



University of Technology  
Chemical Engineering Department



Branch : Chemical Processes Engineering

Methyl ethyl ketone production

The Students Name :

1. Amer yassen Hamad
2. Waleed kamel Mohammed



Supervised by : Prof. Dr. Qusay F. Al-Salhy

Abstract of Project:

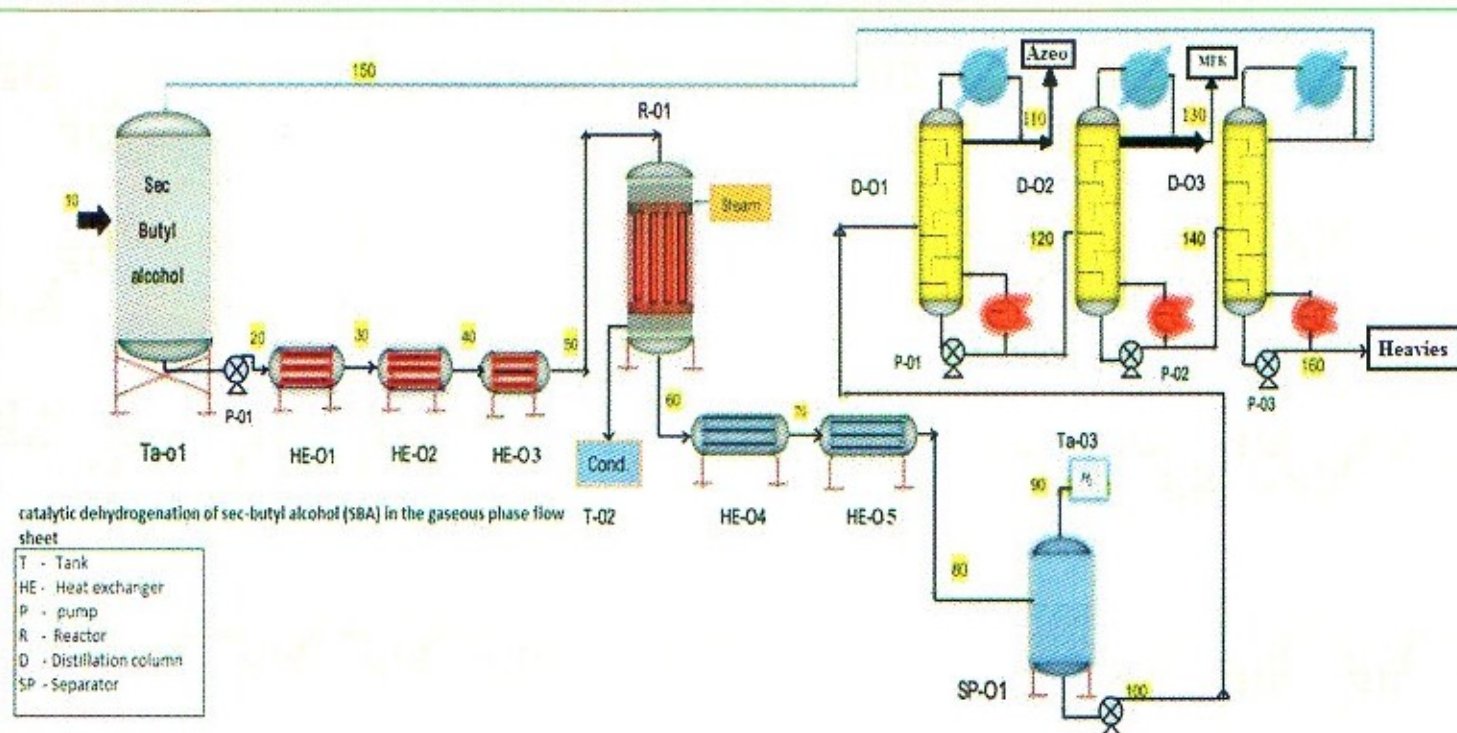
This Project report deals with the design calculations of Methyl Ethyl Ketone from Hydrocarbon Feedstock along with their relevant aspects such as instrumentation and process control, and cost estimation.

Production Methods:

1. catalytic dehydrogenation of sec-butyl alcohol (SBA) in the gaseous phase.
2. MEK as By product of the fischer-Tropsch coal – to liquid process .
3. oxidation of sec-butyl benzene According to the Hock phenol synthesis.
4. liquid –phase oxidation of n-Butane .

Uses:

- 1- MEK is a liquid solvent used in surface coatings, adhesives, printing inks, chemical intermediates, magnetic tapes and as dewaxing agents in lubricant base oil production.
- 2- MEK also is used as a solvent for fats, oils, waxes and resins. It is a highly efficient and versatile solvent for surface coatings. Because of its effectiveness as a solvent, MEK is especially valuable in formulating high solids coatings, which help to reduce emissions from coating operations.
- 3- The primary use of methyl ethyl ketone is as a solvent in processes involving gums, resins, cellulose acetate, and cellulose nitrate.
- 4- Methyl ethyl ketone is also used in the synthetic rubber industry, in the production of paraffin wax, and in household products such as lacquer and varnishes, paint remover, and glues.



Reference:

- 1 - Ullmann ; Encyclopedia of Industrial chemistry 2<sup>nd</sup> Edition , John wiley , New York (2005)
- 2 - Kirk - Othmer , Encyclopedia of chemical Technology , 4<sup>th</sup> Edition , Vol ., John Wiley ; New York (1998).
- 3 - <http://www.caer.uky.edu/podcast/gibson> - KESummitoct. 2007r. Pdf





University of Technology

Chemical Engineering Department

Branch: Chemical processing engineering



## Production of vanillin

The Students Name : 1- Ibrahim Khalid Khaleel

2- Hader Hameed Suhal

The Name of Supervisor : Dr. Bashir Yousif Sherhan

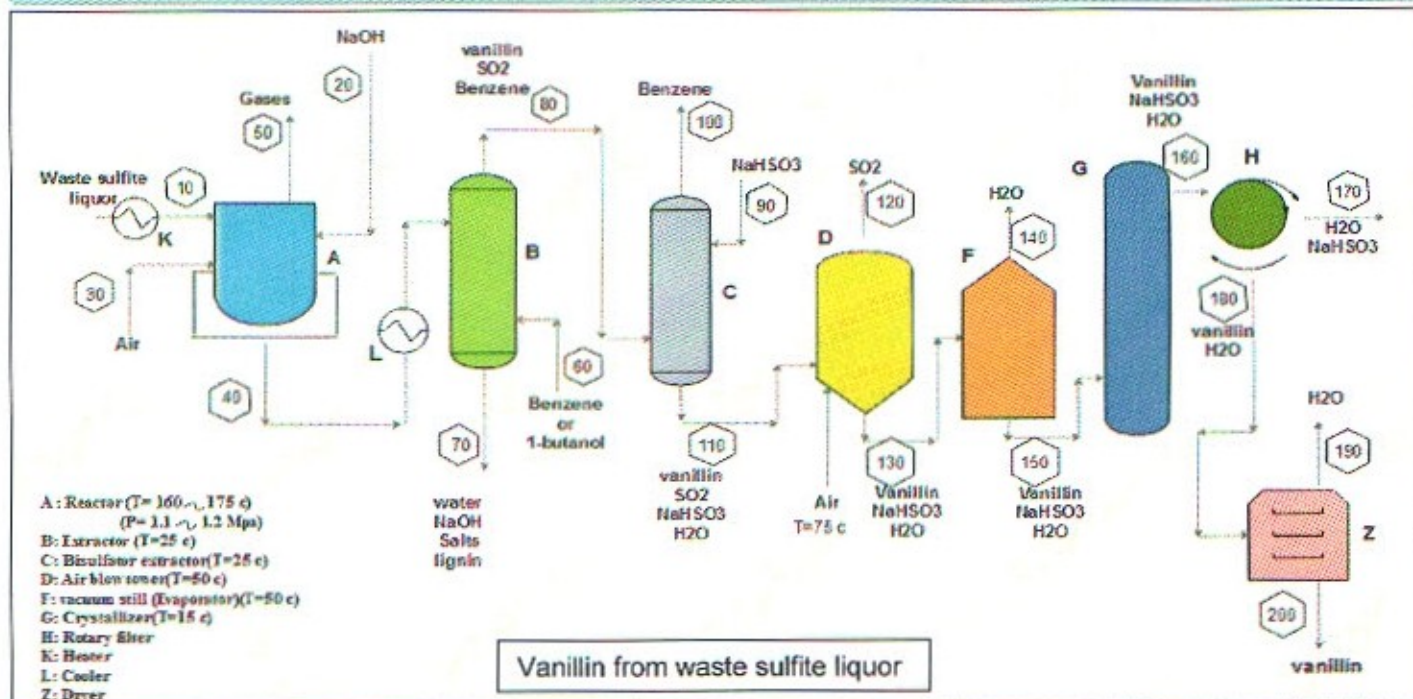
### Abstract of Project

Vanillin is an organic compound with the molecular formula  $C_8H_8O_3$ , it is naturally exist in the leaves and vanilla flower seeds which is the main component of vanilla flower, because of the importance of the vanillin there are several ways to prepare it. And the sources of producing it depends mainly on the basis of the seeds and peels of different plant and the container material (lignin), vanillin occurs in the form of white needle-like crystalline powder with a pleasant aromatic vanilla odor and an intensively sweet taste, which are the main reasons for its widespread demand.

### Uses

- 1- The largest use of vanillin is as a flavoring, usually in sweet foods, The ice cream and chocolate industries together comprise 75% of the market for vanillin as a flavoring because of the beautiful smell and taste .
- 2- Used in the fragrance industry and in perfumes .
- 3- Vanillin has been used as a chemical intermediate in the production of pharmaceuticals , cosmetic and other fine chemicals .
- 4- Used for paper and textile industry and in prepare of some dyes.

**Production Methods:** A - From guaiacol    B - From safrole    C - From eugenol  
D - From coniferine    E - From waste sulfite liquors



**Reference:** 1- Othmer, K., "Encyclopedia of Chemical Substances", 2<sup>nd</sup> edition, Vol (21) pp. 189-196, Wiley-Interscience Publication New York, 1973  
 2 - Excess from internet ( <https://en.wikipedia.org/wiki/Vanillin> ) at 2/10/2016









**University of Technology**  
**Chemical Engineering Department**  
*Branch of chemical process*



*Capture of Carbon dioxide by Ammonia Solution*

Supervisor :  
Dr. Thamer Jassaim

Student :  
Ali ahmed & Zainab abbas

**Abstract of Project:**

Carbon capture and storage or carbon capture and sequestration is the process of capturing waste carbon dioxide ( $\text{CO}_2$ ) from large point source, such as fossil fuel power plants, transporting it to a storage site and depositing it where it will not enter the atmosphere normally an underground geological formation. the aim is to prevent the release of large quantities of carbon dioxide into the atmosphere (from fossil fuel use in power generation and other industries).

**Methods of Production:**

- Chilled ammonia process
- Ethanolamines process
- Alkaline salt solution process

**Uses**

- production of commercial importance, mainly urea and methanol
- Carbon dioxide is used extensively as a shielding gas in arc welding
- Carbon dioxide is particularly suitable for use in fire extinguishers

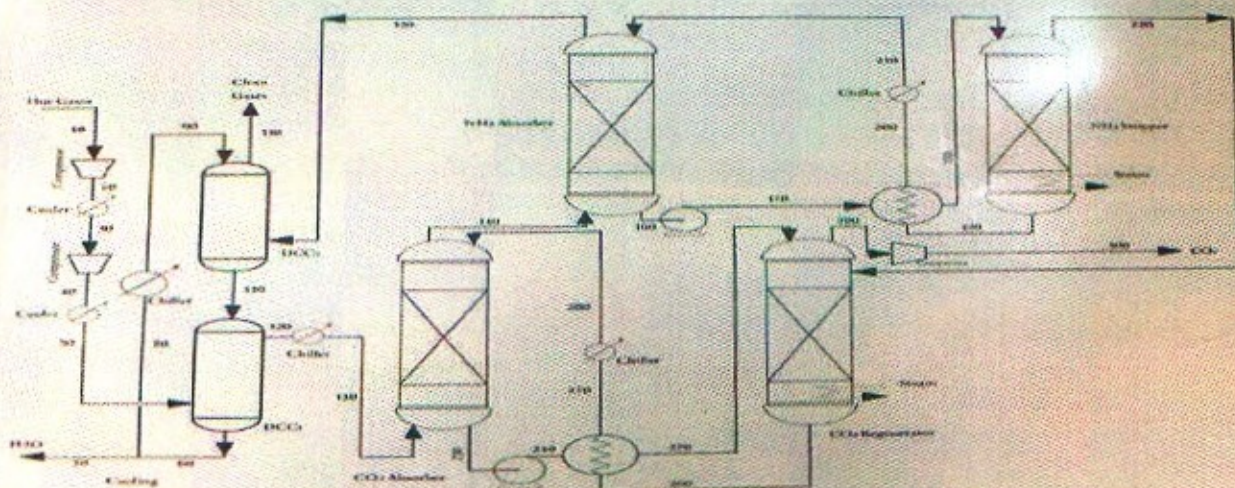


Fig.1.1: Flow Sheet of the Chilled Ammonia Process

**Reference:**

**References :**

- 1 - " Kirk - othmer "; Encyclopedia of chemical technology. " 4<sup>th</sup>edn . John Wiley and Son Co. " 2004.
- 2 - Ullmann - Encyclopedia of chemical Industries . propylene oxide 2<sup>nd</sup>edn - Wiley VCH Verlag GmbH & Co. KGaA , Weinheim - 2005.
- 3 - carbon dioxide - Wikipedia ,the free encyclopedia.





# University Of Technology

## Chemical Engineering Department

### Branch of Oil a



The Project Name : **Production of n-Butyl acetate**

The Students Name : Omar saad Mohamed & Marwa Mohamed jasem

The Name Of Supervisor: Dr. Saad Raheem

#### Abstract Of Project :

n-Butyl acetate  $C_6H_{12}O_2$ , also known as (butyl ethanoate ,Acetic acid,n-butyl ester; Butile) , is an ester which is a colorless flammable liquid at room temperature. Butyl acetate is found in many types of fruit .

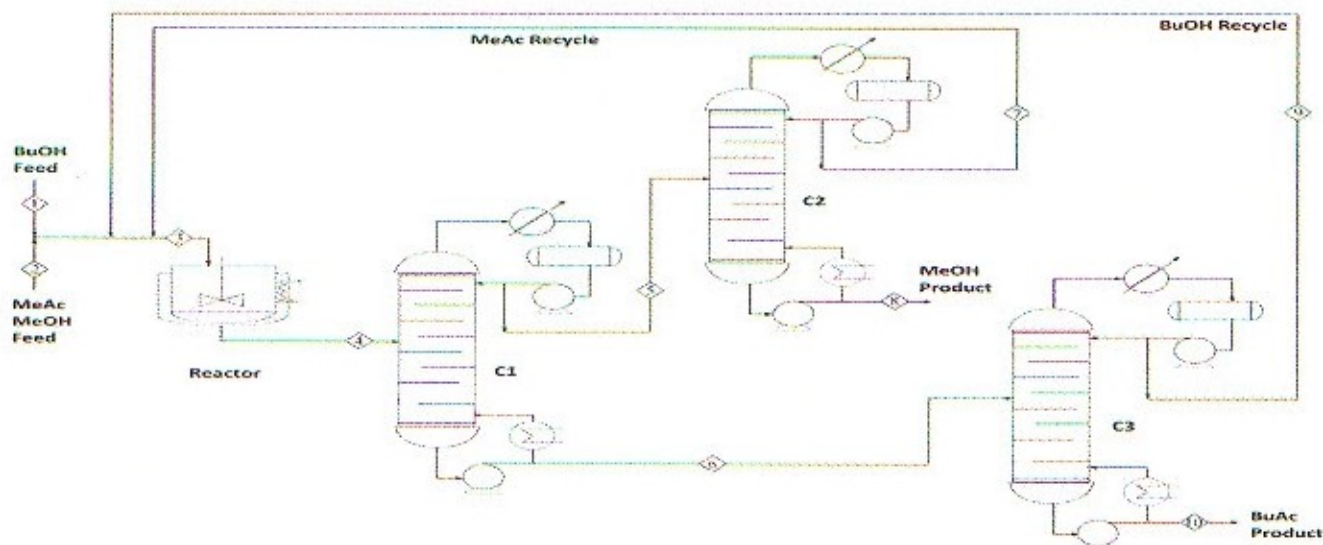
n-Butyl acetate is one of the important fine chemical products. It is widely used in different areas such as solvent, plasticizer, resin, painting, perfume, cosmetics, medicine, surfactant and other organic syntheses Acetic acid and n-butanol are used as feedstock to manufacture n-butyl acetate in the industry. Butyl acetate is commonly produced by esterification of acetic acid with butanol .

#### Uses :

- 1- Butyl acetate is an important solvent in the paints industry on account of its versatility.
- 2- Butyl acetate is often employed in combination with n-butanol in paints
- 3- extractant in the manufacture of pharmaceutical preparations .
- 4- Butyl acetate applications in protective coating .

#### Production Methods :

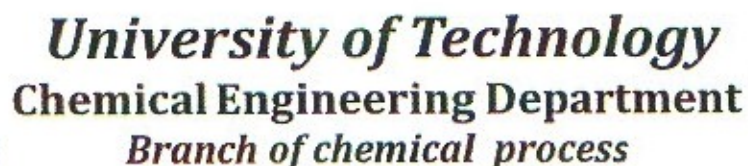
1. From methyl acetate and butanol
2. From butyl alcohol and acetic acid by esterification



#### References :

- 1 - " Kirk - Othmer "; Encyclopedia of Chemical Technology, " 4<sup>th</sup>edn , John Wiley and Son Co. " 2004.
- 2 - Ullmann - Encyclopedia of Chemical Industries . propylene oxide 2<sup>nd</sup>edn - Wiley VCH Verlag GmbH & Co. KGaA , Weinheim - 2005.
- 3 - n-Butyl acetate - Wikipedia ,the free encyclopedia.





- 1 – “Kirk – othmer”; Encyclopedia of chemical technology. “ 4<sup>th</sup>edn. John Wiley and Son Co. “ 2004,
- 2 – Ullmann – Encyclopedia of chemical Industries . propylene oxide 2<sup>nd</sup>edn – Wiley VCH Verlag GmbH & Co. KGaA , Weinheim – 2005.
- 3 –Wikipedia ,the free encyclopedia.





# University of Technology

## Chemical Engineering Department



### Production of phenol from oxidation

By

Hussam Jasem Ali  
Muntadher Musafer Obaid

Supervised

by  
Dr. Shurooq Talib

#### Abstract of Project:

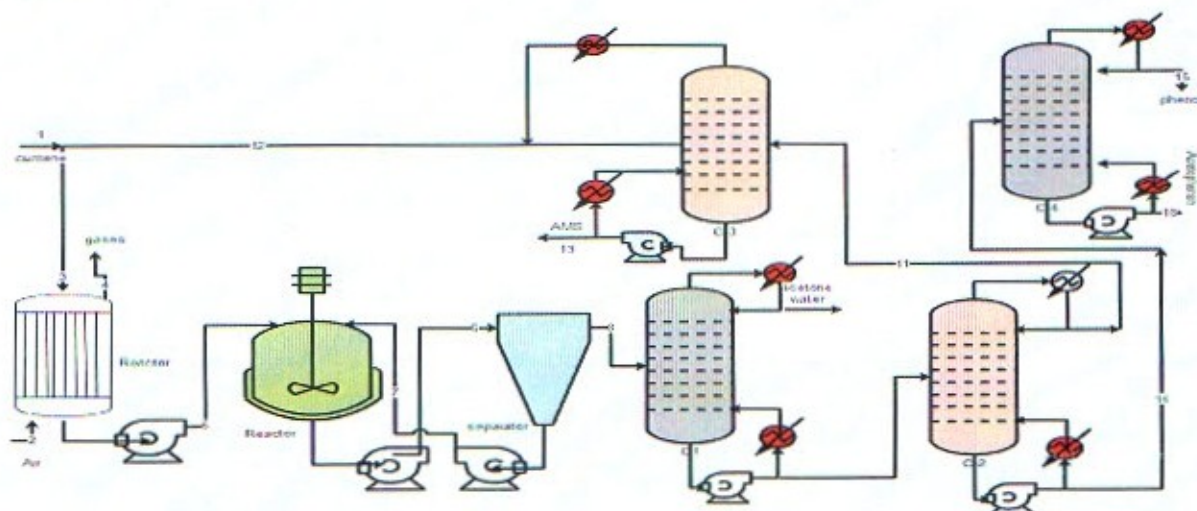
• Phenol is the Common name of Hydroxybenzene  $C_6H_5OH$  and belongs to the class of compounds commonly referred to as phenols containing one or more hydroxyl groups attached to an aromatic ring. Phenol has also being called Carboic acid, Phenylic acid, Phenol Hydroxide or oxybenzen. • Phenol at lower temperature below melting Point it crystalizes as a white mass in the molten State it is clear Colorless liquid. At temperature up  $68.4^\circ C$  it is partially miscible with water.

#### Uses

- Conversion to Precursor for Plastic.
- Condensation with acetone gives bisphenol-A, a key precursor to polycarbonates and epoxide resins.
- Condensation with formaldehyde gives phenolic resins.
- Production of cyclohexanone a precursor to nylon.
- Production of Alkylphenols.
- Phenol is also a versatile precursor to a large collection of drugs such as Aspirin.

#### Method of production

- Cumene peroxidation process.
- Benzenesulfonate process.
- Chlorobenzene caustic process.
- Toluene oxidation process.



#### Reference:

- 1 - "Kirk - outhmer"; Encyclopedia of chemical technology. " 4<sup>th</sup>edn , John Wiley and Son Co. " 2004.
- 2 - Ullmann - Encyclopedia of chemical Industries . propylene oxide 2<sup>nd</sup>edn - Wiley VCH Verlag GmbH & Co. KGaA ,





**University of Technology**  
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## Production of Allyl alcohol

**Student**  
Rafal Salman  
Fatima Ali

**supervisor**  
Dr. Ebtisam Hussain

### Abstract of Project:

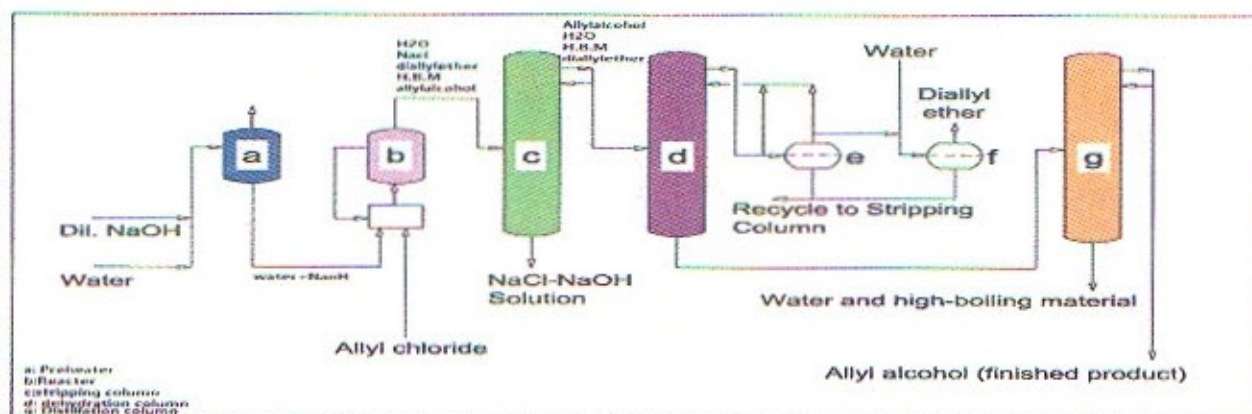
**Allyl alcohol** : It is an organic compound with the structural formula  $\text{CH}_2=\text{CHCH}_2\text{OH}$ . Like many alcohols, it is a water-soluble, colorless liquid, but it is more toxic than typical small alcohols. Allyl alcohol is the smallest representative of the allylic alcohols and the most important allyl compound in commerce.

### Methods of Production:

- isomerization of propylene oxide
- Hydrogenation of Acrolein
- Hydrolysis of Allyl Acetate
- Hydrolysis of Allyl chloride

### Uses

- 1-raw material for the production of glycerol
- 2-As a precursor to many specialized compounds such as flame-resistant materials, drying oils, and plasticizers.
- 3 Allyl alcohol is used as the raw material for producing allyl esters



### Reference:

- 1 - "Kirk - othmer"; Encyclopedia of chemical technology. " 4<sup>th</sup>edn . John Wiley and Son Co. " 2004.
- 2 - Ullmann - Encyclopedia of chemical Industries . propylene oxide 2<sup>nd</sup>edn - Wiley VCH Verlag GmbH & Co. KGaA .