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Mechanical Expression

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Expression:

Expression can be used with plants such as orange peel, lemon oil glands. This method does not require heat. Not cause disintegration but loss to the waste oil. Volatile oils can be done from plants in several ways. but either way, it is appropriate to plant depends on the amount of oil that was stored in plants the stability of the oil to heat, oil accumulation in the organs of the plant, etc. oil production can be divided into 3 major ways.

1. Distillation
2. Solvent Extraction
3. Mechanical expression

Water distillation

Is an ancient technique for extraction of volatile oils. It is use worldwide for its simplicity but requires high energy consumption for heating and cooling, this method can be used for such still, condenser and receiver. Packed plant in a pot and fill with water to flood and then boil until the water boil. When water evaporates, the steam will help bring in the essential oils of the plant tissue out simultaneously on the condenser steam and vapor is condensed into liquid oil. The separation of oil and water together. Distillation plant for small amounts in the laboratory we can do it refined using a set made of glass called a refined kind "Clevenger type apparatus".

Steam Distillation

Steam distillation requires the boiler for vapor increase. The principles are similar to water distillation, but to place the plant on the grid in still and connect pipe with a boiler.

What is Solvent Extraction?

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Solvent Extraction, also known as liquid-liquid extraction, is a method to separate compounds based on their relative solubilities in two different immiscible liquids, usually water and an organic solvent.

History of mechanical oil extraction

Hand Press Extraction:

Documented oil extraction dates back to 1650 B.C. when ripened olives were pressed by hand in Egypt using wooden pestles and stone mortars. The extracted olive oil was filtered through goat hair filters and used as a lubricant. Sesame, linseed, and castor oils were recovered in Egypt.

Hydraulic Press Extraction

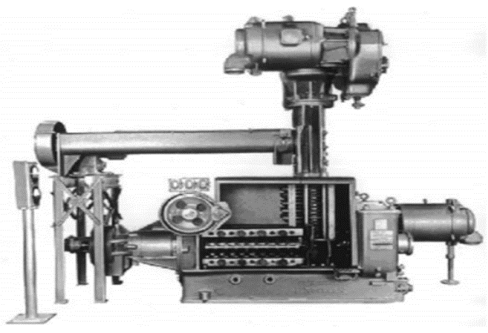
In 1795, J. Bramah of England invented the hydraulic press for oil extraction. Oilseeds were milled, cooked, and wrapped in filters cloths woven from horse-hair. The oilseeds wrapped in filter cloths were manually loaded into perforated, horizontal boxes below the head block and above the ram of the press. The boxes were pressed together using upward hydraulic pressure on the ram. The oil was pressed out through the filter cloths surrounding the oilseeds. The filter cloths and spent cake were manually removed from the hydraulic press. The residual oil in spent cake was approximately 10%.

In 1801, the first cottonseed oil mill was constructed in the United States using hydraulic presses. By the 1870s, American technology in hydraulic pressing had outpaced European technology.

By the end of the nineteenth century, hydraulic press oil mills were the standard technology for oil extraction.In 1900, Alfred French founded the French Oil Mill Machinery Company in Piqua, Ohio, for the purpose of advancing hydraulic press technology.

Screw Press Extraction:

In 1900, Valerius D. Anderson invented the mechanical screw press in Cleveland, Ohio. He was awarded a U.S. patent for the apparatus. The mechanical screw press was a radical departure and significant technological advancement over the hydraulic presses being used at the time.



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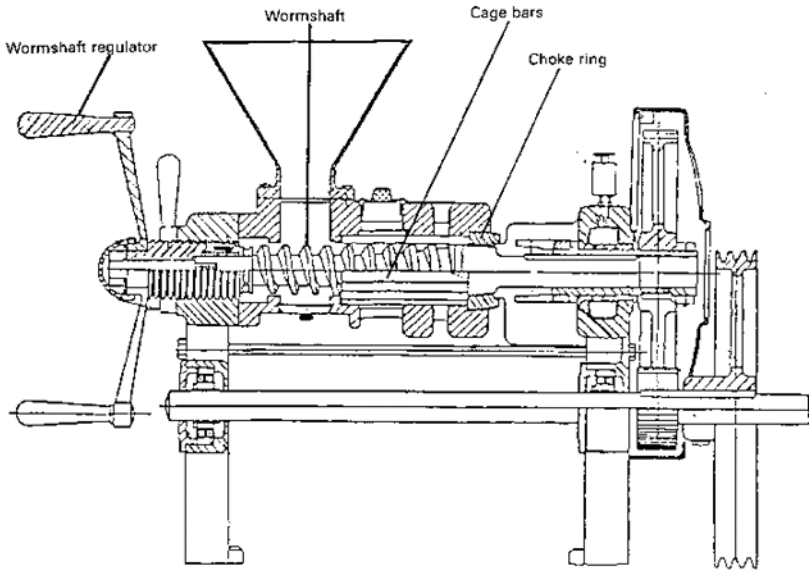

Hander Type 52 expeller

In the past 100 years, the primary improvement in mechanical screw press design has been developing materials of construction that extend wearing part life.Screw and barrel parts that once lasted three months before requiring replacement may now last up to two years.Initial capacities of 5 tons per day up to present-day capacities of over 100 tons per day for full pressing and over 800 tons per day for prepressing applications.

Advantages:

The primary advantage of the mechanical screw press was that it allowed continuous oil extraction and could process large quantities of oleaginous materials with minimal labor.

Mechanized Extraction

Ghani: The ghani consists of a large mortar and pestle, the mortar being fixed in the ground and the pestle being moved within the mortar by animal traction (donkey or mule) or (more commonly) a motor. Oilseeds are placed in the mortar and the pestle grinds the material to remove the oil. The oil runs out of a hole in the bottom of the mortar and the cake is scooped out by hand.

Motorized ghanis are fasters than manual or animal types but are more expensive and their higher capital scale of production for profitability. The width of this gap, which can be varied using an adjustable pressure cane, controls the operating pressure of the press. The design of the press is such that it can achieve operating pressures in excess of those obtained in most manually operated cage presses and as high as those in small expellers. The ram press

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has to low seed throughput but has the advantage of continuous operation. The ram press was developed in Tanzania specifically for processing in thin shelled high all content sesame.

Advantages

- Virgin oil is more sought after
- No potential for solvent contamination
- Relatively inexpensive after initial capital costs
- Minor consumables cost

Disadvantages

- Generally ineffective for processing beauty leaf
- Time and labour intensive
- Relatively low oil yields
- Operators require experience to achieve best results
- High dependence on kernel moisture content