



EDX/ EDAX Based Analysis Of Sethura Laddu (A Traditional Recipe Of Uttar Pradesh)

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Abstract-

Energy Dispersive X-ray (EDX/ EDAX) is a technique commonly used to study the chemical composition of solid materials, mostly consist elements (like carbon, oxygen, and nitrogen). Recent advances in EDX technology have improved its ability to detect these light elements. Laddu, a popular traditional recipe in North India, are often prepared using "ghee" (clarified butter), which is a key ingredient in many postpartum recipes due to its high nutritional content and digestive benefits. Many types of laddus are commonly prepared for new mothers, each offering specific health benefits. **Gum (Gond) Laddu, Methi (Fenugreek) Laddu, Sesame Laddu, Dates Laddu** etc. are commonly consumed as a snack or for breakfast, helping improvement of iron levels and providing essential vitamins. These laddus not only satisfy sweet cravings but also support the postpartum health and recovery of new mothers.

Carbon (C) has the highest atomic fraction (72.1%) in the sample, which can be attributed to its relatively small atomic mass.

Keywords: Nutrition, Energy Dispersive X-ray (EDAX / EDX), Sethura Laddu, traditional foods, maternal health.

Introduction- Laddus, a popular traditional recipe in North India, are often prepared using "ghee" (clarified butter), which is a key ingredient in many postpartum recipes due to its high nutritional content and digestive benefits. Ghee is believed to aid in the recovery of a new mother's body by improving digestion, enhancing bowel movements, and providing essential nutrients. Several types of laddus are commonly prepared for new mothers, each offering specific health benefits. **Gum (Gond) Laddu, Methi (Fenugreek) Laddu, Sesame Laddu, Dates Laddu** etc. are commonly consumed as a snack or for breakfast, helping

improvement of iron levels and providing essential vitamins. These laddus not only satisfy sweet cravings but also support the postpartum health and recovery of new mothers.ⁱ

Energy Dispersive X-ray (EDX) is a technique commonly used to study the chemical composition of solid materials to detect nanoparticles, mostly consist elements (like carbon, oxygen, and nitrogen). Nanoparticles, when they are hit with an electron beam, they produce X-rays. The EDX detector instrument, which is connected to a Scanning Electron Microscope (SEM), release X-rays to maintain the energy variations between two electrons. These X-rays helps to identify and measure the presence of trace elements in the sample/ material. The energy of the X-rays release is unique to each element, recognising for both qualitative (identifying which elements are present) and quantitative (calculating how much of each element is present) analysis.ⁱⁱ

Objective- To detect the basic elements like carbon, oxygen, nitrogen and others in Sethura laddu.

Methodology- The laboratory experiment was carried out in Department of Physics, BHU, Varanasi. Samples were analysed for its surface features and elemental composition using SEM with EDAX technique.

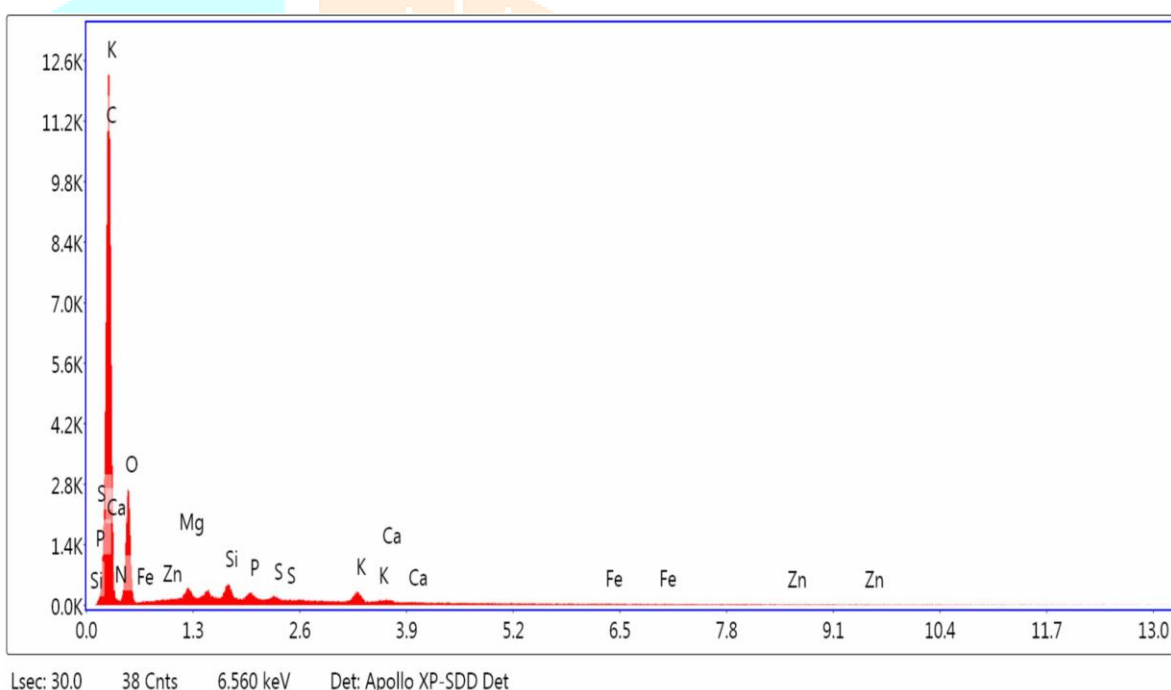
Result-

Table no.- 1

Element	Weight %	Atomic %
C	62.5	68.7
O	27.8	23.0
N	8.2	7.8
Mg	0.3	0.2
Si	0.3	0.2
P	0.2	0.1
S	0.1	0.0
K	0.4	0.2

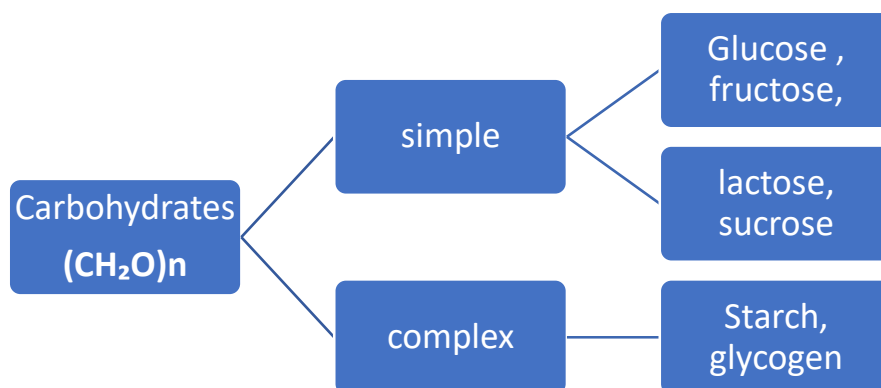
Ca	0.1	0.0
Fe	0.1	0.0

- Carbon is the most abundant element in the sample, both by weight and atomic percentage. This shows that the sample seems to be an organic material or contains a significant organic component.
- Oxygen is the second most abundant element, which supports the presence of various oxides or organic compounds (as carbon and oxygen often appear together in organic molecules).
- Nitrogen is also a significant element, which could indicate proteins or other nitrogen-containing compounds if the sample is biological in nature.
- Magnesium, Silicon, Phosphorus, Sulphur, Potassium, Calcium, Iron are present in very small amounts.



Discussion-

Through this analysis we got carbon and oxygen percentages are high. So, the sample could be an organic material or a biological sample.



Carbohydrates are a major source of energy for the body, providing 4 calories per gram.

1. Simple Carbohydrates:

1. These are quick sources of energy and are found in foods like fruits, vegetables, and milk. Such as **glucose** (in fruits), **fructose** (in fruits), **sucrose** (table sugar), and **lactose** (in milk).

2. Complex Carbohydrates:

1. These are slower to digest and provide lasting energy. They are found in foods like cereals, pulses, root vegetables, and millets. Such as **starch** (in cereals and potatoes) and **glycogen** (in animal foods).ⁱⁱⁱ

Postpartum period, especially for breastfeeding mothers, adequate energy intake is critical to maintaining milk supply and supporting physical healing.

Lactating mothers don't "consume" oxygen directly through food, certain nutrients such as Iron, Vitamin B12, Vitamin C, help support the body's ability to carry oxygen in the blood, promote overall health, and reduce fatigue.^{iv}

Conclusion-

Sethura laddu is a traditional sweet consumed by postpartum women basically in Uttar Pradesh region of India. Good nutrition during this time is essential for both maternal health and the baby's development through breastfeeding. **EDX analysis** is a technique used to detect and measure the elements/components in nanoparticles by identifying the X-rays they release, when hit by an electron beam.

Findings show that, **Carbon** in the sample is likely organic or contains a high organic component.

Oxygen suggests the presence of oxides or organic compounds (carbon and oxygen often occur together).

Nitrogen suggests the presence of proteins or other nitrogen-containing compounds. And Mg, Si, P, S, K, Ca, Fe elements are present in very small amounts.

ⁱ Jaiswal Deepshikha & Roy Anuradha. (2024). Dietary Practices in Various Regions of India in Post-Partum Women. International Journal of Research and Innovation in Social Science. VIII. 3544-3559. 10.47772/IJRISS.2024.8090296.

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