DOI: https://doi.org/10.36811/jca.2022.110038 **JCA: April-2022: Page No: 07-12**

Universal Journal of Chemistry and Applications

Review Article **Open Access**

The role effect of phenolic compounds of graviola on enhance lipid profile in male rabbits

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***Received Date:** Mar 14, 2022 / **Accepted Date:** Mar 30, 2022 / **Published Date:** Apr 01, 2022*

Abstract

Graviola, called is annona muricata an evergreen plant of the Annonaceae family, mainly distributed in tropical and subtropical parts of the world. The major bioactive components of graviola is acerogenins, rutin, quercetin, kaempferol which have been shown to have anticancer and anti-arthritis. Rabbits were orally given sublethal dose of graviola (100 mg/kg BW) was given alone. The tested doses were given to rabbits every day for 6 weeks. Results showed that graviola caused a significant (PB/0.05) decrease in the levels of plasma cholesterol, triglyceride (TG) and low density lipoprotein (LDL), while the level of high density lipoprotein (HDL) increased.

Keywords: Paracetamol; TBARS; Glutathione S-Transferase; Rabbits

Cite this article as: Hameda TA, Fathia MA, Fayrouz AK. 2022. The role effect of phenolic compounds of graviola on enhance lipid profile in male rabbits. J Chem Appl. 4: 07-12.

Introduction

Graviola, which belongs to the Annonaceae family, is commonly known as annona. muricata Linn soursop, or guanabana. It is native to sub-Saharan countries though it is now widely cultivated in many tropical countries in the world such as India, Malaysia and Nigeria [1]. Often, this plant is sought for its therapeutic effects. Each part of the tree i.e. the root, stem-bark, leaves, fruit and even the seed is used in traditional medicines around the world [2]. The supposed therapeutic benefits of the soursop have attracted intensive research on the chemical composition of the leaves and seeds that has led to the finding of acetogenin compounds [3]. This molecular structure is a very potent compound against cancer as it deprives the high-energy demanding cancer cells of adenosine triphosphate (ATP) supply via the disruption of the mitochondrial electron transport system, resulting in apoptosis [4]. These isolated compounds, which are secondary metabolites/antioxidants, answer the potential of the soursop for possessing anti-cancer, insecticidal, sedating as well as pain and immunosuppressing properties [5]. Additionally, graviola leaf aqueous extract was found to alleviate the pancreatic B-cells of Streptozotocintreated diabetic rats by directly quenching lipid peroxides and indirectly enhancing production of endogenous antioxidants, thus addressing its antioxidant

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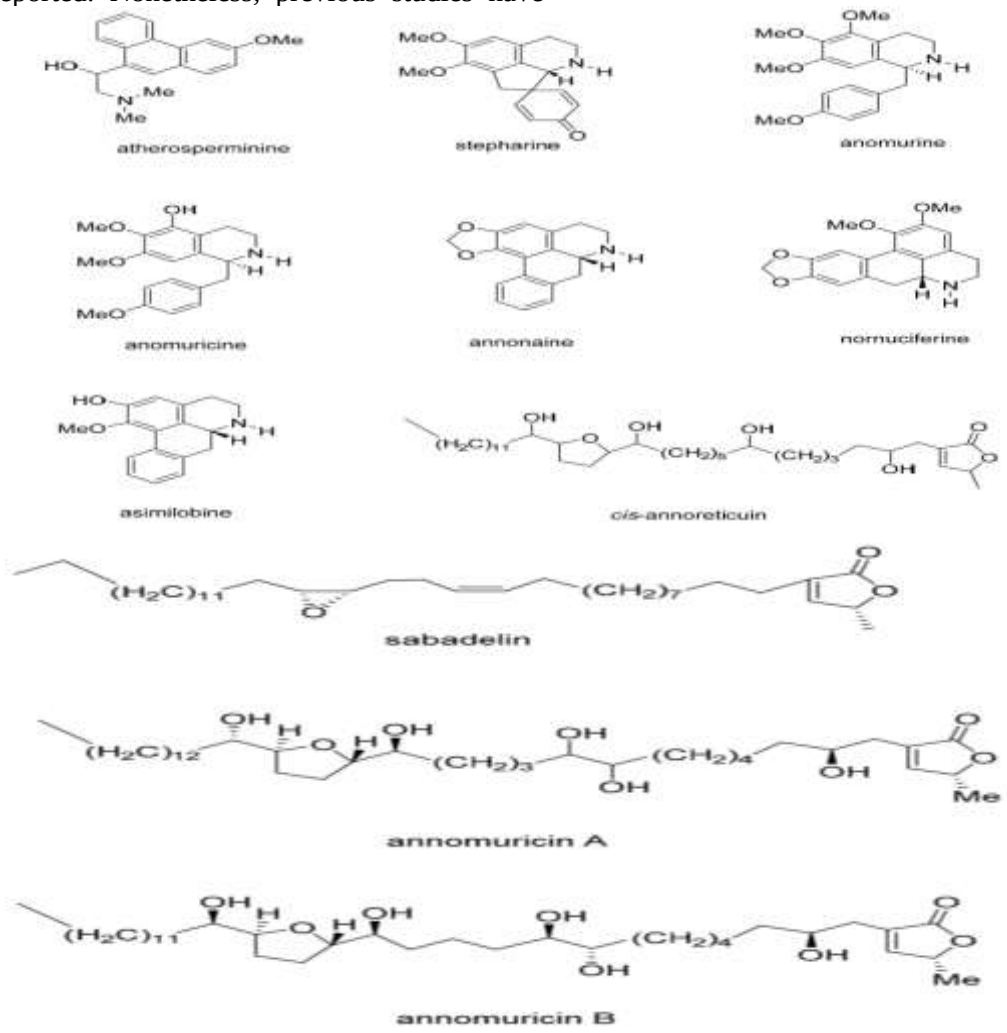
potential [6,7], reported that the hepatoprotective and antioxidant activity of soursop stem bark extract against oxidative stress in rats induced by DM as determined from plasma enzyme markers. According to [8], ethanol-induced gastric injury in rabbits could be treated by ethyl acetate extract of graviola leaves, which provide a suppressive effect against oxidative damage and a preservative effect on gastric wall mucus. Despite extensive research into the antioxidant level and activity possessed by graviola and its effectiveness in treating disease, a comparative study of the antioxidant level and activity of graviola obtained from different locations has not been reported. Nonetheless, previous studies have shown that there are different levels of antioxidant/phenolic content among plants of similar species. Extensive phytochemical evaluations on different parts of the A. muricata plant have shown the presence of various phyto constituents and compounds, including alkaloids (ALKs) [9,10], megastigmanes (MGs) [11], Flavonol triglycosides (FTGs) [12], phenolics (PLs) [13], cyclopeptides (CPs) and essential oils [14,15] (Figure 1). However, Annona species, including A. muricata, have been shown to bea generally rich source of annona ceousace to gen in compounds (AGEs) [16].



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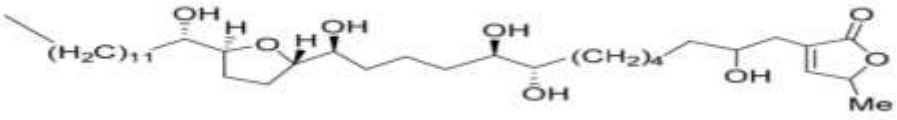

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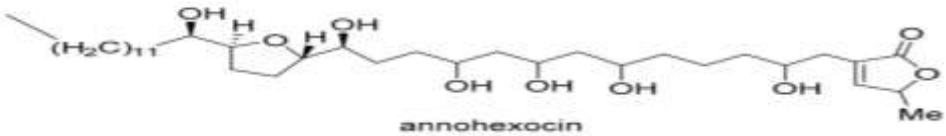
annomutacin

annonacin A



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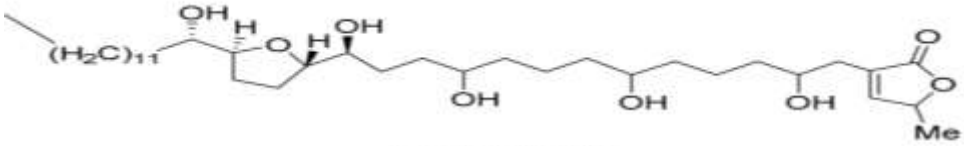

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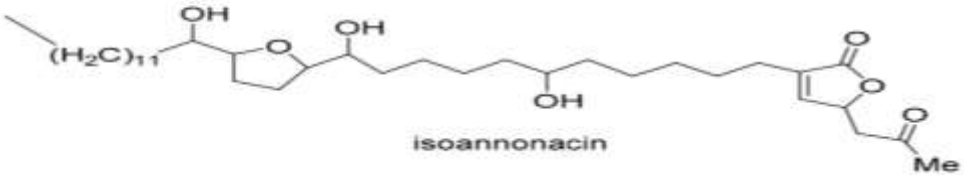

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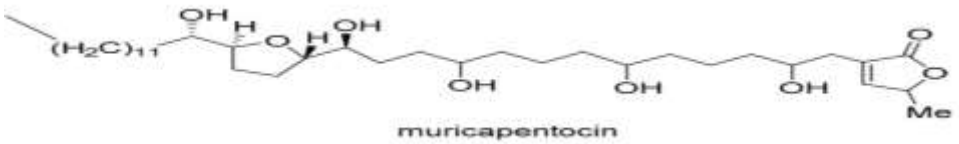

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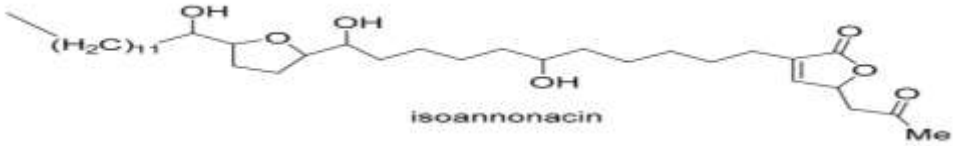

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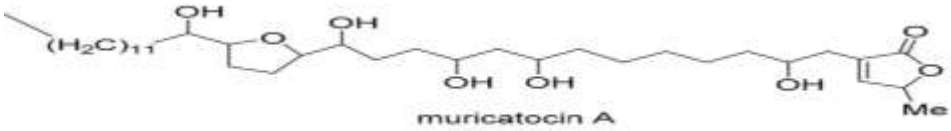

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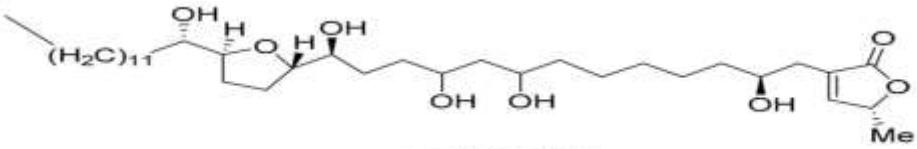

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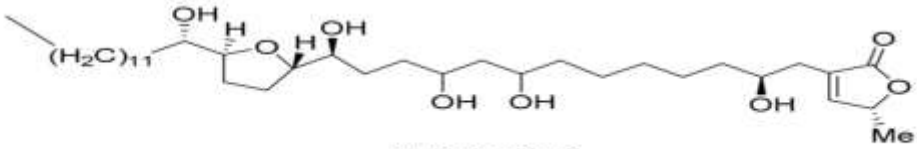

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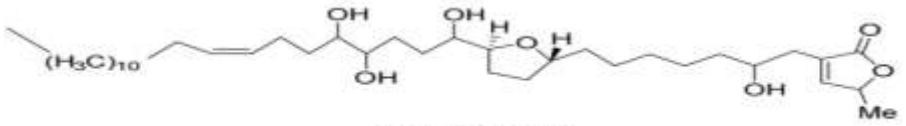

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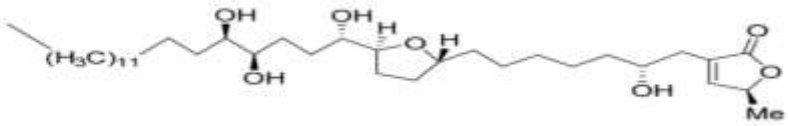

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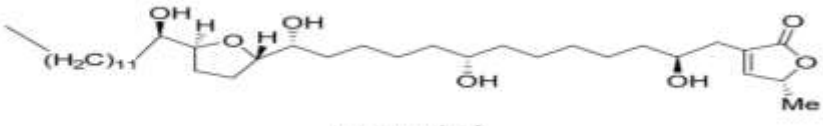

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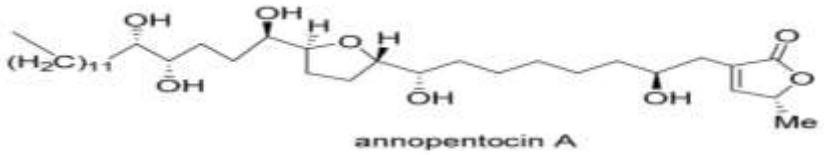

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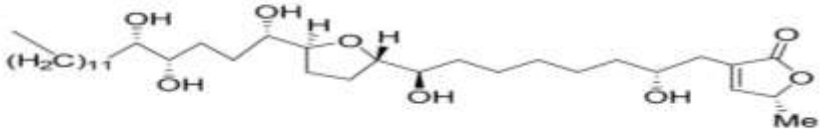

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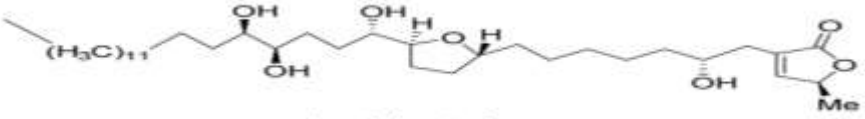

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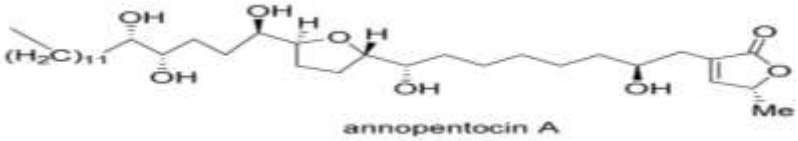

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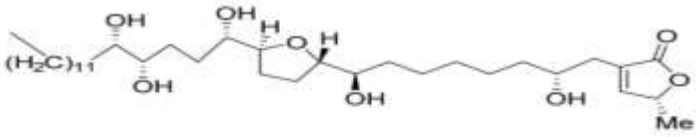

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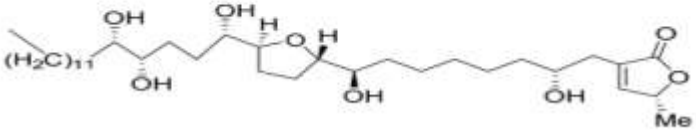

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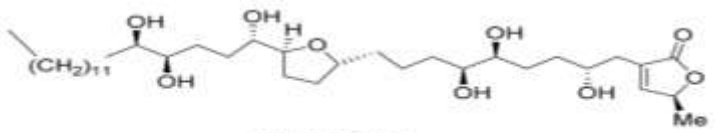

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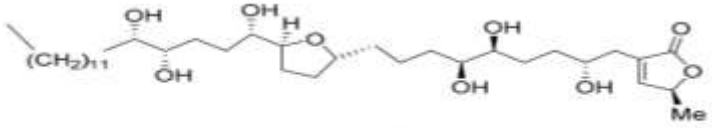

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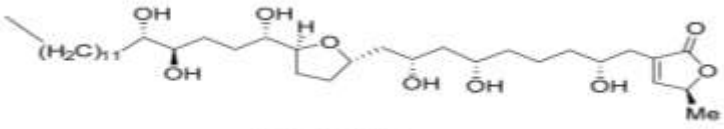

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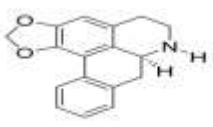

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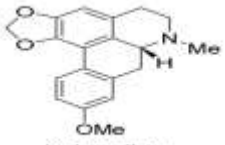

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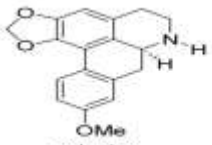

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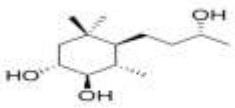

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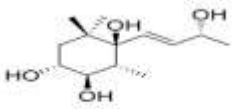

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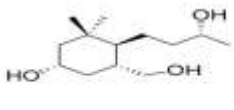

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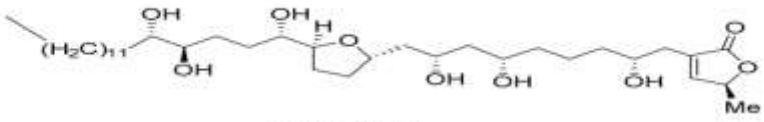

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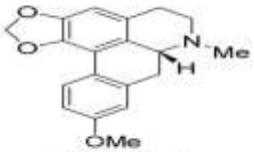

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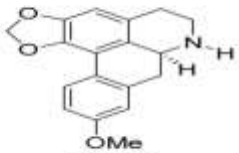

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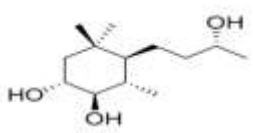
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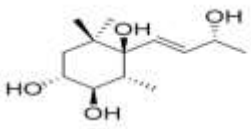
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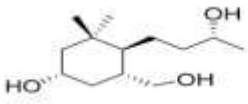
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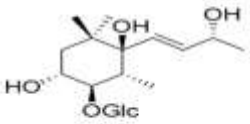
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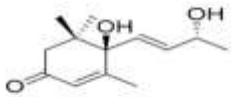
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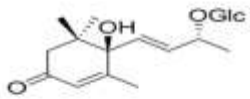
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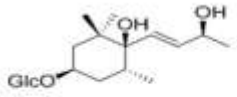
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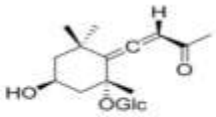
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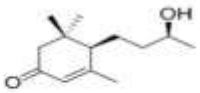
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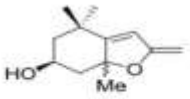
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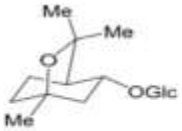
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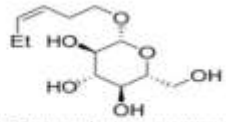
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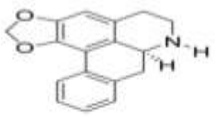
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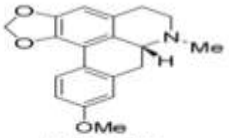
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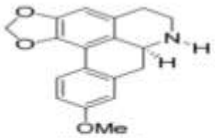
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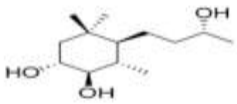
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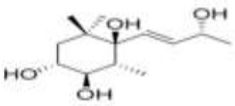
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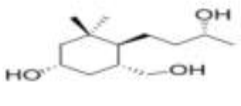
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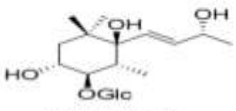
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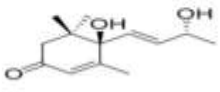
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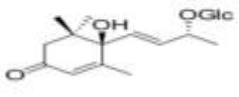
roseoside

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DOI: https://doi.org/10.36811/jca.2022.110038 **JCA: April-2022: Page No: 07-12**

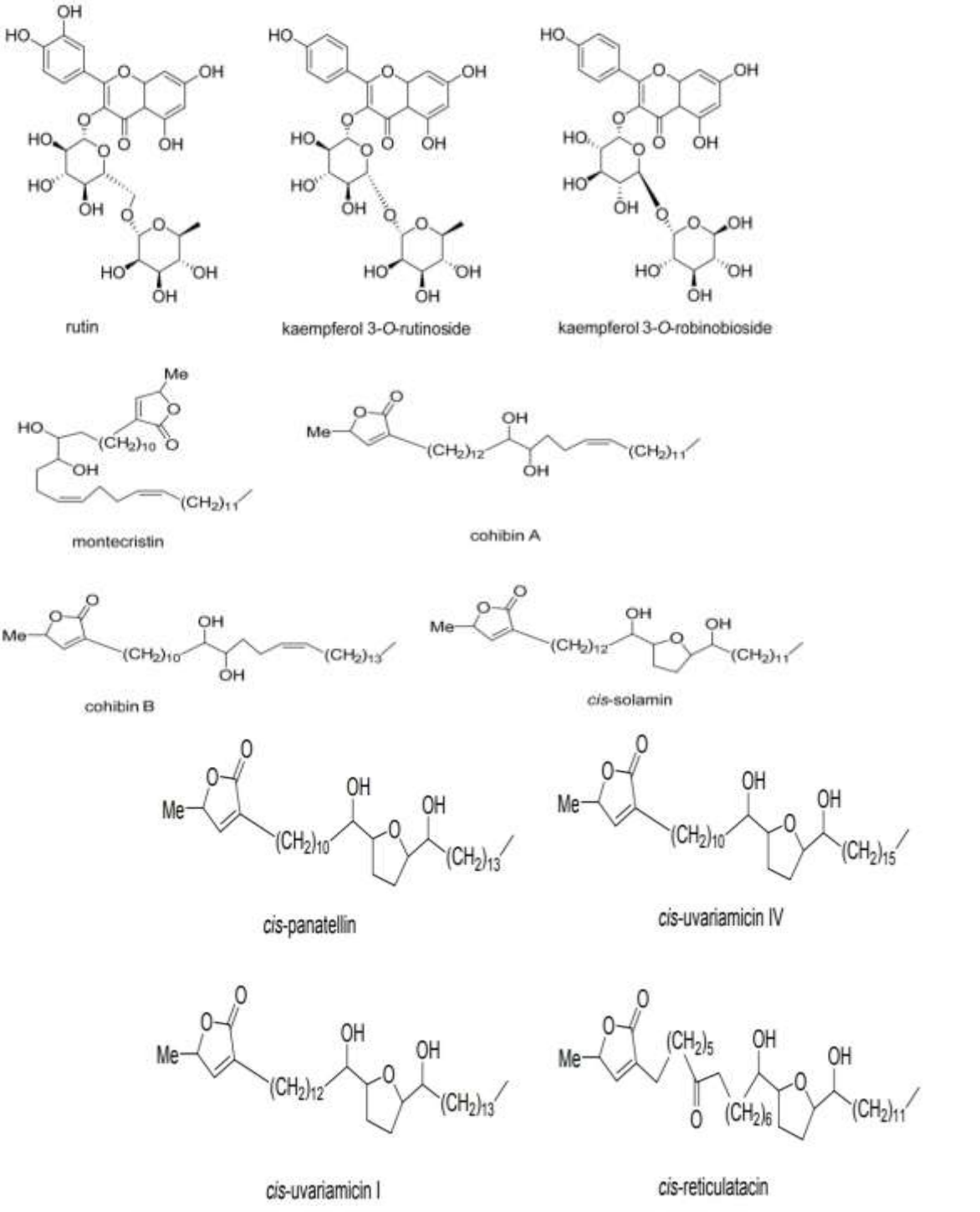

Figure 1: Chemical structures of the major compounds isolated from Graviola

DOI: https://doi.org/10.36811/jca.2022.110038 JCA: April-2022: Page No: 07-12

Materials and Methods

Tested compounds

In this study graviola was purchased from maximum international company, Brasil. Each capsule contains 3 g powder and the content of each capsule was dissolved in corn oil just before use.

Experimental animals

Mature male New Zealand White rabbits (age of 6 months and initial weight of (1.641 ± 27.2 Kg) were used. Animals were individually housed in cages and weighed weekly throughout 6- Week experimental period. Ten mature male rabbits were randomly divided into two groups (each five rabbits) as follows: - Group I: Rabbits were used as control daily for six successive weeks. Group II: Rabbits were treated with graviola was given daily by gavage at a dose of 100 mg/kg B.W, [17-19], which dissolved in corn oil for four successive weeks.

Blood Specimens

Blood samples about 3 ml were collected from the ear vein of all animals every week throughout the 6-week experimental period. Blood samples were obtained in the morning before accesses to feed and water and placed immediately on ice. The blood samples were collected in tube containing heparin to obtain plasma. Plasma was obtained by centrifugation of samples at 860×g for 20 min, and was stored at (–20°C) until used for analysis. Stored plasma samples were analyzed for cholesterol and triglycerides (TG) were determined according to the methods of [20-22], respectively. High-density lipoprotein-cholesterol (HDL-c) was determined according to the methods of [23]. Low-density lipoprotein-cholesterol (LDL-c) was determined by the calculation (cholesterol-(TG/5+HDL-c).

Statistical Analysis

Where applicable, statistical analysis was carried out in Minitab software (version17)/ GraphPad prism8; statistical significance was assessed using ANOVA analysis with Tukey multiple comparison test after detection normal distribution to the data and appropriate $P < 0.05$ consider significant.

Results

Tables 1 illustrated the effect of graviola on the levels of total cholesterol (TC), triglyceride (TG), high and low-density lipoprotein-cholesterol (HDL-c and LDL-c) in blood plasma of male rabbits. The levels of, TC, TG,and LDL-c were significantly ($P<0.05$) decreased, while HDL-c, were significantly ($P<0.05$) increased in plasma of rabbits treated with graviola as compared with control group.

Table 1: Weekly average of plasma total cholesterol (TC; mg/dl) of male rabbits treated with graviola (means ± SE).

	Experimental groups	**Graviola**
Weeks	**Control**	120.0 ± 0.00
1	120.2 ± 1.54	111.0 ± 0.94
2	121.3 ± 2.46	93.25 ± 3.21
3	120.2 ± 0.47	84.20 ± 2.49
4	119.7 ± 0.31	77.85 ± 3.76
5	119.6 ± 0.51	76.82 ± 4.40
6	119.4 ± 0.40	**93.85 ± 7.92^{c}**
Overall means	**120.1 ± 1.16^{bc}**	

Data are expressed as mean ± SE of 5 rabbit. Within each row, means with different superscript (a, b, c or d) were significantly different at $p<0.05$. Where means superscripts

DOI: https://doi.org/10.36811/jca.2022.110038 JCA: April-2022: Page No: 07-12

with the same letters mean that there is no significant difference (p>0.05).

Table 2: Weekly average of plasma - triglyceride (TG; mg/dl) of male rabbits treated with graviola, (means ± SE).		
	Experimental groups	
Weeks	**Control**	**Graviola**
1	55.9 ± 0.39	57.0 ± 3.00
2	57.4 ± 1.83	58.0 ± 4.11
3	57.3 ± 0.50	52.5 ± 4.83
4	56.3 ± 5.25	47.3 ± 5.44
5	57.0 ± 2.10	46.2 ± 2.53
6	55.9 ± 0.39	57.0 ± 3.00
Overall means	**57.1 ± 1.0^{b}**	**50.17 ± 1.8^{a}**

Data are expressed as mean ± SE of 5 rabbit. Within each row, means with different superscript (a, b, c or d) were significantly different at p<0.05. Where means superscripts with the same letters mean that there is no significant difference (p>0.05).

Table 3: Weekly average of plasma high-density lipoprotein- cholesterol (HDL-c; mg/dl) of male rabbits treated with graviola (means ± SE).		
	Experimental groups	
Weeks	**Control**	**Graviola**
1	45.16 ± 0.62	44.50 ± 1.56
2	44.56 ± 0.56	45.00 ± 1.51
3	44.45 ± 0.28	47.25 ± 0.79
4	44.46 ± 0.75	47.53 ± 0.92
5	43.97 ± 0.67	49.00 ± 0.71
6	44.35 ± 0.67	50.12 ± 1.48
Overall means	**44.51 ± 0.58^{a}**	**47.23 ± 1.43^{b}**

Data are expressed as mean ± SE of 5 rabbit. Within each row, means with different superscript (a, b, c or d) were significantly different at p<0.05. Where means superscripts with the same letters mean that there is no significant difference (p>0.05).

Table4: Weekly average of plasma low-density lipoprotein-cholesterol (LDL-c; mg/dl) of male rabbits treated with graviola (means ± SE).		
	Experimental groups	
Weeks	**Control**	**Graviola**
1	63.92 ± 2.03	63.69 ± 7.41
2	65.08 ± 2.41	60.15 ± 2.54
3	64.41 ± 0.54	57.75 ± 1.85
4	63.97 ± 0.98	55.56 ± 1.45
5	64.25 ± 0.97	54.31 ± 3.60
6	63.66 ± 0.62	53.51 ± 3.48
Overall means	**64.22 ± 1.33^{a}**	**57.49 ± 3.91^{b}**

Data are expressed as mean ± SE of 5 rabbit. Within each row, means with different superscript (a, b, c or d) were significantly different at p<0.05. Where means superscripts with the same letters mean that there is no significant difference (p>0.05).

Discussion

Numerous considers have shown that utilization of vegetables and natural products are emphatically related to lower rate of a few incessant no communicable illnesses. In spite of the fact that composition of natural product and vegetable juices is distinctive from that of the consumable parcel of natural products and vegetables, they contain polyphenols and vitamins from natural products and vegetables. Drinking vegetable and natural product juices is exceptionally well known in numerous nations, conjointly an effective way to make strides utilization of natural products and vegetables. The considers appeared that natural product and vegetable juices influence cardiovascular chance variables, such as bringing down blood

DOI: https://doi.org/10.36811/jca.2022.110038 JCA: April-2022: Page No: 07-12

weight and progressing blood lipid profiles. The most components of activity included antioxidant impacts, advancement of the angles of the cardiovascular framework, hindrance of platelet conglomeration, anti-inflammatory impacts, and avoidance of hyperhomocysteinemia. Drinking juices may be a potential way to progress cardiovascular wellbeing, particularly blends of juices since they contain a assortment of polyphenols, vitamins, and minerals from distinctive natural products and vegetables. [24] reports that A. muricata brings down hypertriglyceridemia and hypercholesterolemia in alloxan-induced diabetic rats. [25] illustrated that natural product and vegetable juice decrease add up to cholesterol within the body and improve cholesterol profile within the blood. The progressing blood lipids impacts of the juice mix were ascribed to the tall substance of add up to polyphenol.

Conclusion

The effects of graviola on lipid profile. A large number of studies supported the view that consumption of graviola could prevent the increase of blood pressure and improve lipids.

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