Chemical composition of bone

Health & Medicine

Inorganic Components in Bone matrix: They are mineral salts, mainly calcium phosphate, and some calcium carbonate. The mineral gives bone its toughness and rigidity that allows it to resist compression. Mineral salts make 65% of the bone mass and roughly 2/3rd of the matrix. Organic Components in Bone matrix: It is mainly composed of collagen It is believed, as much as 25-30% of the total organic material in a bone is collagen. It reinforces the mineral salts and provides the bone ability to be flexible and to resist breaking. In a way, it acts like cords in a car tire sidewall. The issue is to investigate the effect of vinegar and heat on the structure and properties of chicken bone.

As a measure of safety, since chicken bones could be contaminated with salmonella hands were thoroughly washed before and after handling the bones, and gloves were worn. Adequate eye protection measures were also taken.

Materials required:

Fresh chicken leg bones

Approximately one-gallon vinegar

Oven for baking bones

Containers for holding bones (quart jar and heatproof dish)

Procedure

After removing all muscle and cartilage from the bones, the bone was placed in a container and the container was filled with vinegar and left for about a week. The bone was removed from the vinegar and rinsed thoroughly in water. It was found that the inorganic material calcium phosphate was removed making the bone lose its toughness and rigidity. The bone had become flexible.

In the second instance, the chicken bone was cleaned first and then placed in an oven and heated at 350 degrees Fahrenheit for about two hours.

This heating removed the collagen and left just the calcium phosphate. It became brittle. It had lost its flexibility and tensile strength. Applying a little pressure turned it into small bits and smashing/trampling on it turned it into ash.

This experiment helps us to conclude that inorganic material calcium phosphate is responsible for the hardness of bone while organic material collagen is responsible for flexibility.

This study emphasizes the major role inorganic (in the form of calcium phosphate) and organic (in the form of collagen) constituents play in the structure and properties of bone.