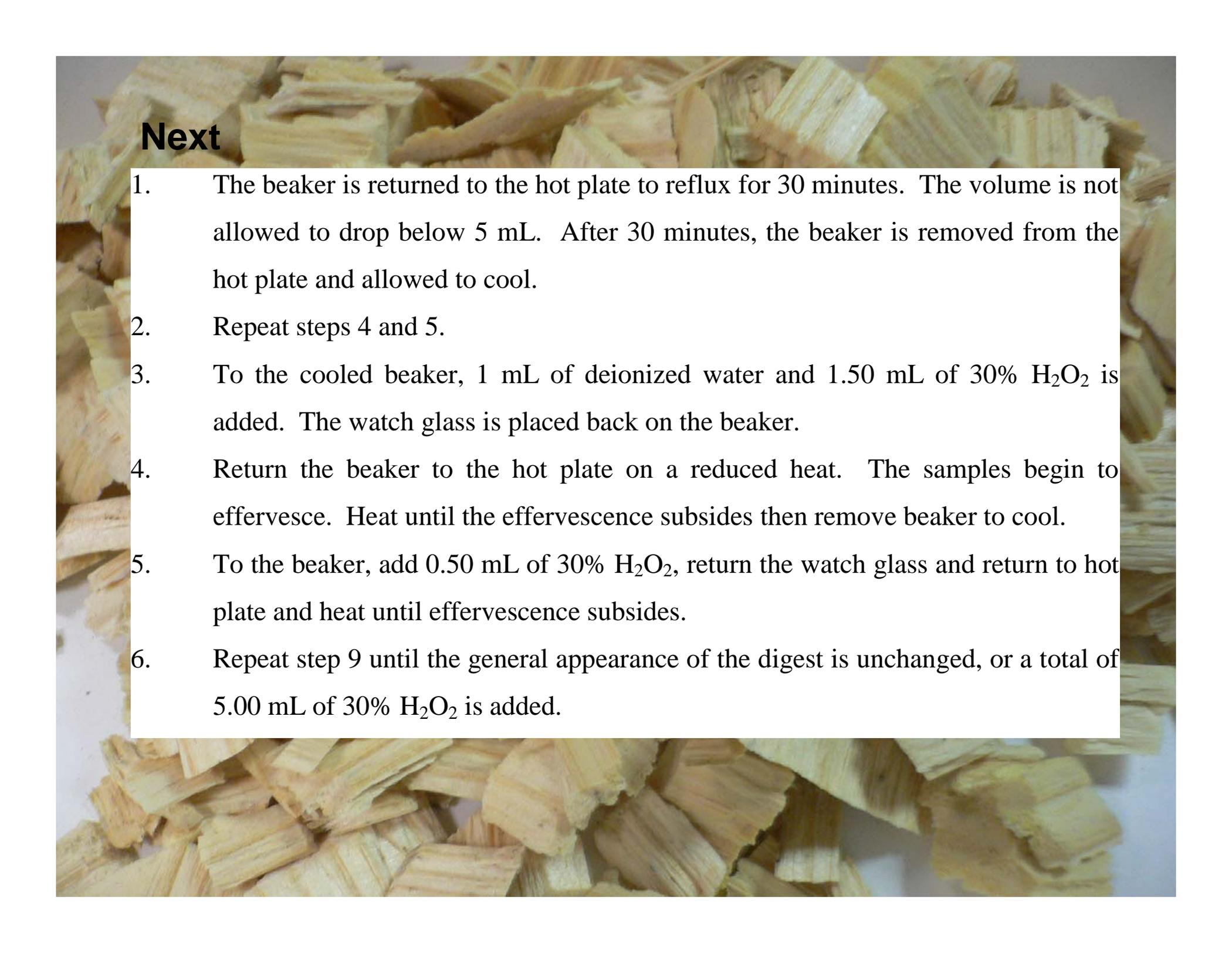
The background of the slide is a close-up photograph of light-colored wood chips, likely from a softwood, scattered across the surface. The chips are irregular in shape and size, showing the natural grain and texture of the wood.

Metals Analysis of Wood/Pulp by Inductively Coupled Plasma (ICP)

The determination of trace metals in wood and pulps is accomplished using Inductively Coupled Plasma (ICP) Emission Spectroscopy. This technique requires the preparation of acid digests from representative sample specimens to enable the instrumental analysis of metallic analytes. A summary of the digestion method, from US EPA SW-846 Method 3050A is as follows:

1. An oven-dried (105°C) sample of wood or pulp (0.5-2.0 g) is accurately weighed in a clean, labeled, pre-digested glass griffin beaker and covered with a watch glass. The weight of the sample specimen is recorded to the nearest 0.10 mg.
2. The sample is transferred to a hot plate in a fume hood. To the beaker, 5.00 mL of 1:1 HNO₃ is added, swirled, and recovered with the watch glass.
3. The sample is heated slowly for 10 to 15 minutes to a gentle reflux. After 10 to 15 minutes the beaker is removed from the hot plate and allowed to cool.
4. 2.50 mL of concentrated HNO₃ is added to the beaker. The watch glass is placed back on the beaker.

The background of the slide is a close-up photograph of light-colored wood chips, likely from a softwood, scattered across the surface. The chips are irregular in shape and size, showing the natural grain of the wood. The lighting is even, highlighting the texture and color variations of the wood.

Next

1. The beaker is returned to the hot plate to reflux for 30 minutes. The volume is not allowed to drop below 5 mL. After 30 minutes, the beaker is removed from the hot plate and allowed to cool.
2. Repeat steps 4 and 5.
3. To the cooled beaker, 1 mL of deionized water and 1.50 mL of 30% H_2O_2 is added. The watch glass is placed back on the beaker.
4. Return the beaker to the hot plate on a reduced heat. The samples begin to effervesce. Heat until the effervescence subsides then remove beaker to cool.
5. To the beaker, add 0.50 mL of 30% H_2O_2 , return the watch glass and return to hot plate and heat until effervescence subsides.
6. Repeat step 9 until the general appearance of the digest is unchanged, or a total of 5.00 mL of 30% H_2O_2 is added.

Next

1. To the beaker, 2.50 mL of concentrated HCl is added along with 5 mL of deionized water. Return the beaker to the hot plate and heat for 15 minutes and then remove to cool.
2. Once cool, rinse the under surface of the watch glass into the sample beaker with deionized water. Filter the digest through a pre-rinsed Whatman 41 filter paper into a 50 mL graduated cylinder. Rinse the sides of the beaker with deionized water to ensure quantitative transfer of the sample digest. Do not exceed a final volume of 50 mL.
3. Bring the final volume of the filtrate up to 50 mL with deionized water.
4. Transfer the digests to appropriately labeled, pretreated sample bottles and submit for ICP analysis.

Analysis of the sample digests is accomplished using a Perkin Elmer Optima 3000 DV ICP Emission Spectrometer. This instrument, equipped with an autosampler and integral computer workstation is configured to detect up to 30 elements simultaneously in less than 5 mL of sample digest solution. To improve instrument performance, a yttrium internal standard is added to each sample, standard, and blank to compensate for small variations in sample flow rate, sample viscosity, acid concentration, and other instrumental and chemical parameters. Quantification of the sample analytes is based on the measurement of specific wavelength intensities and comparison against multi-point calibration standards for each element. The method employed is from US EPA SW-846 Method 6010A [463].