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Composition Determined by IR Spectroscopy of Castor Oil

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Abstract

In this article, we determined the composition of castor oil using FTIR spectroscopy and the ShemadzuIRPrestige-21 spectroscope as the instrument. Castor oil contains

absorption bands between the wave numbers 3384 and 458 cm^{-1} . The functional groups contained in castor oil are: O-H, C-H, C=O, C-O.

Keywords: Chemical Composition, Castor Oil, IR Spectroscopy

Introduction

Castor oil is a thick, odorless oil extracted from the seeds of the castor plant. Its use dates back to ancient Egypt, when castor oil was used as a lamp fuel, but it was also used for medicinal and beauty purposes. Cleopatra is even said to have used it to brighten the whites of her eyes. Today, most castor oil is produced in India. It is still used as a laxative and in skin and hair products [1-5]. Castor oil is also an ingredient in motor oil. This article will introduce what castor oil is and discuss its skin benefits, as well as how to use it and the possible side effects to expect. Castor oil is a vegetable oil that people use for a wide range of cosmetic and medical purposes. People commonly take castor oil as a laxative, but the oil also has potential benefits for hair and skin. Here are some essential facts about castor oil:

- it comes from the seeds of the *Ricinus communis* plant;
- it is applied directly to the skin;
- castor oil is relatively safe to use, but some people have reported side effects after applying it to the skin (allergic reactions);
- castor oil is believed to have anti-inflammatory, antimicrobial, moisturizing, and several other beneficial properties.

Castor oil is not considered an edible oil and has a very unpleasant taste. But some people take small amounts orally for medicinal reasons. One tablespoon of castor oil contains: calories: 120; protein: 0 grams; fat: 14 grams; carbohydrates: 0 grams; fiber: 0 grams; sugar: 0 grams [6-12].

Castor oil also contains: vitamin E; omega-9 fatty acids; Omega-6 fatty acids.

The active ingredient in castor oil is a fatty acid called ricinoleic acid.

Materials and methods

IR spectrometer (resolution 4 cm^{-1}) for KBr pellets (2 mg sample with 500 mg KBr). Attempts were made to monitor the intermolecular interactions in solutions according to changes in the spectra.

FT-IR spectra were recorded on Shimadzu's Fourier transform infrared spectrometer (Japan) with frequency range of 4000-500 cm^{-1} .



Fig 1: ShemadzuIRPrestige-21 Spectofotometer

Results and Discussions

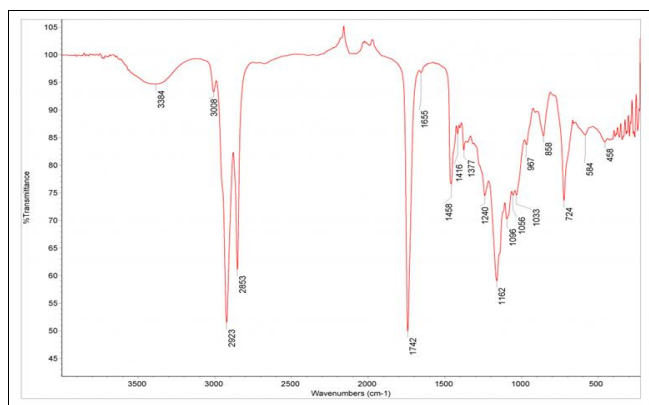


Fig 2: Spectre IR of castor oil

Castor oil has a wave number 3360 cm^{-1} with a weak intensity indicating the existence of O-H bond stretch vibrations and wave number 1745.58 cm^{-1} with strong and sharp intensities indicating the existence of stretching vibrations of the C=O bond as esters [13-19].

Conclusions

Castor oil is a thick, odorless oil obtained from castor seeds. Its use dates back to ancient Egypt, when castor oil was used as a lamp fuel, but it was also used for medicinal and cosmetic purposes. Castor oil contains absorption bands between wave numbers 3384 and 458 cm^{-1} and the functional groups contained in castor oil are O-H, C-H, C=O, C-O and were determined with the ShemadzuIRPrestige-21 spectrometer.

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