

## Circular Dichroism

<https://search.labfacilities.wur.nl/SearchDetail.aspx?deviceid=5824d8a7-4c5c-4318-84f4-3d36031c74e1>

### **Brand**

Jasco

### **Type**

J-715



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### **Description**

Circular dichroism (CD) is a technique that is used to obtain structural information, for example about the arrangement of peptide bonds in secondary protein structure elements like helices and sheets.

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can be used to obtain structural information, for example about the arrangement of peptide bonds in secondary protein structure elements like helices and sheets. The amount of the different secondary structure elements can be obtained by fitting a CD spectrum. Instruments for normal and stopped-flow CD are available.

### **Technical Details**

The Jasco Spectropolarimeter J-715 is a high-precision instrument for CD measurements (manual). A powerful xenon lamp combined with a double monochromator enables accurate wavelength selection in the 165 to 900 nm range. The CD apparatus contains a photo elastic modulator (PEM) that generates circularly polarized light. Furthermore, it is possible to measure fluorescence detected CD. Cells of different sizes, ranging from a path length of 0.1 mm to 10 cm, can be used in the sample chamber. The temperature of the sample is controlled by a Peltier element (from 10 to 100 °C). Data recording and analysis is performed on a PC workstation, equipped with Jasco software (version 1.52.01).

## **Applications**

A molecule shows circular dichroism (CD) when it meets two requirements: the molecule should contain a chromophore and the molecule should be chiral. These molecules, for example proteins, interact differently with left- and right-handed circularly polarized light (see figure). The difference in absorbance of the left (L)- and right-handed (R) circularly polarized light is defined as:

$$= \epsilon_L - \epsilon_R$$

In this equation,  $\epsilon_l$  and  $\epsilon_r$  are the molecular extinction coefficients for the right and left circularly polarized beams of light. The CD spectrum of a protein molecule can be used to obtain structural information, for example about the arrangement of peptide bonds in secondary structure elements like helices and sheets. The amount of the different secondary structure elements can be obtained by fitting a CD spectrum to a set of known reference spectra. Some of these fit programs are available on the web.

- N.J. Greenfield, *Analytical Biochemistry* 235, 1 (1996)
- "Circular Dichroism – Principles and Applications" (K. Nakanishi, N. Berova and R.W. Woody, eds.), VCH, New York (1994)
- "Circular Dichroism and the Conformational Analysis of Biomolecules" (G.D. Fasman, ed.), Plenum Press, New York (1996)