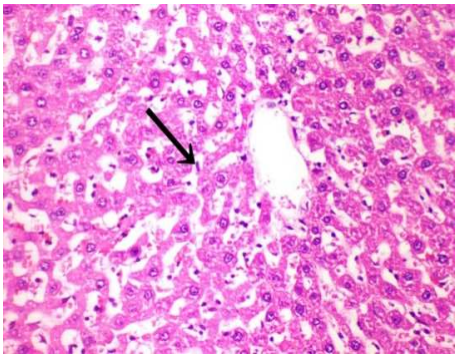

photo (5): Photomicrograph of liver of rat from group 4 showing proliferation of Kupffer cells (arrow) (H & E X 400).

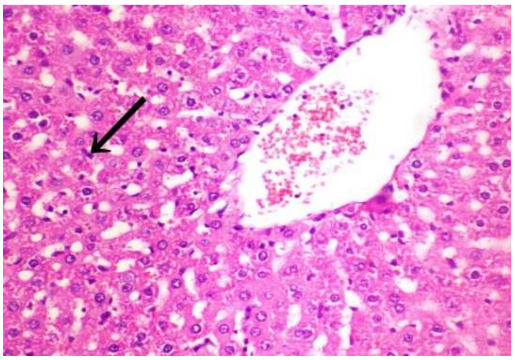

photo (6): Photomicrograph of liver of rat from group 4 showing proliferation of Kupffer cells (arrow) (H & E X 400).

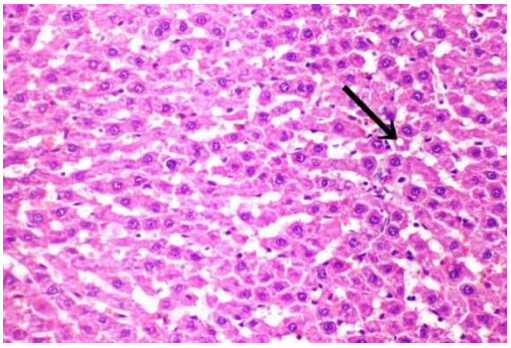

photo (7): Photomicrograph of liver of rat from group 5 showing vacuolation of sparse hepatocytes (H & E X 400).

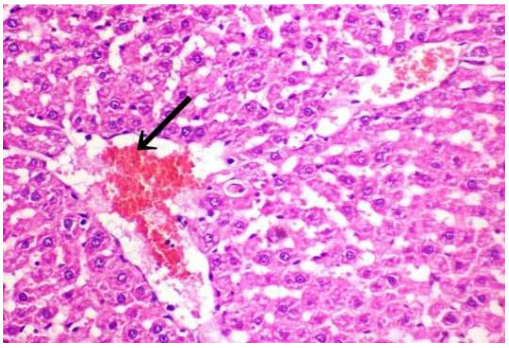

photo (8): Photomicrograph of liver of rat from group 5 showing congestion of central vein (H & E X 400).

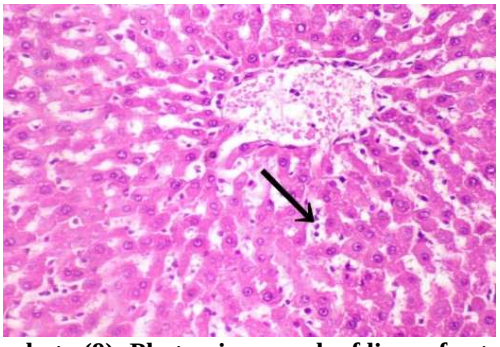

photo (9): Photomicrograph of liver of rat from group 6 showing proliferation of Kupffer cells (arrow) (H & E X 400).

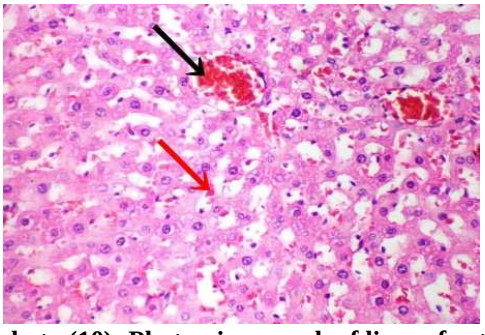

photo (10): Photomicrograph of liver of rat from group 7 showing congestion of central vein (black arrow) and congestion of hepatic sinusoids (red arrow) (H & E X 400).

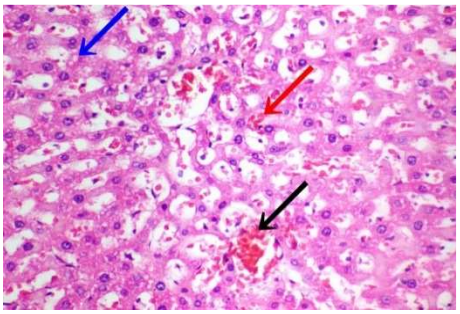

photo (11): Photomicrograph of liver of rat from group 7 showing congestion of central vein (black arrow) and congestion of hepatic sinusoids (red arrow) as well as slight vacuolization of sporadic hepatocytes (blue arrow) (H & E X 400).

Histopathological examination of kidneys:

Microscopically, kidneys of rats from group 1 exhibited the normal histological architecture of renal tissue (photo, 1). Otherwise, some kidneys sections of rats from group 2 revealed normal histological structure of renal parenchyma (photo, 2). Moreover, kidneys of rats from group 3 exhibited no histopathological alterations (photo, 3) except slight vacuolar degeneration of epithelial lining sparse renal tubules in some sections (photo, 4). Likewise, showing slight vacuolar degeneration of epithelial lining sparse renal tubules was the only change observed in kidneys of rats from group 4 (photo, 5). Meanwhile, kidneys of rats from group 5 revealed showing congestion of renal blood vessel (photo, 6) and slight vacuolar degeneration of epithelial lining sparse renal tubules (photo, 7). However, kidneys of rats from group 6 described showing slight vacuolar degeneration of epithelial lining sparse renal tubules (photo, 8). Meanwhile, kidneys of rats from group 7 revealed slight congestion of glomerular tuft and intertubular blood vessels (photo, 9).

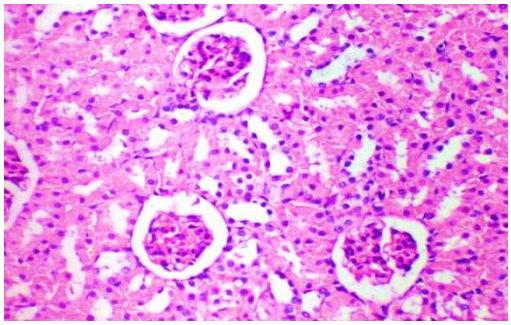

photo (1): Photomicrograph of kidney of rat from group 1 showing the normal histological architecture of renal tissue (H & E X 400).

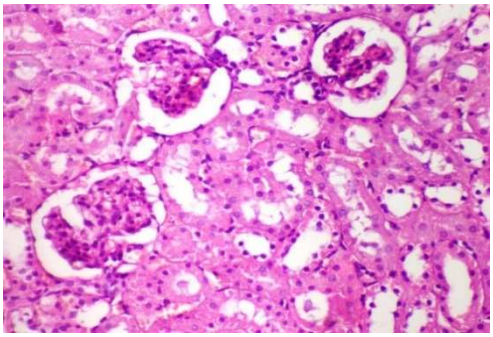

photo (2): Photomicrograph of kidney of rat from group 2 showing normal histological structure of renal parenchyma (H & E X 400).

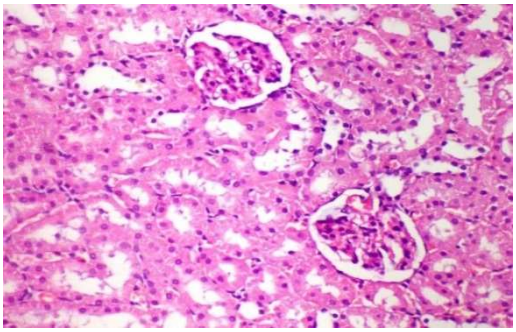

photo (3): Photomicrograph of kidney of rat from group 3 showing no histopathological alterations (H & E X 400).

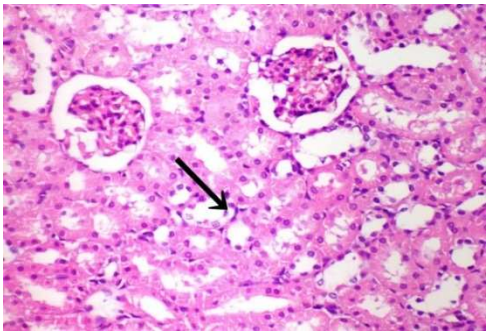

photo (4): Photomicrograph of kidney of rat from group 3 showing slight vacuolar degeneration of epithelial lining sparse renal tubules (black arrow) (H & E X 400).

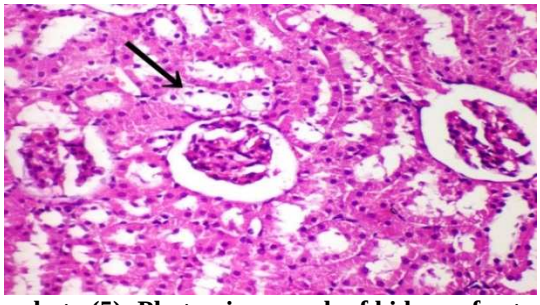

photo (5): Photomicrograph of kidney of rat from group 4 showing slight vacuolar degeneration of epithelial lining some renal tubules (black arrow) (H & E X 400).

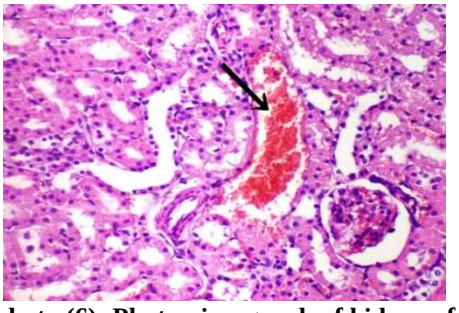

photo (6): Photomicrograph of kidney of rat from group 5 showing congestion of renal blood vessel (black arrow) (H & E X 400).

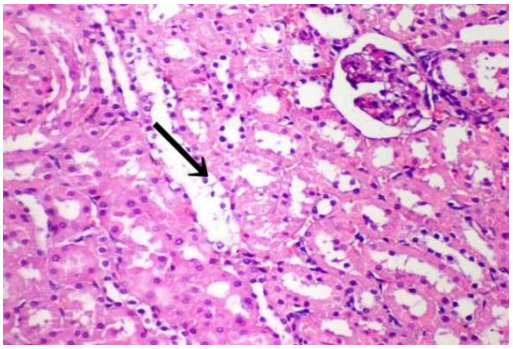

photo (7): Photomicrograph of kidney of rat from group 5 showing slight vacuolar degeneration of epithelial lining sparse renal tubules (black arrow) (H & E X 400).

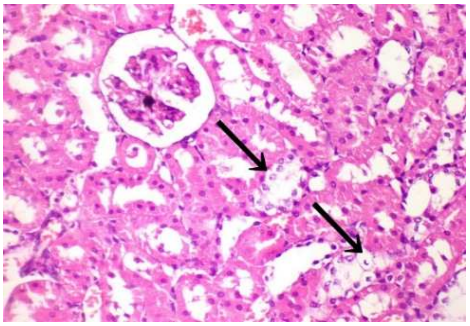

photo (8): Photomicrograph of kidney of rat from group 6 showing slight vacuolar degeneration of epithelial lining sparse renal tubules (black arrow) (H & E X 400).

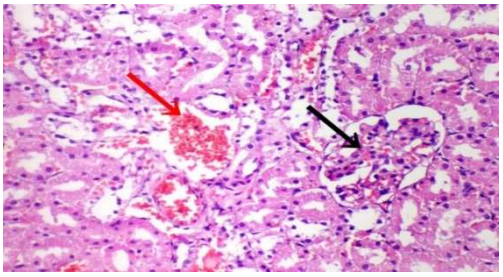

photo (9): Photomicrograph of kidney of rat from group 7 showing slight congestion of glomerular tuft (black arrow) and intertubular blood vessels (red arrow) (H & E X 400).

Conclusion

Apricot and peach kernels contain amygdalin, and due to its importance as an antioxidant and anticancer, it decomposes into toxic hydrogen cyanide, so we recommend through the study to administer in concentrations less than 0.5 ml, followed by 1.5 ml of apricot and peach kernel extracts to avoid toxicity and harmful effects to humans . The recommended dose of apricot and peach kernel extracts was 5 to 15 mL (average 10 mL) per kg body weight per day (equivalent to 0.5 to 1.5 mL/kg body weight of mice) for use as an anticancer.

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الملخص العربي:

الاميجدالين هو عبارة عن جليكوسيد يحدث بشكل طبيعي ، وهو مصدر لسيانيد الهيدروجين (HCN) ، ويتركز بدرجة عالية في حبات الفاكهة من أنواع الوردية. إنه مركب مثير للاهتمام طبيًا ولكنه مثير للجدل لأنه يحتوي على نشاط مضاد للسرطان من ناحية ويمكن أن يكون سامًا من ناحية أخرى. علاوة على ذلك ، يمكن أن يؤدي التعرض لجرعات عالية من الأميغدالين إلى سمية السيانيد. تم تغذية ٢٨ من ذكور الفئران وزنها (١٥٠ ± ١٠ جم) بنظام غذائي أساسي ، ثم قسمت الفئران إلى سبع مجموعات (٤ فئران) على النحو التالي: المجموعة (١): المجموعة الضابطة السلبية(-) : تم تغذيتها على الوجبة الاساسيه (BD). المجموعة (٢): التى تم تغذيتها على الوجبة الاساسيه مع مستخلص نواة الخوخ (PKE) بنسبة ١,٥٪. المجموعة (٣): التى تم تغذيتها على الوجبة الاساسيه مستخلص نواة الخوخ بنسبة ١,٥٪. المجموعة الرابعة: التى تم تغذيتها على الوجبة الاساسيه مع مستخلص نواة المشمش(AKE) بنسبة ١,٥٪. المجموعة (٥): التى تم تغذيتها على الوجبة الاساسيه مع مستخلص نواة المشمش بنسبة ١,٥٪. المجموعة (٦): التى تم تغذيتها على الوجبة الاساسيه مع خليط من مستخلص نواة المشمش والخوخ بنسبة ١,٥٪. المجموعة (٧): التى تم تغذيتها على الوجبة الاساسيه مع خليط من مستخلص نواة المشمش والخوخ بنسبة ١,٥٪. تم تحديد بعض المتغيرات السريرية مثل: وظائف الكبد (GOT، GPT) ووظائف الكلى (اليوريا وحمض اليوريك والكرياتين) في نهاية فترة التجربة. وأخيرا أظهرت النتائج أن المجموعات التى تغذت على مستخلص نواة المشمش والخوخ و الخليط بنسبة ١,٥٪. سجلت أقل قيمة للمجموعات التي تمت تغذيتها بنسبة ١,٥٪ مع اختلاف معنوي عند ($P\leq0.05$). في الختام أثبتت الدراسة الحالية أن نسبة ١,٥٪ حقق أفضل النتائج وتأثيرات أقل ضرراً وسمية على مستويات الكلى والكبد لدى الفئران. لذلك ، يمكن استخدام مستخلص نواة المشمش والخوخ و الخليط في مشروباتنا وأطباقنا اليومية