LETTER TO THE EDITOR

Hydroxymethyl ester derivative of hexadecanoic acid: A possible hepatoprotectant from pulp of *Cucurbita pepo*

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Sir,

Every year, hepatic diseases claim the lives of thousands of individuals worldwide. Despite tremendous advancements in modern medicine, there are currently no completely efficient drugs that support liver function, offer complete organ protection, or aid in hepatocyte regeneration. Numerous investigations have documented the protective effects of phytochemical substances found in medicinal plants against various liver diseases.[1] Therefore, finding medicinal plants with hepatoprotective, antioxidant, preventative, and therapeutic potential against liver disorders has received a lot of interest.

Cucurbita pepo, a member of the Cucurbitaceae family, is a well-known edible plant frequently grown and utilized in herbal remedies and functional foods. Fractions of pumpkin are a rich source of minerals, lipids, proteins, fatty acids, and carbs. Pumpkin fractions have been discovered to contain particular types of phytochemical substances, such as phenolics, flavonoids, tocopherols, fatty acids, carotenoids, terpenoids, cucurbitacin, mochatine, and phytosterols. Every portion of *C. pepo* has superior phytochemistry and can benefit health.[2]

New pumpkin fruits were bought from a neighborhood shop in Kashipur, Uttarakhand. Patanjali, Haridwar, Uttarakhand, verified it (Accession No. 5101). After rinsing and cleaning the fruits were sliced into little pieces. Fruit peels and pulp were removed individually, dried in the shade, and then ground into a fine powder in the lab using an electric mixer. Both portions' powders were kept dry and utilized as stock samples for additional analysis.10 g of finely powdered pulp was extracted using 100 mL of hydro-ethanol solvent, which contained 70:30 ratios of ethanol to water. After 24 hours at room temperature, the extract was filtered through Whatman filter paper and subjected to three further extractions. After finishing, the extract was dried, evaporated at room temperature, and separated through various solvents to get aqueous extract.

GC-MS analysis was performed on the extracts to identify the bioactive chemicals present. The GC-MS (GC Clarus 500 Perkin Elmer) analysis (AOC-20i) was conducted under the following conditions using a system with an auto-sampler: Front inert temperature of 220°C; column HP of 5 milliseconds; carrier gas of 99.99% helium at a steady flow rate of 1 mL per minute. 10°C per minute was the oven's temperature range. The temperature of the GC interface and the ion chamber were 250°C. The Quadruple Double Focusing Analyzer was utilized for mass analysis, and for detection, a Photon Multiplier tube was employed. At 70eV, mass spectra were recorded. All information was acquired by gathering full-scan mass spectra in the 50–600 amu scan range. The composition of the crude extract constituents was expressed as a percentage by peak area.[3]

The aqueous extract was examined using the GC-MS technique to determine whether any potential compounds were present in the extract. The occurrence of many peaks in the *C. pepo* aqueous fraction suggests the presence of multiple phytocompounds. The chemical characteristics of the phytocompounds allowed for additional recognition. The findings indicate a 40.66 percent chance of finding different types of Hexadecanoic acid (Figure 1).

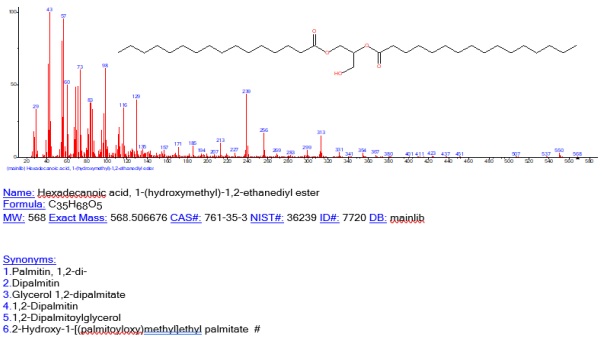

Figure 1: 1-(hydroxymethyl)-1,2-ethanediyl ester of Hexadecanoic acid identified from the aqueous fraction of pulp of *C. pepo* by GC-MS analysis

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Table 1: Some recent findings on the Hepatoprotective activity of Hexadecanoic acids

Compound	*Biological activity*
Hexadecanoic acid	*C. pepo*'s fatty acids improve liver function in rats, reducing inflammation and necrosis,[5]
	N-Hexadecanoic acid is a recognized anti-inflammatory compound[6]
	C. pepo's liver protection may come from single or multiple substances[7]
	Hexadecanoic acid and its derivatives exhibit hepatoprotective, anticancer, and antioxidant properties.[8]

Prior studies have documented the hepatoprotective properties of many phytoconstituents, including flavonoids, triterpenes, saponins, alkaloids, and fatty acids.[4] The Hexadecanoic acid previously reported to be a hepatoproctent was discovered to be the most concentrated ingredient in the current study's aqueous extract, followed by octadecanoic acid, glycidyl oleate, ergosta-5,22-dien-3-ol, acetate, and (3á,22E) acetate (Table 1). Because they are competitive inhibitors of cyclooxygenase or lipoxygenase, the fatty acid-related substances found in *C. pepo* have anti-inflammatory properties because they reduce the synthesis of prostaglandins and leukotrienes.

Changes in the equilibrium of the body's defense against oxidation are the cause of liver-related issues, a significant global health concern. Natural antioxidants work against the oxidative stress caused by liver toxins and can thus, act as a hepatoprotectant. The compound 1-(hydroxymethyl)-1,2-ethanediol ester of Hexadecanoic acid has demonstrated properties such as antioxidant activity, reducing cholesterol levels, antiandrogenic effects, hemolytic actions, and inhibition of alpha-reductase. The bioactive molecules present in *C. pepo* need an important advancement that might eventually contribute to their use as pharmaceuticals and natural antioxidants.

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