



# Poppy & Alkaloid Affairs



The Turkish Grain Board (TMO) was established in 1938 as an Economic State Enterprise in order to stabilize the grain market and operate the state monopoly of opium and narcotic substances in Turkey. For this purpose, being organized throughout the country and within the framework of the relating legislation as it has been defined as traditional poppy producer TMO has been responsible for the cultivation, control and processing of poppy and the production of narcotic substances to be used for medical and scientific purposes in order to meet the need of both domestic and foreign market.







# Foreword

Poppy has been traditionally cultivated in Anatolia since 3.000 B.C. In our day, poppy cultivation activities has been carried out on average in 4-5 decares plots by 70.000 farmers. Farmers benefit from the seeds of the poppy as oil, poppy paste, etc... for food purpose and benefit from the residue of its seeds as animal feed and use the stems for heating.

Poppy cultivation, production and trade of opium were free until 1933 in Turkey. In 1933, controlled poppy cultivation and production was launched and later on, in 1938 with the establishment of Turkish Grain Board (Toprak Mahsulleri Ofisi-TMO) monopoly authority of narcotic drugs was given to TMO. Poppy cultivation was based on obtaining opium gum and poppy seed until 1971. After the poppy capsules were lanced, the world's best quality opium gum with highest morphine concentration was purchased by TMO from the farmers and exported for medical purposes after being processed. The opium production by lancing the poppy capsules was banned in 1974 and production of unlanced poppy capsule which is a safer method was started.

Opium Alkaloids Plant started its production in 1981 in the district of Bolvadin, Afyonkarahisar in order to utilize traditional poppy crop and to meet legal alkaloid requirement of domestic and international market.



# Cultivation, Production and Control of Poppy

Poppy cultivation and production is carried out under control and subject to license.

Farmers apply to TMO for poppy cultivation licence.

The applications of farmers are reviewed by TMO and licence is given to the ones that are convenient with regard to laws and cultivation is implemented, accordingly.

Poppy farms are measured and controlled one by one through the control teams composed by TMO offices to determine the conformity to the location and limits declared on the licences.

Legal proceedings are started against farmers performing illicit cultivation inconsistent to the legislation.

Lancing control is carried out on the poppy cultivation farms by TMO teams to determine whether the capsules are lanced for opium production. If lanced capsules are found, legal proceedings are started.

In order to prevent diversion of poppy capsules, production estimations are made on poppy cultivation areas by TMO teams. In this way, it is ensured that all the capsules of the farmers are given to TMO.











# Opium Alkaloids Plant

The Opium Alkaloids Plant was established in 1981 to process the unalanced poppy capsule produced in order to meet the need of the market of opiate and opiate raw materials (alkaloids) for medical and scientific purpose. The plant equipped with the most modern technique and technology has the capacity to process 20.000 tons of unalanced capsules per annum.

The Opium Alkaloids Plant, with the largest capacity of alkaloid production of the world, consists of two basic units; the extraction and derivatives units. Production is implemented according to the needs and expectations of our customers, and in consistency to BP, USP, EU, INT. PH pharmacopeias and the rules of GMP( Good Manufacturing Practice). Our plant has the Total Quality Management System Certificate, TSE-EN-ISO 9001:2008.





## Extraction Unit

The extraction unit with its modern equipments is composed of solid-liquid, liquid-liquid and crystallization sections and has been designed to produce crude morphine (CPS-M) by processing unlanded poppy capsules separated from their seeds. In this unit; crude morphine, containing 80-93 % anhydrous morphine alkaloid (AMA) is produced by extraction. The percentage of AMA content in the crude morphine can be adjusted according to the requirement of the customer. Depending on the morphine rate of the poppy capsules the extraction unit has an average capacity of 100 tons/year and is at the level of covering 30-35 % of the world trade of licit morphine requirement.



## Derivative Unit

In the Derivatives Unit; the following products are being produced from morphine hydrate: Codeine, Codeine Phosphate, Codeine Sulphate, Codeine Hydrochloride, Dionine (ethyl morphine hydrochloride), Morphine Sulphate, Morphine Hydrochloride, Dihydrocodeine Bitartrate and Dihydrocodeine Thiocyanate. The Active Substance Master File is available for Codeine and Codeine Phosphate which are the most required products. The studies for the Active Substance Master File for other products are continuing.

The Derivatives Unit, designed with a multi-purpose production structure, has the capacity of changing 38 % of the morphine produced in the extraction unit to derivatives. The product specification and quantity can be arranged according to customer requirements.

All derivatives are produced in conformity with the major pharmacopeias such as EP, BP, USP, INT. PH and current rules of GMP.





# Quality Assurance

According to the specified quality policy; the operation of the quality system implemented in every stage of the production starting from the raw material and leading to the finished product, keeping the records, training of the staff and their consciousness of quality provides the protection of quality with the lowest amount of resource utilization planned to be used.





# Our Quality Policy

Our main policy is to produce morphine and its' derivatives in a profitable way according to the needs and expectations of our customers with our trained staff and in conformity with the world standards by considering the worth of the environment and humanity, to comply with the Quality Management System and to continuously improve the Quality Management System.





# Quality Control

The educated and experienced staff in the Quality Control Unit work with modern devices and equipments and the conformity analysis of the raw materials and internal process controls are carried out and the finished products are analyzed to check their consistency with the standards and pharmacopeias. Wet analysis and instrumental analysis are made in our quality control laboratories which have analytic devices such as; HPLC, TLC, GC, IR VE UV- VIS Spectrophotometer, Reflectometer and Polarimeter.



# Research & Development (R& D) Activities

For the sustainability of poppy production and to increase our market share agricultural and chemical R & D studies are continuing in order to increase product variety, efficiency, to reduce costs, to evaluate other industrial plants raised in Turkey and develop process.

## Agricultural R&D

For the increase of profit and efficiency in poppy cultivation in our country and to increase the content of morphine and other alkaloids and the seed quantity in cultivated poppy, the identification of wild poppy and the studies of improvement are implementing. Within the scope of these studies agricultural and technological R & D studies are continuing with the cooperation of TÜBİTAK and different universities.

## Chemical R&D

The development of the process to produce new alkaloids from poppy capsules developed as a result of agricultural research containing different alkaloids, the synthesis of new drug raw materials bearing a market share, studies on laboratory and pilot scale are being carried out to improve the current process and decrease production costs. These studies are implemented with the cooperation of TÜBİTAK and different universities.





# Marketing

Our products are produced in conformity with international pharmacopeias as per the requirements of TS EN ISO 9001:2008 Quality Management System and GMP (Good Manufacturing Practice), and exported to the different countries throughout the five continents.

The main marketing policy of our Foundation is based on giving the best service according to the needs and expectations of our customers and by considering the worth of the environment and humanity.

Our Foundation, which is a reliable, stable and traditional supplier, not only aims to supply good quality morphine and its derivatives to the customers but also to supply it on time. Therefore; in order to provide our customers the best service and quality with its professional understanding our Foundation does not spare any sacrifice.

The number of our customers, the countries we export our products and the quantity of our export increases year by year. We have justified pride of serving the health of the world by meeting the required quantity with our production of morphine and its derivatives for medical purpose.

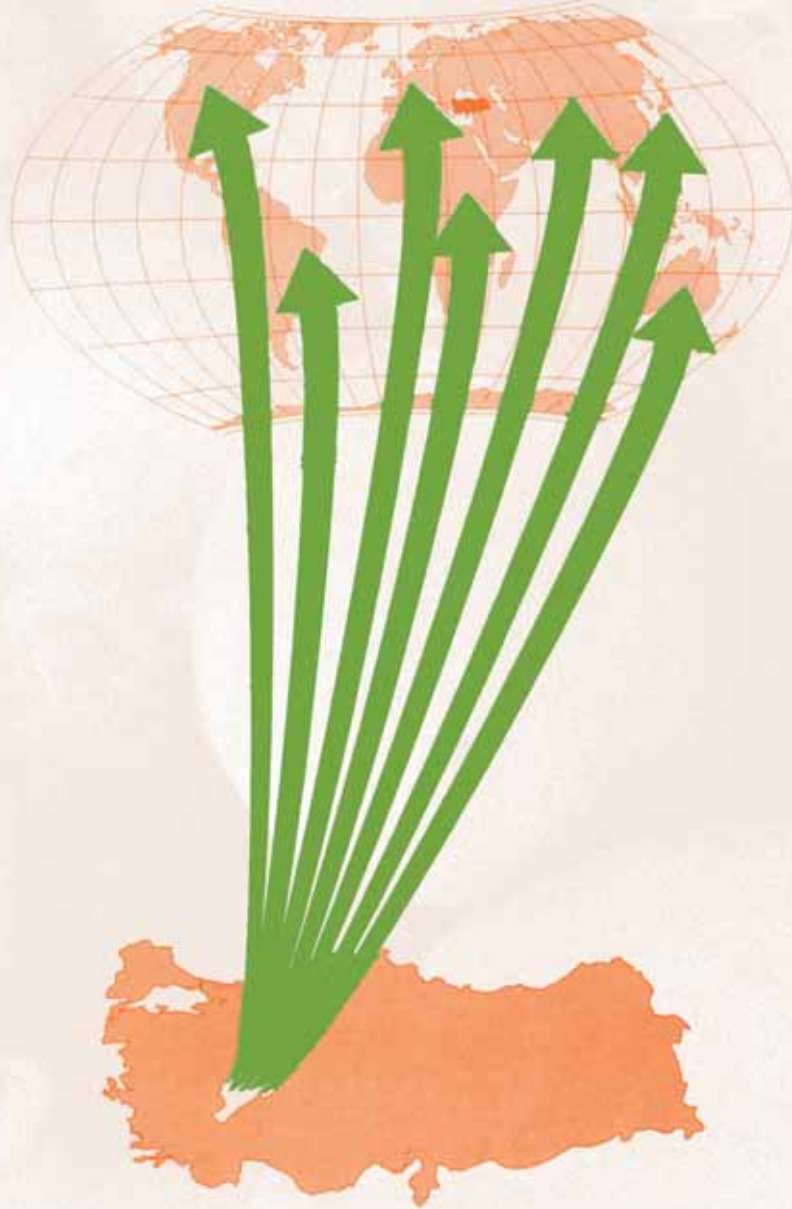
Approximately 95 % of our products are exported. The shipment of the products to be exported is made by airway within 15 days after the necessary procedures are completed. The standard packing is in 1, 5, 10, 20 and 25 kilos of plastic drums. However, specific package sizes can be used for special orders as per the customers' request.







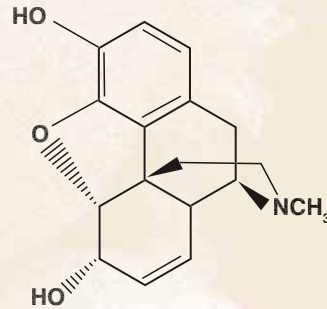
## OUR EXPORT NETWORK



**TURKEY**



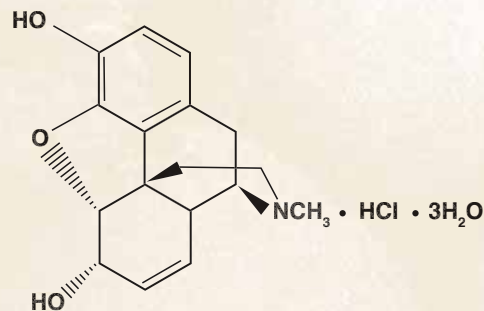
## CONCENTRATE OF POPPY STRAW



**Chemical Formula** :  $C_{17}H_{19}NO_3$   
**Molecular Weight** : 285.3  
**Chemical Name** : 7,8-didehydro-4,5α-epoxy-  
17-methylmorphinan-3,6α-diol

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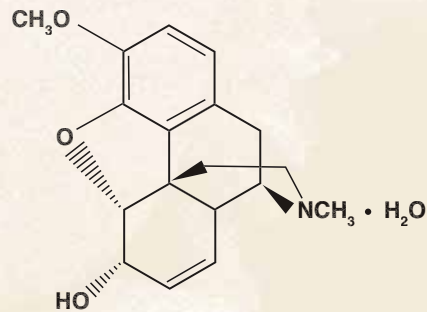
## MORPHINE HYDROCHLORIDE



**Chemical Formula** :  $C_{17}H_{20}ClNO_3 \cdot 3H_2O$   
**CAS Number** : 6055-06-7  
**Molecular Weight** : 375.8  
**Chemical Name** : 7,8-didehydro-4,5α-epoxy-  
17-methylmorphinan-3,6α-diol  
hydrochloride trihydrate  
**Quality** : EP, BP

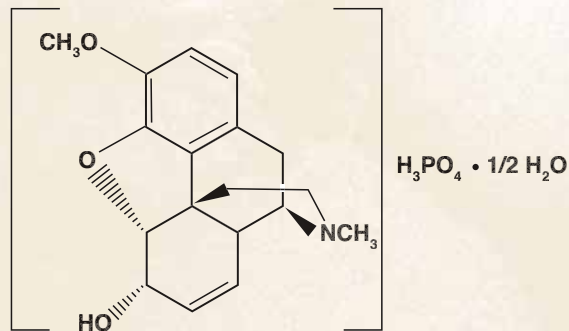


## CODEINE



<b>Chemical Formula</b>	: $C_{18}H_{21}NO_3 \cdot H_2O$
<b>CAS Number</b>	: 6059-47-8
<b>Molecular Weight</b>	: 317.4
<b>Chemical Name</b>	: 7,8-didehydro-4,5 $\alpha$ -epoxy- 3-methoxy-17-methylmorphinan- 6 $\alpha$ -ol monohydrate
<b>Quality</b>	: USP, BP, EP

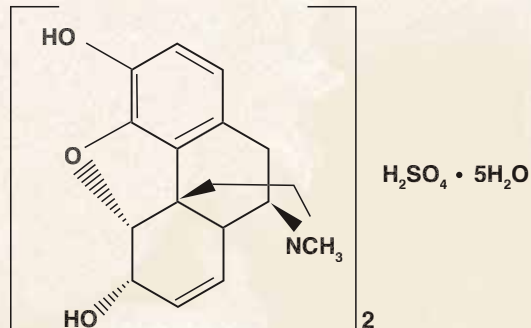
## CODEINE PHOSPHATE



<b>Chemical Formula</b>	: $C_{18}H_{24}NO_7P \cdot \frac{1}{2}H_2O$
<b>CAS Number</b>	: 41444-62-6
<b>Molecular Weight</b>	: 406.4
<b>Chemical Name</b>	: 7,8-didehydro-4,5 $\alpha$ -epoxy- 3-methoxy-17-methylmorphinan- 6 $\alpha$ -ol phosphate hemihydrate
<b>Quality</b>	: USP, BP, EP

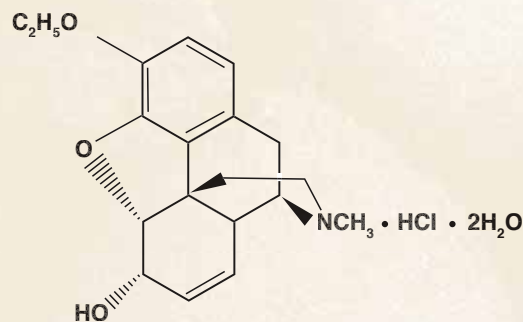


## MORPHINE SULPHATE



<b>Chemical Formula</b>	: $C_{34}H_{40}N_2O_{10} \cdot 5H_2O$
<b>CAS Number</b>	: 6211-15-0
<b>Molecular Weight</b>	: 759
<b>Chemical Name</b>	: Di (7,8-didehydro-4,5 $\alpha$ -epoxy-17-methylmorphinan-3,6 $\alpha$ -diol) sulphate pentahydrate
<b>Quality</b>	: USP, BP, EP

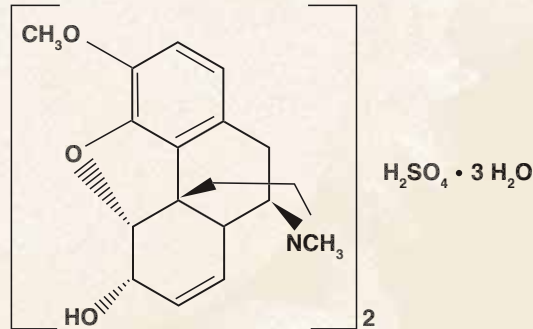
## ETHYLMORPHINE HYDROCHLORIDE (DIONINE)



<b>Chemical Formula</b>	: $C_{19}H_{24}ClNO_3 \cdot 2H_2O$
<b>CAS Number</b>	: 125-30-4
<b>Molecular Weight</b>	: 385.9
<b>Chemical Name</b>	: 7,8-didehydro-4,5 $\alpha$ -epoxy-3-ethoxy-17-methylmorphinan-6 $\alpha$ -ol hydrochloride dihydrate
<b>Quality</b>	: BP, EP

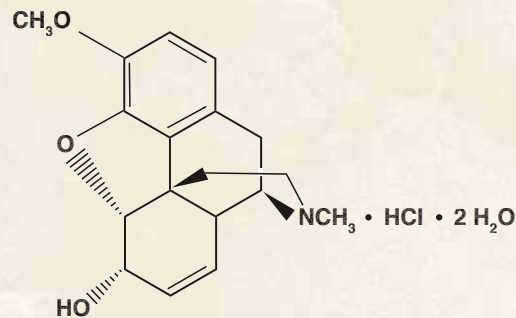


## CODEINE SULPHATE



<b>Chemical Formula</b>	: $(\text{C}_{18}\text{H}_{21}\text{NO}_3)_2\text{H}_2\text{SO}_4 \cdot 3\text{H}_2\text{O}$
<b>CAS Number</b>	: 6854-40-6
<b>Molecular Weight</b>	: 750.85
<b>Chemical Name</b>	: 7,8-didehydro-4,5 $\alpha$ -epoxy-3-methoxy-17-methylmorphinan-6 $\alpha$ -ol sulphate (2:1) (salt) trihydrate
<b>Quality</b>	: USP

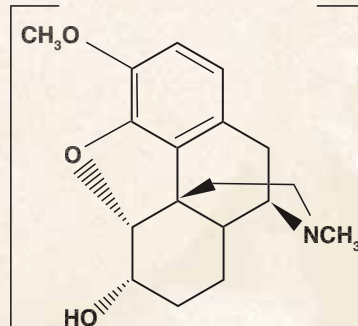
## CODEINE HYDROCHLORIDE



<b>Chemical Formula</b>	: $\text{C}_{18}\text{H}_{22}\text{ClNO}_3 \cdot 2\text{H}_2\text{O}$
<b>CAS Number</b>	: 1422-07-7
<b>Molecular Weight</b>	: 371.9
<b>Chemical Name</b>	: 7,8-didehydro-4,5 $\alpha$ -epoxy-3-methoxy-17-methylmorphinan-6 $\alpha$ -ol hydrochloride dihydrate
<b>Quality</b>	: BP, EP

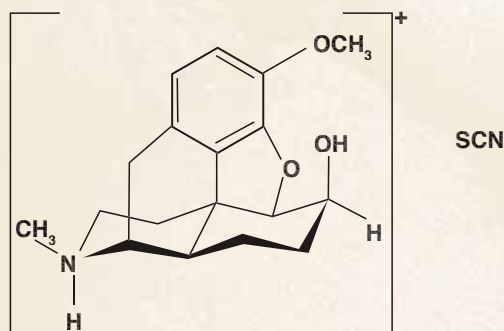


## DIHYDROCODEINE BITARTRATE



<b>Chemical Formula</b>	: $C_{18}H_{23}NO_3 \cdot C_4H_6O_6$
<b>CAS Number</b>	: 5965-13-9
<b>Molecular Weight</b>	: 451.5
<b>Chemical Name</b>	: 4,5 $\alpha$ -epoxy-3-methoxy- 17-methylmorphinan-6 $\alpha$ -ol hydrogen (2R,3R)-2,3- dihydroxybutanedioate
<b>Quality</b>	: USP, BP, EP

## DIHYDROCODEINE THIOCYANATE



<b>Chemical Formula</b>	: $C_{19}H_{24}N_2O_3S$
<b>CAS Number</b>	: 84824-87-3
<b>Molecular Weight</b>	: 360.46
<b>Chemical Name</b>	: 4,5-Alphaepoxy-3-methoxy- 17-methylmorphinan-6 $\alpha$ -ol thiocyanate





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