Namespaces
- Article
- Talk

Views
- Read
- Edit
- View history

Variants

More

Search
Go

Iodine value

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The **iodine value** (or **iodine adsorption value** or **iodine number** or **iodine index**) in chemistry is the mass of iodine in grams that is consumed by 100 grams of a chemical substance. Iodine numbers are often used to determine the amount of unsaturation in fatty acids. This unsaturation is in the form of double bonds, which react with iodine compounds. The higher the iodine number, the more C=C bonds are present in the fat.[1] It can be seen from the table that coconut oil is very saturated, which means it is good for making soap. On the other hand, linseed oil is highly unsaturated, which makes it a drying oil, well suited for making oil paints.

Contents

[hide]

Table of iodine values [edit]

Fat	Iodine number[1]
Tung oil	163 – 173
Cod liver oil	145 – 180
Grape seed oil	124 – 144[2]
Palm oil	44 – 51
Butter	26 – 40
Olive oil	80 – 88
Castor oil	82 – 90
Coconut oil	7 – 10

Palm kernel oil	16 – 19
Cocoa butter	35 – 40
Jojoba oil	80 ~82[3]
Poppyseed oil	133 ~133
Cottonseed oil	100 – 117
Corn oil	109 – 133
Canola oil[4]	110 – 126
Rapeseed oil[4]	94 – 120
Wheat germ oil[5]	115 – 134
Sunflower oil[6]	118 – 144
Linseed oil	136 – 178
Soybean oil	120 – 136
Peanut oil	84 – 106
Rice bran oil	95 – 108
Walnut oil[7][8]	120 – 155
Kapok seed oil[9]	85 – 100

Edit links

Methodology [edit]

This particular analysis is an example of iodometry. A solution of iodine is yellow/brown in color. When this is added to a solution to be tested, however, any chemical group (usually in this test C=C double bonds) that react with iodine effectively reduce the strength, or magnitude of the colour (by taking iodine out of solution). Thus the amount of iodine required to make a solution retain the characteristic yellow/brown colour can effectively be used to determine the amount of iodine sensitive groups present in the solution.

The chemical reaction associated with this method of analysis involves formation of the diiodo alkane (R and R' symbolize alkyl or other organic groups):

The precursor alkene (RCH=CHR') is colourless and so is the organoiodine product (RCHI-CHIR').

In a typical procedure, the fatty acid is treated with an excess of the Hanuš or Wijs solution, which are, respectively, solutions of iodine monobromide (IBr) and iodine monochloride (ICl) in glacial acetic acid. Unreacted iodine monobromide (or monochloride) is then allowed to react with potassium iodide, converting it to iodine, whose concentration can be determined by titration with sodium thiosulfate.[10] [11]

Methods for the determination of iodine value [edit]

Huebl's iodine [edit]

Introduced the iodine value was Hübl which titrated fats in the presence of mercuric chloride with iodine, but with the actual reagent (probably iodine chloride) is formed in situ from mercuric chloride and iodine. Pure iodine accumulates concerned not to alkenes, which is why the still valid definition of iodine is only a formal one.

Wijs iodine value after [edit]

Addition of iodine chloride and back-titration with sodium thiosulphate by DIN 53241-1:1995-05.

Iodine by H. P. Kaufmann [edit]

(Bromination of the double bonds in the dark, reducing the excess bromine with iodide, backtitration of iodine with thiosulfate)

The fat is mixed with an excess of bromine. This bromine is added to the double bonds in the unsaturated fats. This reaction must be carried out in the dark, since the formation of bromine radicals is suppressed by light. This would lead to undesirable side reactions, and thus falsifying a result consumption of bromine.

Then the unused bromine is reduced to bromide with iodide.

Now, the amount of iodine formed is determined by titration with sodium thiosulfate solution.

Related methods of analysis [edit]

- Saponification value
- Peroxide value
- Acid number
- Bromine number
- Hydroxyl value
- Hydrogen number

References [edit]

1. ^ ***a*** ***b*** Thomas, Alfred (2002). "Fats and Fatty Oils". ***Ullmann's Encyclopedia of Industrial Chemistry***. Weinheim: Wiley-VCH. doi:10.1002/14356007.a10_173.
2. ^ http://www.olionatura.de/_oele/index.php?id=18
3. ^ http://rasayanjournal.co.in/vol-2/issue-2/10.pdf
4. ^ ***a*** ***b*** Frank Gunstone: Rapeseed and Canola Oil: Production, Processing, Properties and Uses, page 80; John Wiley & Sons, 2009
5. ^ http://online.personalcarecouncil.org/ctfa-static/online/lists/cir-pdfs/pr248.pdf
6. ^ http://www.olionatura.de/_oele/fettkennzahlen.php
7. ^ http://thesoapdish.com/oil-properties-chart.htm
8. ^ http://www.olionatura.de/_oele/index.php?id=25
9. ^ http://www.tis-gdv.de/tis_e/ware/oele/kapok/kapok.htm
10. ^ Firestone D (May–Jun 1994). "Determination of the iodine value of oils and fats: summary of collaborative study". ***J AOAC Int***. **77** (3): 674–6. PMID 8012219.
11. ^ ***Obtaining the Iodine Value of Various Oils via Bromination with Pyridinium Tribromide*** Michael Simurdiak, Olushola Olukoga, and Kirk Hedberg Journal of Chemical Education Article ASAP doi:10.1021/acs.jchemed.5b00283

Categories: Analytical chemistry | Dimensionless numbers of chemistry | Iodine

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