

Natural Color Extraction Method for Beetroot (*Beta vulgaris*)

Goal:

Extract a **vibrant red to violet colorant** rich in **betalains**, especially **betacyanins**, to serve as a natural alternative to **FD&C Red No. 3** and **Red No. 40**.

Method: Cold Juicing + Stabilization

Materials:

- Fresh red beetroots (mature, firm)
 - **Distilled water** (optional)
 - **Citric acid or lemon juice**
 - Blender or cold-press juicer
 - Fine mesh strainer / cheesecloth
 - Amber glass storage bottles
 - Potassium sorbate or sodium benzoate (optional preservative)
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Step-by-Step Extraction Procedure:

1. Preparation

- Wash beets thoroughly and peel (to reduce earthy flavor).
- Cut into small chunks.

2. Cold Extraction

- **Option A – Cold-Press Juicer (Best for quality):**
Run the beet chunks through a **cold-press juicer** to get juice with intact betalain pigments.
- **Option B – Blender (Common alternative):**
 - Add beet chunks + **minimal distilled water** (just enough to blend).
 - Blend thoroughly.
 - Strain the pulp using **cheesecloth** or fine mesh sieve to get clear juice.

3. Acidification

- Add **citric acid** or **lemon juice** to adjust pH to around **4.0–4.5**.
This helps to stabilize the red pigment and prevent browning.

4. Preservation (Optional)

- Add **0.1% potassium sorbate** or **sodium benzoate** to prevent microbial growth if storing.

5. Storage

- Store in **amber glass bottles** to block light.
 - Keep refrigerated at 4–8°C.
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Resulting Product:

- Rich red-violet extract with **natural earthiness**
 - Suitable for:
 - **Beverages**
 - **Smoothies**
 - **Lip balms**
 - **Natural soaps**
 - **Sauces & yogurt**
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Quality Tips:

- Avoid **heat processing** — betalains degrade at temperatures > 60°C.
 - Use immediately or freeze in **small glass jars or ice cube trays** for portioned use.
 - Keep away from metals like iron and copper — they catalyze color degradation.
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Shelf Life:

- Fresh (refrigerated): **1–2 weeks**
- With preservative: **4–6 weeks**
- Frozen: **3–6 months**
- Spray-dried powder: **6–12 months**

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